# 74th Indian Pharmaceutical Congress, 2025

## Intelligence. Innovation. Impact

19-21 DECEMBER 2025

74th INDIAN PHARMACEUTICAL CONGRESS

IPC

BENGALURU

19th - 21st December 2025

# ABSTRACT BOOK

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Indian Pharmaceutical Congress Association

**Hosted By**

Association of Pharmaceutical Teachers of India (APTI)

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# 74th Indian Pharmaceutical Congress, Bengaluru

Venue: **Bangalore International Exhibition Centre,**
**10th Mile, Tumkur Road, Bengaluru – 562162, India**

# ABSTRACT BOOK

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# ॥ सरस्वती वंदना ॥

या कुन्देन्दु तुषारहारधवला, या शुभ्रवस्त्रावृता
या वीणावरदण्डमण्डितकरा, या श्वेतपद्मासना।
या ब्रह्माच्युत शंकरप्रभृतिभि र्देवैः सदा वन्दिता
सा मां पातु सरस्वती भगवती, निःशेषजाड्यापहा ॥

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# Messages

# MESSAGE

**Prof. Milind J. Umekar**
President, Indian Pharmaceutical Congress Association (IPCA)
President, Association of Pharmaceutical Teachers of India (APTI)

It is with immense pleasure and great anticipation that I welcome all researchers, academicians, and industry professionals to the 74th Indian Pharmaceutical Congress (IPC), the nation's most inclusive gathering of pharmacy professionals. Hosted by the Association of Pharmaceutical Teachers of India (APTI), this gigantic event is scheduled from December 19th to 21st, 2025, at the Bangalore International Exhibition Centre (BIEC), Bengaluru. The scientific structure of the 74th IPC has been purposefully designed to address the technological evolution necessary for stakeholder advancement, encapsulated in our dynamic theme: "AI & TECHNOLOGY IN PHARMA: EDUCATE, INNOVATE, EMPOWER."

This Abstract Book stands as a definitive compilation of the cutting-edge research to be presented at the Congress, reflecting the depth and breadth of pharmaceutical innovation across India.

We are proud to acknowledge the exceptional response of more than 3300 abstracts submitted across 12 distinct areas of specialization, including Pharmaceutical Technology, Medicinal Chemistry, Pharmacognosy, Indigenous Drugs, Herbal formulations and Phytochemistry, Pharmacology and Toxicology, Clinical Research & Pharmacovigilance, Pharmaceutical Analysis and Quality Assurance, Biopharmaceutics, Pharmacokinetics & Drug Metabolism, Biotechnology and Biotherapeutics, Hospital, Community and Clinical Pharmacy, Pharmaceutical Education and Professional Pharmacy, Drug Regulatory Affairs & Pharmaceutical Management, Pharmacoeconomics and Pharmacoepidemiology, Artificial Intelligence / Bioinformatics / Data Analytics. These selected posters and oral presentations will facilitate a vital scientific discourse and knowledge exchange among learners and professionals from all domains of pharmacy across India.

The program intentionally places major emphasis on the integration of disruptive technologies within the pharmaceutical sphere. A core focus is placed on the scientific presentation and discourse surrounding Artificial Intelligence (AI) and advanced automation methodologies, examining their transformative capacity in optimizing industrial operational efficiency, expediting the drug discovery and development pipeline, and ultimately enhancing therapeutic efficacy and patient care trajectories. Dedicated symposia, plenary, and brainstorming sessions will explore innovations in medical devices, nanotechnology, and biotechnology platforms. Technical discourse will cover the synthesis, markets, and regulatory compliance of APIs, excipients, cosmeceuticals, and nutraceuticals. Concurrently, critical updates on global decisions and guidelines in pharmacovigilance, medical coding, and regulatory affairs will be provided.

My whole-hearted thanks to the IPCA Scientific Committee and the Local Scientific Team for diligently structuring these scientific themes and flawlessly executing the complex process of abstract scrutiny and error resolution. I extend my deepest gratitude to the abstract evaluation team for their tremendous expertise and time in the domain-wise scrutiny and correction process, and to the dedicated abstract book compilation team.

May this Abstract Book serve as an indispensable resource, igniting new collaborations and directing the path of pharmaceutical research. I look forward to an enriching, empowering, and fruitful 74th IPC.

Warm regards,
Dr. Milind J. Umekar
President, IPCA


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MESSAGE

## Dr. T V. Narayana
Secretary – Indian Pharmaceutical Congress Association (IPCA)

As the secretary of the Indian Pharmaceutical Congress Association (IPCA) I am delighted to convey my sincere felicitations and an enthusiastic invitation to every scientist, educator, and corporate expert gracing our presence. This summit represents the most all-encompassing assembly for pharmacy professionals nationwide.

The stage for this monumental convention, organized under the stewardship of the Association of Pharmaceutical Teachers of India (APTI), is the Bangalore International Exhibition Centre (BIEC) in Bengaluru, dated December 19th to 21st, 2025. The leitmotif guiding our proceedings is "AI & TECHNOLOGY IN PHARMA: EDUCATE, INNOVATE, EMPOWER," which highlights the essential role of technological progress in elevating all stakeholders.

We celebrate a staggering contribution of over 3500 abstracts, distributed across 12 specialized domains. This robust collection of posters and oral presentations is set to catalyze crucial scientific dialogue and intellectual exchange among the community. The Abstract Book serves as the definitive index of pioneering investigations scheduled for presentation.

A primary pillar of the agenda is the intensive study of game-changing technologies within the pharmaceutical ecosystem. We are dedicating significant attention to the scientific exploration of Artificial Intelligence (AI) and sophisticated automation techniques. The goal is to dissect their power to streamline operational efficiency in industry, accelerate the drug development process, and ultimately improve therapeutic outcomes and patient service pathways.

Furthermore, our technical sessions will meticulously address the synthesis, commercial landscape, and regulatory adherence for Active Pharmaceutical Ingredients (APIs), excipients, cosmeceuticals, and nutraceuticals. Specialized forums and sessions are slated to showcase breakthroughs in nanotechnology, medical devices, and biotechnology platforms, along with essential international regulatory and pharmacovigilance updates.

I extend my deepest appreciation to the IPCA Scientific Committee and the Local Scientific Team for their meticulous effort in designing the themes and flawlessly executing the rigorous process of abstract review. A distinct commendation is reserved for the abstract evaluation and compilation teams, whose expertise and time were indispensable to this massive undertaking.

Dr. T V. Narayana
Secretary –Indian Pharmaceutical Congress Association (IPCA)


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MESSAGE

**Prof. Vandana B. Patravale**
Scientific Convener, 74th Indian Pharmaceutical Congress, Bengaluru

It is our great pleasure to welcome all the participants of the 74th Indian Pharmaceutical Congress, Bengaluru, to be held from December 19th to 21st, 2025. This year's Congress marks a defining moment as we stand at the intersection of pharmaceutical science and transformative digital technologies and deliberate on the theme "AI & Technology in Pharma: Educate, Innovate, Empower".

The carefully curated scientific program featuring global experts discussing AI-driven drug discovery, macromolecule delivery, nanomedicine, neurotherapeutics, chemotherapeutics, ADMET prediction, PBPK modelling, medical devices development, pharmacogenomics, precision medicine, 3D printing, phytochemical screening, diagnosis, and sustainable innovation, reflects the breadth and depth of emerging opportunities shaping the future of healthcare. Additionally, lectures tailored for young researchers will focus on AI in pharmaceutical education and research, writing research proposals, and the role of AI as a teaching partner. Industry and academia experts who transformed the pharmaceutical start-up sector will also disseminate their knowledge and experiences.

As pharmacists and pharmaceutical scientists, it is our responsibility to embrace AI not as a replacement, but as a powerful ally that enhances our capability to ensure quality, safety, ethics, and excellence in every aspect of drug development and healthcare delivery.

About 3500 abstracts submitted under 12 areas of specialization have been selected for poster presentation. I urge our young researchers and students to be fearless in exploring new ideas and to fully engage with the enriching learning opportunities this Congress offers through symposia, plenary lectures, oral sessions, and interactions with innovators and thought leaders.

With immense pride, on behalf of the Scientific Services Committee, once again I welcome you all and look forward to a Congress that inspires collaboration, ignites new possibilities, and strengthens India's path toward a technologically empowered pharmaceutical future.

Prof. Vandana B. Patravale
Scientific Convener, IPC


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MESSAGE

## Dr. G. Jeyabalan,
Co-Convener,
IPCA Scientific Services Committee

It is with profound honor and a deep sense of pride that I extend my felicitations on the resounding success of the 74th Indian Pharmaceutical Congress. This distinguished gathering has once again reaffirmed the Congress as the premier forum for advancing pharmaceutical sciences, fostering innovation, and strengthening professional collaboration across the nation.

The remarkable achievements of this Congress are a testament to the unwavering dedication of the organizers, the scholarly contributions of the participants, and the collective vision of the pharmaceutical fraternity. Together, we have illuminated new pathways for research, education, and practice, thereby fortifying our commitment to the health and well-being of society.

On behalf of the IPCA Scientific Services Committee, I convey my heartfelt appreciation to all who have contributed to this historic milestone. May the spirit of scientific inquiry, professional unity, and service to humanity continue to inspire us toward ever greater accomplishments.

Thanks and regards,
Dr. G. Jeyabalan,
Co-Convener, IPCA Scientific Services Committee

## Dr. Sridhar Yeshamaina
Co-Convener
IPCA Scientific Services Committee

It gives me immense pleasure to extend a warm welcome to all delegates, researchers, academicians, industry leaders, and students to the Indian Pharmaceutical Congress (IPC) 2025.

IPC has consistently served as a premier platform for fostering scientific excellence, innovation, and collaboration within the pharmaceutical sciences. As the Scientific Co - Co-Chairman, I am delighted to present a comprehensive scientific program for IPC 2025 that reflects the evolving landscape of healthcare, drug discovery, pharmaceutical technology, regulatory sciences, and translational research.

The scientific sessions have been thoughtfully curated to encourage knowledge exchange, interdisciplinary dialogue, and meaningful engagement between academia, industry, and regulatory bodies. Eminent speakers from India and across the globe will share their insights on emerging trends, cutting-edge research, and future challenges shaping the pharmaceutical sector. I sincerely believe that IPC 2025 will not only disseminate high-quality scientific knowledge but also inspire young researchers and professionals to pursue innovation with integrity and social responsibility. I extend my appreciation to the Scientific Committee members, reviewers, speakers, and organizers for their dedicated efforts in making this congress scientifically enriching and impactful.

I look forward to your active participation and meaningful contributions toward making IPC 2025 a memorable and successful scientific congregation.

With best wishes,
Dr. Sridhar Yeshamaina,
Co-Convener, IPCA Scientific Services Committee


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MESSAGE

**Dr. T. M. Pramod Kumar**
Chairman–Oral Scientific Committee
74th Indian Pharmaceutical Congress 2025, Bengaluru

It gives me great pleasure to welcome all participants to the 74th Indian Pharmaceutical Congress 2025, held at Bengaluru from 19th to 21st December 2025. The theme, "AI & Technology in Pharma: Educate, Innovate, Empower," reflects the progressive vision of our profession as it enters a new era where technology drives transformation across education, research, and healthcare delivery.

Through its scientific sessions, the Oral Scientific Committee aims to showcase the best of contemporary research, innovative thinking, and interdisciplinary collaboration. The integration of artificial intelligence, data science, and digital technologies in pharmaceutical sciences is revolutionizing discovery, development, and patient care pathways.

As educators, researchers, and practitioners, we share the collective responsibility to harness these advancements ethically and effectively to build a healthier, technology-empowered future and align ourselves with the vision of Viksit Bharat 2047.

I extend my heartfelt appreciation to the Organizing Committee, presenters, and reviewers for their dedication to curating a meaningful and forward-looking scientific program. May this Congress serve as a catalyst for fresh ideas, enduring collaborations, and impactful innovation.

Dr. T. M. Pramod Kumar
Chairman–Oral Scientific Committee,
74th Indian Pharmaceutical Congress 2025, Bengaluru


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MESSAGE

**Dr. S. Bharat**
Chairman, Poster Scientific Committee
74th Indian Pharmaceutical Congress 2025, Bengaluru

I extend with immense pride and pleasure a warm greeting to each and every delegate to the 74th Indian Pharmaceutical Congress (IPC), to be held in IT Hub, Silicon Valley of India - Bengaluru from 19th to 21st December 2025. This year's Congress is being hosted under the prestigious ambit of the Association of Pharmaceutical Teachers of India (APTI)and the Indian Pharmaceutical Congress Association (IPCA).

The 74th IPC promises to be a landmark event with several star attractions, including the CEO and HR Conclave, Pharmathon, AI Pavilion, Pharma Expo —the first of its kind Reverse-Buyer Seller meet to empower MSMEs, drive export business and the IPC Education Expo. This Pharma Congress provides a unique forum for knowledge sharing, information exchange and professional development amongst the delegates by bringing together academicians, researchers, industrialists, practitioners, government agencies and regulatory bodies.

I am extremely happy to place on record the overwhelming response received with over 4,000 abstracts with wide specializations under pharma domain submitted from reputed pharmacy institutions across the country to global. This enthusiastic participation strongly reflects the relevance of our theme, "AI & Technology in Pharma: Educate, Innovate, Empower."

I would like to express my sincere gratitude to the Local Scientific Committee and the IPCA Scientific Services Committee for their unwavering support in completing this giant task in a stipulated short span of time. The dedicated efforts of the Abstracts Review Committee in selecting quality scientific presentations are deeply appreciated.

My heartfelt thanks to all the evaluators, student volunteers of poster sessions & editorial team of scientific abstract book, who are poised to ensure the successful completion of the scientific proceedings of the 74th IPC in Bengaluru.

Dr. Bharath Srinivasan
Professor & Dean,
Faculty of Pharmacy,
M.S. Ramaiah University of Applied Sciences,
Bengaluru


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**Dr. Rajiv Raghuvanshi**

Drugs Controller General (India)

Central Drugs Standard Control Organization (HQ), India

dci@cdsco.nic.in

Dr. Rajeev Singh Raghuvanshi currently serves as the Drugs Controller General (India) (DCGI), leading the Central Drugs Standard Control Organization (CDSCO), the apex regulatory body for pharmaceuticals and medical devices in India, under the Ministry of Health & Family Welfare. He was appointed to this pivotal role in February 2023.

A distinguished scientist with a strong background in pharmaceutical innovation, Dr. Raghuvanshi holds a Bachelor's and Master's degree from IIT-BHU and a Ph.D. from the National Institute of Immunology, New Delhi. His scientific expertise is particularly noted in dosage form design and development, including complex formulations like extended-release vaccines, and he has been instrumental in developing products for global markets. His prolific work is reflected in his intellectual property portfolio, which includes over 250 published PCT and Indian patents and 14 granted US patents, alongside numerous publications in peer-reviewed journals.

In his administrative and regulatory capacity as DCGI, Dr. Raghuvanshi is committed to safeguarding public health by ensuring the quality, safety, and efficacy of all drugs, cosmetics, and medical devices circulated in the country. He has aggressively championed the modernization of India's regulatory framework, notably pushing for rigorous Good Manufacturing Practices (GMP) compliance through initiatives like the revised implementation of Schedule M and implementing risk-based inspections. His leadership focuses on transforming India from a high-volume medicine supplier to a global leader in pharma quality and innovation, fostering a culture of self-regulation and collaboration across the pharmaceutical ecosystem, and strengthening crucial programs like the Pharmacovigilance Programme of India (PvPI).

*******

**Dr. Harish K. Jain**

National President, FOPE

Harish K. Jain is a highly influential leader in the Indian pharmaceutical sector, known for his work in industry representation, quality advocacy, and event organization. He is a key figure in both industry associations and his own manufacturing company. Mr. Jain is at the helm of Embiotic Laboratories Pvt. Ltd., a private limited company based in Bengaluru, Karnataka. He has been a Director of the company since its incorporation on August 29, 1988, demonstrating a long-standing commitment to the pharmaceutical manufacturing business. He is currently listed as a Director of the company, alongside Kantilal Vajeraj Jain and Bharat Kantilal Jain. Embiotic Laboratories is involved in manufacturing pharmaceutical formulations. He was appointed as the National President of FOPE for a two-year term, taking over from Mr Vinod Kalani in June 2023. His presidency was centred on resolving the Indian pharma industry's growth and marketing challenges, with a strong emphasis on promoting continuous quality improvement as a self-regulatory initiative. He aims to enhance the sector's quality perception globally and provide value to members, particularly Micro, Small, and Medium Enterprises (MSMEs). He is the President of, Karnataka Drug and Pharmaceutical Manufacturers Association (KDPMA). He actively advocates for strengthening industry-academia collaboration to foster an innovation-led ecosystem in India, noting that while the country holds a large share of the global pharmaceutical market by volume, it represents a smaller value by revenue. Throughout his leadership roles, Mr. Jain has


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been a vocal proponent for Quality and Compliance, Regulatory Implementation and Technological Adoption.

********

**Dr Annam Visala**

Joint Drugs Controller General (India)

Dr Annam Visala is a prominent figure in India's regulatory framework, currently serving as Joint Drugs Controller (India) (JDC(I)) at the Central Drugs Standard Control Organisation (CDSCO), New Delhi. Her professional journey in drug regulation spans over 21 years with the government. She holds an M. Pharm and a PhD in Pharmaceutical Sciences, demonstrating a strong academic foundation. She was promoted to the rank of JDC(I) effective March 26, 2024, following a UPSC reference, having previously served as a Deputy Drugs Controller (India) (DDC(I)) since September 5, 2012. Her extensive experience includes working with the Drugs Control Administration (DCA) of Telangana and Andhra Pradesh as a Drugs Inspector and Assistant Director, and heading the CDSCO Zonal Office in Hyderabad from 2017 to 2022. In her current capacity at the CDSCO headquarters, she plays a crucial role in overseeing divisions related to Investigational New Drugs (INDs), New Drug Applications (NDAs), and complex biologics, including recombinant products and advanced Cell and Gene Therapy Products (ATMPs). Her key contributions and policy advocacy focus on Regulatory Modernisation, Parallel Review Systems, the 3Rs Principle, and Orphan Drugs. Her work emphasises aligning India's regulatory ecosystem with global standards, leveraging technology like AI and data analytics for enhanced efficiency and patient safety, and fostering an innovation-led environment, particularly in advanced therapy medicinal products.

********

**Shri Sudarshan Jain**

Secretary General,

Indian Pharmaceutical Alliance (IPA), India

Mr. Sudarshan Jain has a strong passion for business, healthcare policy and the education sector. He is currently the Secretary General of the Indian Pharmaceutical Alliance (IPA) and the Chairman of the Indian Institute of Health Management and Research (IIHMR), Jaipur. He is an Advisor at EQT Group, a global investment organization and a Board Member of Abbott India, Sunshine Holdings PLC and various educational institutions.

He serves on the Drugs Technology Advisory Board and the Advisory Committee of the Biotechnology Ignition Grant (BIG), Government of India. He is also a Visiting Faculty member at the Indian Institute of Management Ahmedabad (IIM A) and a Certified Executive Coach from the Coaching Foundation of India.

Mr. Sudarshan Jain has a rich healthcare business experience of over 45 years and has contributed to shaping healthcare policy and improving access to healthcare in India. He has held several leadership positions in Abbott, J&J, Boots and leading Indian companies and last served as the Managing Director at Abbott Healthcare Solutions. His experience spans across Pharmaceutical, OTC, Hospital, Diagnostic and Nutrition businesses. He has been associated with over 30 brands which are among the top 300 in the Indian pharmaceutical market. He also served as Chairman of the Life Sciences Skill Sector Development Council (LSSSDC) of India under the Ministry of Skill Development & Entrepreneurship. He has been the Chair of International Generic and Biosimilar Medicines Association (IGBA) 2021. Till recently, he was associated with APAX partners as Seniors Advisor and also the board member of Healthium. Sudarshan is the first Indian recipient of the Global Chairman's Award at Abbott.


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He is an alumnus of St. Stephens College, Delhi and Indian Institute of Management, Ahmedabad (IIM A).

********

**Shri Mehul Shah**

CMD, Encube Ethicals

Mehul Shah, the Promoter & Managing Director of Encube Ethicals, has significantly contributed to the pharmaceutical industry, particularly in the topical drug development and manufacturing sector. With a career that started in 1986, at a stipend of ₹ 250 per month at his first job as a manufacturing pharmacist, to propelling Encube Ethicals to the position of a global leader within the topical landscape, this was a journey filled with perseverance and agility. Under his guidance, Encube Ethicals has excelled in delivering innovation, quality, and operational excellence. Mehul Shah's strategy emphasizes flexibility and specialization in contract manufacturing, setting Encube apart in its capacity to manage diverse projects with efficiency and precision. Since its inception in 1998, Mehul Shah has steered Encube through the dynamic changes in the pharmaceutical manufacturing sector. The journey from facing early skepticism to earning international acclaim has marked a significant evolution of the 'Made in India' brand in the global market. Encube's collaborations with leading dermatology companies underline its dedication to consumer care and commitment to quality and innovation. Encube's manufacturing prowess, highlighted by Mehul Shah's strategic direction, showcases one of the largest manufacturing plants for topical dosage forms, with a strong presence in Goa and expansion into Madhya Pradesh. Additionally, the emphasis on research and development (R&D) has been pivotal, with a Centre of Excellence in India R&D and the US dedicated to advanced drug delivery systems. Mehul Shah's focus on quality and regulatory compliance has solidified Encube's reputation as a reliable partner in the pharmaceutical industry. The company's adherence to global quality standards and regulatory requirements, as evidenced by accreditations from leading agencies such as the US FDA, Japan PMDA and others, reflects his vision for Encube to set a gold standard in pharmaceutical manufacturing. He was awarded as "Emerging Entrepreneur of the Year" at Indian Pharma Awards 2015. He serves as Honorary secretary of IDMA.

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**Dr. Ranjana Pathak**

President

Global Chief Quality Officer,

Lupin, USA

A seasoned pharmaceutical professional with more than three decades of global experience, Ranjana brings comprehensive expertise in quality and related functions. She oversees Lupin's global quality function. Ranjana has joined Lupin after Dr. Reddy's, where she was the Global Head for Quality and Pharmacovigilance. She was a member of the Dr. Reddy's Management Council and under her leadership, the company delivered several positive outcomes. Before Dr. Reddy's, she has held leadership positions in several branded and generic pharmaceutical companies such as Cipla, Actavis, Endo, Zenith Goldline and Thames Pharmacal. Ranjana has a Doctorate in Health Administration from the University of Phoenix, USA, an MBA from Dowling College, New York, a Post-Graduate Diploma in Pharmaceutical & Chemical Analysis from Sophia College, Mumbai, and a B.Sc. (Hons) in Chemistry from Mithibai College, Mumbai. She has received training in leadership in pharmaceuticals and biologics at Harvard University.

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ISBN: 978-81-980623-8-3

**Shri. Namit Joshi**

Chairman,

Pharmexcil

Shri. Namit Joshi is the current Chairman of the Pharmaceuticals Export Promotion Council of India (PHARMEXCIL), having assumed the role on December 23, 2024, after two years as Vice Chairman. In his professional capacity, Mr. Joshi serves as the Commercial Director for East (Asia and Africa) at Centrient Pharmaceuticals. He is a seasoned professional with nearly 30 years of extensive experience across the healthcare and pharmaceutical sectors, encompassing diagnostics, biologics, retail pharmacies, and healthcare media, having worked with prominent companies such as Roche Diagnostics and Nicholas Piramal. Academically, he holds a Master's in Organic Chemistry from Rohilkhand University and a Post Graduate Diploma in International Business Strategy from the Indian Institute of Foreign Trade. As Chairman, Mr. Joshi focuses on strategic initiatives including promoting formulation exports, advocating for responsible manufacturing to address antimicrobial resistance (AMR), strengthening international trade relations through agreements like CEPA, and offering expert guidance to PHARMEXCIL members on Foreign Trade Policy and compliance matters.

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**Dr Ravleen Singh Khurana**

Chief Executive Officer,

Nitika Pharmaceuticals

The life of smiling Sikh Ravleen Singh Khurana, managing director of self-owned Nitika Pharmaceutical Specialities Pvt Ltd, revolves around happiness and health. Forty-four-year-old Khurana's favourite thing is the 'Smiley Ball' that reflects his philosophy of always smiling. It is even part of the logo of his company. His deep humility masks the meteoric rise of his enterprise that now has an annual turnover of almost Rs 40 crore from a humble beginning with just Rs 1.85 lakh in 1993-94. His company, which makes pharmaceutical excipients in Pilli Nadi Industrial Area, boasts a 200% annual growth. Turning entrepreneur at 19, even before securing his degree in Bachelor of Pharmaceuticals from Nagpur University, Khurana had named his company after his niece, who was the only daughter in the family when it was launched. With no experience or financial backing and only his education to rely on, Khurana made an almost impossible leap into the world of entrepreneurship. Khurana's passion for doing something of his own was so strong that he did not even enrol in IIT, for which he was selected with 95% marks. A giant now, Nitika Pharma, has grabbed global attention as a pioneer in manufacturing pharmaceutical excipients or inactive ingredients in tablets, capsules and such drugs. It has an export network spread over 90 countries. Khurana said his company was the first in Asia and second in the world to file a Drug Master File (DMF) with the US Food and Drug Administration for Magnesium stearate (sold under the brand name of Tablube), which is used as an anti-adherent in medicinal tablets and capsules during manufacturing and storage. "Initially, no one was ready to buy Nitika's products as it was not a well-known company. After my visit to the US in 2000, we started getting business from abroad, and now one in every


ISBN: 978-81-980623-8-3

10 tablets or capsules in the world uses our product," said Khurana. The entrepreneur was conferred the 'Business gaurav award' in 2012 by Don and Broadstreet and Axis Bank from a field of almost a lakh other Small and Middle Enterprises (SME). The company was also selected as 'Leading SME of India -2014' by Don and Broadstreets and The Times of India. Adopted as a 'son' by his grandparents, Bhagat Singh and Rajendra Kaur, Khurana now wishes to contribute to the growth of the city by turning it into a pharmaceutical hub in collaboration with Vidarbha Drug Manufacturing Association. "We have taken up the task of making Nagpur a pharmaceutical hub and are pursuing it with senior ministers of the Union and state. Once the city is so declared, the companies here would get relief from excise, VAT, income tax and other facilities," he said. Khurana is also part of an NGO, Vision Next and has taken up the issue of the development of Pilli Nadi Industrial Area with ex-mayor Anil Sole and a budgetary allocation of Rs 5 crore was made for this cause by the government due to his efforts. It was determined resistance of Khurana and his group that saved the NIT swimming pool on North Ambazari road from the verge of closure. Whether in business or social work, Khurana is never out of his wits or spirituality. He says "Hanste raho (Keep Smiling)" is the best way to enjoy life.

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**Dr Gaurav Pratap Singh**

Senior Principal Scientist,

Indian Pharmacopoeia Commission

Dr Gaurav Pratap Singh is a highly qualified Principal Scientific Officer at the Indian Pharmacopoeia Commission (IPC) in Ghaziabad, where his tenure spans over nine years and four months, starting in September 2016. Holding a PhD in Biotechnology from the National JALMA Institute for Leprosy and Other Mycobacterial Diseases (2003-2008) and an M.Sc. in Biotechnology from Dr B. R. Ambedkar University, Dr Singh has established a robust career in specialised microbiology and pharmaceutical regulatory science. He began his professional life as a Lecturer and a Senior Microbiologist at the Stanley Browne Laboratory, The Leprosy Mission, before spending a pivotal six and a half years as a Scientist at the National Institute of Biologicals (NIB) in Noida (2010-2016), focusing on the quality control and standardisation of biological products. At the IPC, he advanced from Senior Scientific Officer to his current senior role, where he is responsible for guiding scientific teams, drafting and revising the quality standards published in the Indian Pharmacopoeia, and ensuring the national drug quality benchmarks remain current and globally aligned.

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**Dr. T.V. Narayana**

President

SEAR Pharma Forum

Dr. T.V. Narayana completed his B. Pharm, M. Pharm, M. Phil and PhD from Andhra University, India and working as Director of Vikas Institute of Pharmaceutical Sciences, Rajahmundry, Andhra Pradesh. He has 25 years of experience in the field of pharmacy and has been instrumental in uplifting the profession, particularly in pharmacy education in India. At present, he is Vice-President of The Indian Pharmaceutical Association, Mumbai and Chairman of IPA Education Division. He has been bestowed the honor of IPA fellowship in 2004 for his outstanding contribution. He has initiated the IPA Student forum and organized 4 National Level Student Congresses and 125 workshops throughout the country for the benefit of pharmacy students. His efforts and hard work motivated many pharmacy students throughout the country and


ISBN: 978-81-980623-8-3

resulted in the enrollment of nearly 5000 student pharmacists in IPA. He is responsible for creating the largest network of Indian pharmacy students throughout the country. He has organized 45 QIP Programmes to pharmacy teachers and 25 Continuing Education Programmes for Community and Hospital Pharmacists throughout the country. He is Core Committee Member of the Indian Host Committee of the recently held FIP world Congress at Hyderabad in 2011 and Joint Secretary of the 63rd Indian Pharmaceutical Congress. He was a LOC Secretary for 68th IPC at Visakhapatnam. He is member of Pharmacy Council of India (PCI), a statutory body which regulates the pharmacy profession in India. He is active member of professional pharmacy and pharmacy Ethics Committee of PCI, New Delhi. He is the Hon. Gen. Secretary of Indian Pharmaceutical Congress Association (IPCA). He is member of FIP since 2004 and has been attending the world congress of FIP since 2002. He has motivated and led the Indian pharmacists to FIP Congresses held at Egypt, China, Basel, Istanbul and Lisbon. He has attended the Global Pharma Education Task Force meetings as official representative of IPA and promoted the ongoing projects of FIP in India. He is successful in promoting the FIP objectives in India and instrumental in framing the guidelines to suit the local needs. He has been honored with many awards to his career including the Eminent Pharmacist and Fellowship of IPA for his outstanding service and contribution to the pharmacy profession. He has guided more than 1500 students to mould their career as community pharmacists throughout the country.

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**Dr. B. Suresh**

Pro-Chancellor,

JSS AHER;

Former President,

PCI, India

Dr. Suresh Bhojraj is an eminent academic leader, visionary institution builder, and global advocate for quality, ethics, and innovation in pharmacy and higher education. With a distinguished career spanning over four decades, he has been instrumental in shaping the future of health sciences education and research in India and abroad. He currently serves as the Pro-Chancellor of JSS Academy of Higher Education & Research (JSS AHER), Mysuru, Karnataka, JSS University, Noida, Uttar Pradesh, and the Director of the Technical Education Division of JSS Mahavidyapeetha, Mysuru — one of India's largest educational networks. Under his strategic leadership, JSS institutions have emerged as centers of excellence in multidisciplinary education, research, and innovation, with a global presence across Mauritius, Dubai, and the United States. A former President of the Pharmacy Council of India (PCI), Dr. Suresh played a transformative role in modernizing pharmacy education and regulation. He was the driving force behind the introduction of the Doctor of Pharmacy (Pharm.D.) program in India — a milestone that integrated clinical pharmacy into the nation's healthcare system. His leadership redefined the academic and professional landscape of pharmacy education, aligning it with international standards and patient-centric practice. On the global stage, Dr. Suresh has served with the U.S. Pharmacopeia (USP) and worked closely with the Accreditation Council for Pharmacy Education (ACPE), contributing to global educational reforms, harmonization of standards, and capacity-building across continents. His thought leadership has earned him recognition as a key voice in advancing pharmaceutical quality, regulatory science, and professional ethics. He has been a member and advisor to several national and international scientific bodies, steering initiatives in research, innovation, and policy development. His dynamic vision has led to the establishment of Centers of Excellence in frontier areas such as space technology applications, artificial intelligence, molecular modeling, quantum computing, and EV mobility, through collaborations with ISRO, DRDO, DST, DBT, and global universities. Dr. Suresh is a mentor to a generation of educators, researchers, and health professionals, known for his transformative leadership


ISBN: 978-81-980623-8-3

philosophy — "From Healer to Leader." His approach blends science and spirituality, fostering leadership rooted in compassion, purpose, and service. An inspiring orator and author, he is frequently invited to speak at national and international forums, where he articulates his vision for a world where education, innovation, and ethics converge to serve humanity.

Dr. Suresh Bhojraj continues to inspire a global movement in healthcare education — empowering the next generation of professionals to lead with knowledge, humility, and vision.

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**Mr. Jagannath Shinde**

President

All India Organization of Chemists and Druggists

Jagannath Shinde serves as the long-standing President of the All India Organisation of Chemists and Druggists (AIOCD), where he represents and advocates for the welfare of the vast network of chemists and druggists across India. Known widely in the sector as "Appa," he is recognized as a key visionary leader dedicated to streamlining the distribution of economical healthcare products throughout the nation. In addition to his primary leadership role at the AIOCD, Mr. Shinde also holds the position of Chairman for AIOCD Pharma Limited—an initiative aimed at establishing a robust, world-class pharmaceutical logistics and supply chain network. He further extends his influence as the Chairman of the Maharashtra State Chemists and Druggists Association (MSCDA) Ltd. and the President of the Shiv Niketan Trust, actively working to guide the industry's future and address critical sectoral challenges.

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**Mr. Atul Ahire**

President

Maharashtra State Pharmacy Council (MSPC)

Mr. Atul Ahire currently holds the distinguished position of President of the Maharashtra State Pharmacy Council (MSPC), a leadership role he assumed in August 2023, focusing on the professional development and regulatory compliance of pharmacists within the state. A registered pharmacist with a Bachelor of Pharmacy (B. Pharm.) degree earned in 2000, he also possesses a strong entrepreneurial background in the pharmaceutical sector. Since 2013, Mr. Ahire has served as a Director at Raksha Life Sciences Pvt. Ltd., which specializes in basic chemical manufacturing, and he operates a retail pharmacy connected to a hospital facility in Nashik. He is actively involved in advocating for the pharmacy profession and streamlining regulatory processes, such as simplifying Adverse Drug Reaction (ADR) reporting mechanisms for practicing pharmacists.

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**Karunakar (Karu) Sukuru**

Global Vice President-Pharma Product Development

& Head-Scientific Advisory, Pharma and Consumer Health

Catalent Pharma Solutions, USA

karunakar.sukuru@catalent.com

Karunakar Sukuru is a distinguished leader in the pharmaceutical industry, with over three decades of expertise in Drug Product and Technology Development. At Catalent,


ISBN: 978-81-980623-8-3

he oversees the development of small molecule Rx products, guiding a team of over 800 scientists across 14 sites on four continents. His role involves managing a robust pipeline of several new molecules, utilizing diverse drug delivery technologies to support successful product launches. Karunakar has a proven track record in product development and technical oversight of numerous Contract Development and Manufacturing Organizations (CDMOs) globally. He is renowned for pioneering innovative controlled-release platform technologies in softgel dosage forms. He holds several granted patents and has over 20 pending patent applications, particularly in modified shell, fill technologies and lyophilization techniques for biologic products. Before joining Catalent in 2016, Karunakar held key positions at Endo Pharmaceuticals, Banner Pharmacaps (in India and USA), and Natco Pharma in India, demonstrating his extensive leadership in the field. He is actively involved in professional organizations, including the American Association of Pharmaceutical Scientists (AAPS), Controlled Release Society (CRS), Society for Pharmaceutical Dissolution Science (SPDS), and serves as an expert committee member at the United States Pharmacopeia (USP), for the last 10 years where he contributes to setting pharmaceutical standards. Karunakar obtained his M.Pharm., Ph.D., in Pharmaceutical Technology from Indian Institute of Technology, Banaras Hindu University, India and his B.Pharm. from Gulburga University, India. He is also a registered Pharmacist (R.Ph.) in Delaware, USA.

**Topic: Challenges and Opportunities in Oral Delivery of Macromolecules in the AI Era**

Oral delivery of macromolecules remains one of the greatest challenges in pharmaceutical development. Enzymatic degradation, limited permeability, and instability under gastrointestinal conditions restrict the success of traditional approaches. Advances in enabling technologies such as lipid based formulation in softgel systems in combination with delayed release shell and lymphatic delivery have expanded formulation possibilities, allowing delivery through modified GI routes that improve bioavailability and patient compliance. Additionally, artificial intelligence is becoming a valuable tool in formulation and manufacturing, with data-driven models identifying correlations between excipient properties, processes, and product performance. This presentation examines the scientific barriers to oral macromolecule delivery, compares formulation and manufacturing learnings from fast-dissolve and softgel systems, and explores how AI-supported analytics can enhance development predictability, process robustness, and time-to-clinic.

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**Twan Lammers**

Chair of Experimental Molecular Imaging; Full professor of medicine

Dept. of Nanomedicine and Theranostics, Institute for Experimental Molecular Imaging, RWTH Aachen University Clinic, Center for Biohybrid Medical Systems, Germany

Twan Lammers obtained a D.Sc. in Radiation Oncology from Heidelberg University in 2008 and a Ph.D. in Pharmaceutical Technology from Utrecht University in 2009. In the same year, he started the Nanomedicine and Theranostics group at RWTH Aachen University. In 2014, he was promoted to full professor of medicine at RWTH Aachen University Clinic. His group aims to individualize and improve disease treatment by combining drug targeting with imaging. To this end, image-guided (theranostic) drug delivery systems are being developed, as well as materials and methods to monitor tumor growth, angiogenesis, inflammation, fibrosis and metastasis. He has received multiple scholarships and awards, including ERC starting, consolidator and proof-of-concept grants, the CRS Young Investigator and Exceptional Leadership Awards, the Adritelf


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International Award, the Belgian Society for Pharmaceutical Sciences International Award, and the JNB Trailblazer Award. He was president of the Controlled Release Society in 2023-2024 and currently serves as secretary of the European Society for Molecular Imaging. He is a member of the editorial board of 10 journals, and acts as associate editor for JCR, DDTR and MIB. Since 2019, he is included in the Clarivate Analytics list of Highly Cited Researchers.

**Topic: Artificial intelligence and advanced imaging technologies to improve cancer nanomedicine clinical performance**

Nanomedicines are extensively used for cancer therapy. By delivering drug molecules more effectively and more selectively to pathological sites, they assist in improving the balance between drug efficacy and toxicity. The tumor accumulation of nanomedicines is traditionally ascribed to the EPR effect, which is highly variable, both in animal models and in patients. To address issues associated with EPR heterogeneity, and to facilitate cancer nanomedicine clinical translation, we are working on artificial intelligence tools and advanced combination ther-apy technologies to predict, monitor and modulate tumor-targeted drug delivery. In the present lecture, several of these strategies will be highlighted, including machine learning-optimized ultrasound interventions to image and prime the tumor microenvironment, and the use of gradient tree boosting-based tissue biomarkers to pre-select tumors and patients likely to respond to cancer nanotherapies. ltogether, our work aims to establish ra-tional and realistic ways forward towards improving the clinical impact of cancer nanomedicines.

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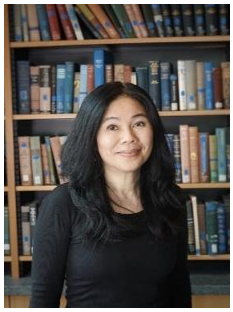
**Joanne Chun, PharmD, PhD**

Director, Postgraduate Education Programs, Dean's Office, School of Pharmacy; Director, MS in AI and Computational Drug Discovery and Development (AICD3)



Bioengineering and Therapeutic Sciences, Schools of Pharmacy and Medicine, UCSF, CA, USA

Joanne.Chun@ucsf.edu

Dr. Joanne Chun, PharmD, PhD, is a faculty member in the Department of Bioengineering and Therapeutic Sciences at UCSF and the founding architect and Director of the Master of Science in Artificial Intelligence and Computational Drug Discovery and Development (AICD3) program. This first-of-its-kind program in the United States trains students to apply AI, machine learning, and advanced computational methods across the entire drug discovery and development spectrum. Dr. Chun also serves as Director of Postgraduate Education Programs, leading the design of innovative academic offerings that integrate cutting-edge research and technology into education. Her research interests include pharmacogenomics, pharmacokinetics/pharmacodynamics, precision medicine, cancer biology, and AI-driven computational methods for drug discovery and development. Dr. Chun earned both her PharmD and PhD at UCSF and completed a full-stack software engineering certification at UC Berkeley.

**Topic: AI in Pharmaceutical Education: Preparing the Next Generation for a Technology-Driven Future**

Artificial Intelligence (AI) is reshaping pharmaceutical sciences across drug discovery, development, and patient care. Preparing the next generation to lead in this transformation requires innovative educational models that integrate computational and data-driven skills with pharmaceutical training. This talk will highlight the design and impact of the UCSF Master of Science in Artificial Intelligence and Computational Drug Discovery and Development (AICD3) program — the first of its kind in the United States — and share strategies to equip students with the competencies needed to thrive in a technology-driven pharmaceutical future.

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ISBN: 978-81-980623-8-3

**Professor Mahendra G Patel OBE**

Director, Centre for Research Equity

University of Oxford

A UK-wide pharmacy luminary and health equity advocate.

Mahendra played a leading role in landmark primary care COVID-19 trials, driving inclusive recruitment strategies that shaped policy nationally and internationally.

A Founding Director of the Centre for Research Equity at Oxford, he champions community-engaged research — showcased at the WHO and UN. Under his leadership, the Centre has built groundbreaking partnerships with Wales and Northern Ireland's governmental R&D departments supporting inclusive research and health equity.

Mahendra co-leads NIHR's Race Equity Incubator and is professional advisor to England's Chief Pharmaceutical Officer on inclusive practice and health inequalities. He is a member of the BMJ Commission on the Future of the NHS, and the UK Pharmacy Professional Leadership Advisory Board in helping create a Royal College of Pharmacy.

Honoured with an OBE and the RCGP's highest award for a non-GP, he continues to bridge disciplines and drive systemic change. Also, named among HSJ's 50 most influential black, Asian and minority ethnic healthcare professionals.

**Topic: Transforming Community Pharmacy: The NHS Pharmacy First Model and the Expansion of Clinical Practice in the United Kingdom**

Community pharmacy in the United Kingdom is undergoing a profound transformation, moving beyond traditional dispensing functions into a dynamic landscape of patient-centred clinical care. This presentation will showcase the development, implementation, and early impact of Pharmacy First, a nationally commissioned service designed to position community pharmacists as the first point of contact for a range of common and minor conditions.

Across the UK, minor ailment services have been part of community pharmacy practice for nearly two decades; however, national commissioning accelerated their scale and consistency—beginning in Wales (2016), followed by Scotland (2020), and most recently England (2024). These services enable patients to access timely, effective care for conditions that would otherwise burden general practice and urgent care pathways.

A major catalyst for this evolution is the expansion of pharmacist prescribing. From 2026 onward, all newly qualified pharmacists in Great Britain will be independent prescribers at the point of registration, marking a significant shift in workforce capability and patient care potential. This presentation will highlight emerging qualitative findings from our research on prescribing implementation within community pharmacy, exploring pharmacist readiness, operational challenges, professional identity, and the implications for interprofessional collaboration.

We will present initial results from the ongoing national evaluation of the Pharmacy First service in England, including insights into patient experience, clinical outcomes, and the capacity of community pharmacies to safely and effectively deliver frontline clinical care. By sharing the UK's journey toward a more autonomous and clinically driven pharmacy profession, this session aims to inspire and inform colleagues in India.

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**M. Raj Rajasekaran, Ph. D**

Professor of Urology; Research Pharmacologist

UCSD; VA San Diego Healthcare System, CA, USA


ISBN: 978-81-980623-8-3

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Dr. Rajasekaran is a Pharmacologist by training and he joined UCSD Urology in 1998. He has initially focused his research on urological disorders and established animal models for urinary continence function studies. He moved to Gastroenterology in 2006 and focused his research on pelvic floor muscle physiology in collaboration with Dr. Ravinder Mittal. His current areas of research include development of animal models for anal and urinary sphincter function, mechanism of skeletal muscle injury & repair and evaluation of novel pharmacological interventional agents for muscle regeneration. His current research is supported by funding from Veterans Health Administration Research & Development and American Society of Colon & Rectal Surgeons Research Foundation. As an accomplished Pharmacology Scientist for over 20 years, Dr. Rajasekaran has received national and international recognition for research. This includes prestigious awards, such as, the Uvnas prize for best publication in Immunopharmacology, and a national scholar award from the American Urological Association. As an academic researcher, he has also served as principal/co-investigator of industry funded projects working with Medicinova, Myogen, Actelion Pharmaceuticals, Vivus Inc, cook Urological and Pharmacia & Upjohn. Dr. Rajasekaran has authored over 50 articles in these areas, which have been published in journals including American Journal of Physiology, Diseases of Colon & Rectum, The Journal of Urology, Urology, the Journal of Andrology, and the International Journal of Andrology

**Topic: Engineered Silk Fibroin Hydrogels as a Controlled Release Platform for Sustained Antifibrotic Therapy: Targeting Biochemical and Biomechanical Modulation of Fibrosis in Multidimensional in vitro Models**

This invited lecture will present recent progress in our laboratory on the development of advanced biomaterials for antifibrotic therapy, focusing on an enzyme-responsive, sustained-release hydrogel system for the prevention of recurrent fibrosis. Fibroproliferative diseases, arising from dysregulated wound healing and aberrant tissue remodeling, are major contributors to organ failure and account for nearly 45% of global mortality. Current antifibrotic drugs, such as pirfenidone, have limited efficacy due to pharmacokinetic constraints and incomplete inhibition of fibroblast activity, resulting in persistent fibrosis and high recurrence rates, particularly in urethral tissues. To address these challenges, our laboratory has engineered an in situ injectable silk fibroin-based hydrogel incorporating pirfenidone within a cell-adhesion inhibiting polymer matrix. This hydrogel mimics native tissue stiffness (~5 kPa), discourages fibroblast proliferation, and provides sustained, enzyme-triggered drug release synchronized with disease progression. The system demonstrated significant antifibrotic efficacy in fibroblast and urothelial cell models, as well as in 3D urothelial spheroids, effectively reducing fibroblast hyperproliferation, reactive oxygen species, and the expression of collagen I and α-SMA.

It also blocked epithelial–mesenchymal transition, lowered fibrotic cell stiffness, and restored mitochondrial function, evidenced by a ~40% improvement in maximal respiration. This lecture will discuss how our enzyme-responsive hydrogel integrates biochemical and biomechanical regulation to inhibit extracellular matrix accumulation, suppress EMT, and normalize cellular mechanotransduction, offering a next-generation therapeutic strategy for preventing recurrent fibrosis and promoting tissue regeneration.

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**Ranjit Barshikar**

CEO, QbD International, India

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With a distinguished career spanning 54 years, Dr. Barshikar has amassed rich and


ISBN: 978-81-980623-8-3

varied experience in the pharmaceutical industry, particularly in Quality Management, R&D, Manufacturing, Regulatory affairs, and compliance with US FDA, EU, WHO, and other global standards. His major honors include the "Quality Champion – Gold" award, the highest quality award conferred by the Government of India through the Quality Council of India; "Lifetime Achievement" Awards from the International UNICEF Council (USA) and Eminence Business Media – Global Eminence Venture Group; and recognition as one of the "100 Most Impactful Healthcare Leaders – Global" by the World Health Congress / Economic Times. He has served as a Jury member for the Economic Times ET Healthcare Awards 2022, ET Now DataCon 2024, and TechNext 2025. Currently, he is the CEO of QbD International (Quality by Design / cGMP Consulting for Bio-Pharma and Pharma), a United Nations–MPP Geneva Advisor, and a member of the Editorial Board of the Journal of Generic Medicines, England. He is an expert in Artificial Intelligence applications in Pharma 4.0, ML, DL, quality data and automation, Quality by Design, data integrity, CAPA, quality culture, validations, continuous manufacturing, PAT, regulatory affairs, and multiple other cGMP subjects, and is an expert auditor of formulation (sterile and non-sterile) and API facilities. His global experience includes working as a Quality Expert with the World Bank, Washington DC, and collaborating with the Saudi Arabia FDA to develop regulations and train SFDA inspectors on behalf of the World Bank. He has delivered over 500 presentations worldwide as a Chairman, Keynote Speaker, or Speaker at conferences organized by ISPE FDA, Marcus-Evans, IQPC, IPC, CBI (USA), WHO, ISO, UNOPS, Government of India, CPHI, multiple state FDAs, and universities, and has addressed 164 webinars and conference talks since 2020 on COVID-19 and diverse pharmaceutical topics. His articles and interviews have been published in leading international journals and platforms such as Pharmaceutical Manufacturing (USA), Pharmaceutical Technology (Europe and Asia), Express Pharma, WHO ResearchGate, Journal of Generic Medicines (UK), and Hindustan Times. Earlier in his career, he worked with Pfizer Ltd., Ranbaxy Labs, Lyka Labs, and Cancer Research Mumbai, and retired in 2006 as Global Quality Head / Vice President.

**Topic: AI applications in Pharma Industry**

Emerging technologies like Artificial Intelligence (AI), Machine Learning (ML) & Robotic Process Automation (RPA) have revolutionized the pharma industry. These technologies are very useful from the perspectives of quality and compliance, based upon Industry 4.0/Pharma 4.0 concepts. AI / ML / RPA are no longer small operations as manufacturers are using these technologies to maximize quality and compliance for patients' safety. Several companies are already using AI to analyze huge scientific data in an effort to speed up and improve the drug discovery process. These technologies have new applications in diverse areas like regulatory/compliance, clinical trials, manufacturing, packaging operations for Primary, Secondary & Tertiary packaging, Supply chain- Block chain & Pharmacovigilance. Such AI tools, automatically handle manual, repetitive, time-consuming, and highly structured tasks such as data entry, reviews and back-office functions. RPA solutions can improve regulatory compliance because bots do not deviate from programmed steps and audit trail history can be tracked. They provide comprehensive, unchangeable, and time-stamped activity logs, reducing risks and errors through the automatic execution of repetitive and routine manual activities. Major advantages are Data Integrity compliance, Predictive Analytics, Speed of Developments & Operations, Predictive Quality, Predictive Maintenance, etc

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**Shrenik Kole**
VP/Head - Sterile Product development
Micro Labs Limited,
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ISBN: 978-81-980623-8-3

Shrenik Kole brings over 27 years of vast experience in the pharmaceutical sectors, particularly in drug product development of both conventional and speciality dosage forms, including solid oral, ophthalmic, sterile semisolids and complex injectable products. He is currently serving as Vice President/Head- Sterile Product Development at Micro labs advance Research centre, Bengaluru.

He possesses a comprehensive background spanning the entire product lifecycle, from initial concept to commercialization, with a proven track record in developing complex injectable Peptide, Iron complex and ophthalmic products. A significant strength lies in navigating the intricacies of global regulatory landscapes, having successfully managed and submitted regulatory dossiers for major markets including the USA and EU, as well as other international territories.

He has completed his bachelors from Kolhapur university and Master in pharmaceutical sciences from Rajiv Gandhi University of Health Sciences and undergone senior leadership programmes at IIM Ahmedabad and IIM- Nagpur.

Prior to joining Micro Labs Ltd, he held key leadership position at Lupin Research Centre and also worked in companies like Novartis and NPI, Oman.

Shrenik Kole has several achievements: He has inventorship in 9 patents and several applications on his credit and also developed and filed more than 50 ANDA's for the US and other regulated market, achieving a high approval rate.

**Topic: Changing Complex Generic Drug Product Development**

The generic drug industry faces unprecedented complexity in developing products for the US market, particularly in complex generic drug products (CGDPs) such as peptide injectables, nanotechnology-based formulations, and highly potent active pharmaceutical ingredients. Artificial intelligence and machine learning technologies have emerged as transformative tools to accelerate development timelines, reduce costs, and enhance product quality—critical factors in achieving competitive market positioning within narrow market exclusivity windows.

This presentation addresses the comprehensive integration of AI/ML throughout the pharmaceutical development lifecycle for generic drugs, with particular emphasis on GLP-1agonist formulations (semaglutide, tirzepatide), which represent a $50+ billion opportunity in the generic market by 2030. The US generic market, valued at over $180 billion annually with 90%+ of dispensed prescriptions being generics, demands innovation in complex formulation development where traditional approaches require 18-24 months and millions of dollars in R&D investment.

Key Topics Covered
AI Fundamentals and applications
Industry Standards AI tools and Platforms
GLP-1 Complex Generic Development
Current Industry Landscape and Business Impact
Regulatory and Implementation framework

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**Dr. Hari Krishna Maram**

Chairman

Vision Digital India, India

drharikrishnamaram@gmail.com

Dr. Hari Krishna Maram, Digital Brand Ambassador and Chairman of Vision Digital India & Vice Chancellor Global Digital University USA, President Lead India Foundation. Dr. Maram's work in the field of Management and Management Education spans over 27 years. Worked decade in leading MNC Novartis Global Pharma. He has an illustrious career in education and has served as the Governing Council Member at AIMA (All India Management Association), Managing Committee Member CII, Chairperson - International Facility Management Association (IFMA), Vice President at AIMS (Association of Indian Management Schools). Additionally, he was Honorable Secretary-BMA (Bangalore Management Association), Treasurer-Education Promotion Society for India


ISBN: 978-81-980623-8-3

(EPSI) South India, Executive Board Member at NIPM and Chairperson Higher Education Forum –Karnataka. His efforts in management education have been recognized on numerous occasions by the Government of India. He is also a part of the UGC Committee. Besides being an excellent academician and educationist, Dr Maram is involved with a large number of CSR activities. He is the District Chairman of Lion's International and Trustee of Lions Super Speciality Eye Hospital & Lions District Service Foundation. Additionally, he is the Chief Mentor of the great initiative "Bangalore Green" which aims at environmental conservation in Bangalore. Throughout his lifetime, he has received various awards like Prestigious Knighthood Award from UK, MTC Global Top 10 Thinkers, "Ramaswamy P Aiyar Best Young Teacher" Award by AIMS,"J L Batra Best Research Paper" Award, "Education Evangelist of India" Award, Lions International President's Medal, Karmavira Chakra Award, "Medal of Honour" from CIAC Global & The Education, 50 Most Admired Global Indian award from Passion Vista Magazine, Sunfo High appreciation award from Srilanka, International Leadership Innovations Excellence Award from Indo-Srilanka Economic Summit, SHIKSHA RATTAN award from Institute of Economic Studies, International Icon Award from International Economic Summit @ Thailand, Global CIO Award by Global CIO Forum and many more.

**Topic: Future of AI**

Artificial Intelligence is rapidly transforming healthcare and pharmacy by enabling faster diagnosis, precision treatment, intelligent drug discovery, and improved patient care. In the coming years, AI will redefine education and industry by creating new skill pathways, automating complex workflows, and enhancing decision-making through data-driven insights. For healthcare professionals, these technologies open opportunities to personalise therapy, predict disease progression, and improve clinical efficiency. As AI becomes more accessible, students and institutions can leverage these tools to build future-ready competencies. This session will explore the expanding scope of AI and how the healthcare and pharmaceutical sectors can strategically adopt it to gain sustainable advantage.

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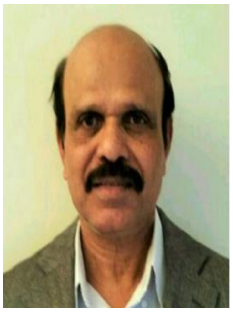
**G. Jagadeesh, Ph.D.**



Formerly Senior Expert Pharmacologist at US FDA
Currently holds multiple distinguished visiting professorships.

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Formerly (for 33 years), Senior Expert Pharmacologist, Office of Cardiology, Hematology, Endocrinology, and Nephrology, Center for Drug Evaluation and Research, US Food and Drug Administration, Silver Spring, MD, USA Distinguished Visiting Professor, College of Pharmaceutical Sciences, Dayananda Sagar University, Bengaluru; Visiting Professor at College of Pharmacy, Adichunchanagiri University, Karnataka; and College of Pharmaceutical Sciences, Manipal Academy of Higher Education, Manipal, India. Senior Consultant & Advisor, Auxochromofours Solutions Private Limited, Bengaluru, India Dr. Jagadeesh's distinguished career spans over fifty years, marked by significant contributions to pharmacy, pharmacology, toxicology, pharmacokinetics, and medical sciences. His journey began as a research fellow and progressed through academic ranks to become a respected professor at various institutions. This led to his nearly 33-year tenure as a senior expert pharmacologist at the CDER of the U.S. Food & Drug Administration. While at the FDA, he also served as an adjunct scientist at the National Institutes of Health in Bethesda, USA. His specialized expertise in cardiovascular and autonomic receptor pharmacology, the reninangiotensin-aldosterone system, and G protein-coupled receptors was essential to his FDA role, in which he reviewed preclinical studies to ensure drug safety. His extensive knowledge and experience have greatly contributed to the research and development of drug products, ensuring


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their efficacy and safety for the public. While at the FDA, he evaluated preclinical pharmacological, ADME, and toxicological studies submitted in support of INDs and NDAs to assess drug safety.

**Topic: The emerging trends in the US FDA's approval of new molecular entities and biologics over the past decade. Therapeutic targets and drug innovation.**

Drug discovery research concentrates on creating molecular-targeted therapies to treat diseases and disorders. These drugs must interact with specific target proteins and be relevant for addressing human illnesses. We present a map of the molecular targets of 465 FDA-approved drugs from 2015 to 2024: 29% were biologics, 71% were NMEs, 50% targeted orphan diseases, and 41% were first-in-class drugs with novel mechanisms. Analyzing drug target innovation reveals five key protein classes: enzymes (17%), kinases (16%), GPCRs (12%), transporter proteins (4%), and nuclear receptors (3.7%), emphasizing a focus on chronic and life-threatening diseases, especially orphan indications. Our analysis highlights trends in the approval of new drugs across the top four non-communicable diseases: CVD (8.6%), cancer (29%), respiratory disease (4.3%), and diabetes (3%). We examined drug approval trends by comparing regular and expedited reviews across therapeutic areas. The FDA's expedited review pathways have significantly increased access to new therapeutics (67%), particularly in oncology, where 90-100% of drug approvals have utilized at least one expedited pathway. Over 70% of expedited approvals were granted through a combination of two or more pathways, allowing quicker access to treatments for various malignancies. Of the 465 novel drugs approved, 61% received priority review, 37% fast track designation, 30% breakthrough therapy designation, and 22% accelerated approval. Priority review was the most common pathway, while accelerated approval was the least. A large portion of drugs approved each year employed at least one expedited pathway, with some utilizing multiple programs to speed development. Additionally, the review analyzed drug innovation by examining trends in first-in-class and orphan drug designations and their links to expedited review processes. Importantly, this review employed an extended analytical framework—the "quartet model"—to explore the complex relationships among drugs, target classes, therapeutic areas, and diseases in drug discovery. This multidimensional analysis aims to uncover subtle connections and provide a comprehensive understanding of drug development trends and innovations.

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**Dr. Manish Diwan**

Head of Biofoundry

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Head – Strategic Partnership & Entrepreneurship Development, & Make In India Facilitation Cell for Biotech sector. Leading large national programs for Government of India's efforts to nurture and empower the Biotech Innovation Ecosystem in India. Sectoral lead for National Missions especially Startup India, Make In India; contributes to Policy Reforms; Strategic collaborations including International partnerships; serves on National committees and Advisory Boards.

Leads national flagship schemes and programs of BIRAC promoting Startups, Entrepreneurs and Industry. Manages Risk Funding through Grant-in-aid, Equity, co-investments by Angels, VCs, AIFs (Fund of funds); setting up Incubation Centres for capacity building; Human Resource development through integrating a large partner pool of mentors, experts, peers and industry associations. Being a central enabler representative, contributes in Ecosystem gap identification and finding solutions. A few policy initiatives include establishment of the Technology Clusters with Pilot and manufacturing facilities for startups, Field validation for startup


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solutions, Access to Regulatory guidance, Scaling and Global integration through a strategic network of national and international partnerships.

Supports technology led Startups, Entrepreneurs, Incubation Centres, Knowledge Clusters of Academia and Industry enabling them to address unmet needs in the Healthcare, Medical Devices, Diagnostics, Industrial biotech, Agriculture, Waste management, Clean Energy and related areas through development of globally competitive, innovative products and technologies.

He has about 27 years of global R&D experience in Pharma/ Biotech sector from discovery research to product development, Science Administration and Project Management for Industry and Academia. Before moving into Public sector in 2017, he contributed to several Clinical Drug Candidates for global drug development at Daiichi Sankyo (India), Daiichi Sankyo (Japan), Ranbaxy, Dabur and University of Alberta (Canada). Also developed technologies during doctoral (ICGEB, NII India) and post-doctoral research (KAIST South Korea; University of Alberta) that were transferred to industry. Trained in Pharmaceutics, Molecular Pharmacology, Immunology, he has led large professional teams in First-In-Class and Best-In-Class Drug Discovery, Translational Preclinical Research and Early Clinical Development.

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**Dr. Dipti Kakkar Thukral**

Scientist G

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Dr. Dipti Kakkar Thukral is a distinguished research scientist currently serving as a Scientist 'G' at the Anusandhan National Research Foundation (ANRF) under the Department of Science & Technology, Government of India. She has an extensive background spanning over two decades in advanced research, primarily focusing on nanomedicine, polymer chemistry, and biomedical sciences.

Prior to her role at ANRF, which she began in October 2022, Dr. Kakkar was a Senior Scientist at the Institute of Nuclear Medicine and Allied Sciences (INMAS), DRDO, for over 21 years. Her academic background includes a Ph.D. in Biomedical Sciences, an M.Tech. in Polymer Science & Technology, and an M.Sc. in Chemistry, all from IIT Delhi. She has held national fellowships from the CSIR and international fellowships, including a "Sandwich fellowship" from the French Embassy for research at the University of Bordeaux. She has also worked as a Senior Research Scientist and visiting research collaborator at Rutgers University and Princeton University in the US.

Dr. Kakkar's research focuses on creating nanoparticulate systems using polymers, lipids, and metal oxides for use in cancer therapy and anti-infection drug delivery (theranostics). She has published extensively in international journals on this topic and was recently elected as an INSA Women Associate by the Indian National Science Academy.

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**Dr. Kailash Petkar**

Scientist-D

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Dr. Kailash Petkar is presently serving as a Scientist with the Department of Scientific and Industrial Research (DSIR), under the Ministry of Science and Technology, Government of India.

He is working towards advancing research and innovation ecosystems, with a strong focus on promoting R&D in Micro, Small, and Medium Enterprises (MSMEs), academia-industry collaboration through various schemes of DSIR. He is actively involved in


ISBN: 978-81-980623-8-3

formulation and implementation of science, technology, and innovation related schemes to create a conducive environment for individual innovators, startups, MSMEs and R&D-based enterprises thereby enhancing India's position as a global industrial hub through.

Dr. Petkar serves on review panels for a number of projects that are funded to national research and academic institutions as well as universities. He is a nominated member to the 'Testing and Calibration Advisory Committee' of Bureau of Indian Standards and 'Techno Economic Appraisal Committee of Micro & Small Enterprises Cluster Development Program (MSE-CDP)' under Ministry of MSME, Govt. of India. He is also involved in various inter-ministerial, cabinet and NITI-Aayog related matters

Dr. Petkar is an Alumni Advisory Panel Member of Commonwealth Scholarship Commission (CSC), UK ; Member of the Association of Commonwealth Scholars and Fellows in India (ACSF-India). He also serves on the editorial board of the official newsletter of ACSF-India, ACSF-Bulletin. In addition, Dr. Petkar serves as an editor to scientific journals and newsletters reflecting his commitment to disseminating scientific knowledge.

With the academic background in Pharmacy, Dr. Petkar obtained his PhD from the M. S. University of Baroda (India) and University College London, School of Pharmacy, London (UK). He pursued a postdoctoral-Industry fellowship at the Hebrew University of Jerusalem and Bionanosim Inc., Jerusalem, Israel. Dr. Petkar is having more than 15 years of administrative, academic and industrial research experience and has contributed to national and international research papers and book chapters to the scientific community.

**Topic: Strengthening India's R&D Ecosystem: The pathway to Viksit Bharat**

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**Ravleen Kaur Bakshi**

Scientist D

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Dr. Ravleen Kaur Bakshi serves as Scientist D in the Descriptive Research Division at the Indian Council of Medical Research, under the Department of Health Research, Ministry of Health and Family Welfare, Government of India. She has 56 publications and her research interests focus on Reproductive and Child Health.

She was awarded the IJCM Ford Foundation Research Grant for 2023–24 and has been conferred the title of "Member Academy Medical Sciences" (MAMS) by the National Academy of Medical Sciences (NAMS), New Delhi. She also received a scholarship to attend the 1st South East Asia Regional Group Meeting of the International Epidemiological Association and the 24th Annual Academic Sessions of the College of Community Physicians of Sri Lanka held in Colombo from 19th to 21st September 2019.

**Topic: ICMR Funding Schemes: Opportunities for Researchers**

The Indian Council of Medical Research (ICMR) offers a diverse portfolio of funding schemes to support innovation, evidence generation, and capacity building in biomedical and public health research. This session provides an overview of major opportunities, including Small Grant and Intermediate Grant Proposals, Centres for Advanced Research (CAR), the First-in-World (FiW) Challenge, National Health Research Priority calls, and periodic Expressions of Interest (EOIs). By outlining eligibility, focus areas, evaluation criteria, and best practices for proposal development, the talk aims to equip early-career and established researchers with the knowledge required to effectively navigate ICMR's


ISBN: 978-81-980623-8-3

funding ecosystem and translate ideas into impactful research.

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**Rahul Purwar**

Professor; Founder

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Dr. Rahul Purwar is a professor at Department of Biosciences and Bioengineering at IIT Bombay. He holds a Ph.D. in Molecular Medicine from Hannover Medical School, Germany. Dr. Rahul's professional journey spans various prestigious institutions and roles. He started his post-doctoral fellowship at Harvard Medical School, Boston, USA. After his fellowship, he joined ImmunoGen, Inc. (Boston, USA), as a scientist before returning to India as a faculty member at IIT Bombay. His lab at IIT Bombay developed indigenous technology platform for CD19 CAR-T cell therapy, a type of gene therapy. Based on his research at IIT Bombay, Dr Purwar founded ImmunoACT in 2018, first cell & gene therapy company in India. Upon successful multiple clinical trials, ImmunoACT received market authorization of the country's first CAR-T cell therapy, and Honorable President of India dedicated CAR-T cell therapy to the nation on April 4th, 2024. This is the first of many planned milestones in democratizing access to advanced cell & gene therapies in India. Dr. Purwar's research work is well-recognized in the scientific community, with numerous publications to his credit in esteemed journals. His contributions to the field of Biosciences & Bioengineering are commendable and his work continues to inspire many in the scientific community.

**Topic: Journey of India's First Indigenous CAR-T therapy**

Cancer is a global problem; India ranks 2nd in cancer mortality and cancer incidences are on the rise in low- and middle-income countries (LMICs). Gene therapy, especially CAR-T cell therapy platform is an emerging therapeutic platform for cancer cure. Recent studies have shown remarkable success in curing blood cancers like leukaemia and lymphomas. However, this technology platform is exorbitantly expensive (500,000 USD/patient) and not available in India and in LMICs. Our objective is to ensure access of this technology platform to all patients, who might benefit from these therapies. Recently, we designed and developed a robust, safe and highly affordable technology platform. To validate the platform, first-in-human Phase I clinical trial (investigator-initiated trial) and a pivotal Phase II trial (ImmunoACT sponsored) are successfully concluded. The results of these trials showed excellent safety profile and efficacy profile. In fact, few patients are in long-term remission. Based on these extraordinary results, CD19 CAR-T is approved by CDSCO for commercial use in October 2023, and now over 300 patients are treated across the country. Overall, our affordable platform will ensure access of gene therapy, CAR-T cell therapy, to patients in India and in LMICs and save millions of lives.

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**Mr. Sandip Kulkarni**

Founder and CEO

Image ProVision
Technology, USA

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Sandeep Kulkarni is a Mechanical Engineer from NIT and has completed a management program from IIM Ahmedabad, along with a specialized course in Image Processing from Duke University. With over 31 years of professional experience across diversified industries, he has held senior leadership roles and successfully set up and managed multiple greenfield manufacturing units. His expertise spans manufacturing operations, IT systems, and ERP implementations. After 22 years in the corporate world, he ventured into entrepreneurship and founded


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ImageProVision Technology Pvt. Ltd.—a pioneering company in the field of intelligent image analytics. Under his leadership, the company has grown into a trusted name in pharmaceutical image analytics, offering advanced solutions in microscopic particle analysis powered by AI and machine learning. Mr. Kulkarni has filed multiple patents in the domain of image-based particle analysis, reinforcing ImageProVision's innovation-led approach. The company has won several accolades, including the India Pharma Award for Most Innovative Product (CPhI 2015), Best Startup at Shark Tank Pune, and recognition among the Top 50 Emerging Tech Companies by NASSCOM. A passionate mentor and educator, he actively seeks opportunities to share knowledge and engage with professionals across disciplines. ImageProVision Technology Pvt. Ltd. operates from offices in Princeton (USA), Pune, and Hyderabad (India).

**Topic: Revolutionizing Particle Characterization through AI-Based Particle Morphology Analysis**

Accurate particle characterization forms the cornerstone of pharmaceutical research, impacting formulation development, bioavailability, stability, and regulatory compliance. Traditional methods such as laser diffraction and manual microscopy often fail to capture the true morphological complexity of heterogeneous particle systems limiting insight into parameters that govern performance-critical attributes. This presentation introduces an AI/ML-powered particle morphology characterization framework designed to deliver high-resolution, reproducible, and quantitative insights into particle size, shape, and texture. By combining deep learning with advanced image analytics, this approach enables automated detection and classification of irregular and agglomerated particles providing statistically significant data beyond conventional averages. We will present real-world case studies demonstrating how this technology supports a range of pharmaceutical applications, including:

- API and excipient particle uniformity assessment
- Suspension and emulsion stability evaluation
- Polymorphic form differentiation
- Solid-state deformulation and comparative batch analysis

Through adaptive learning models, the system continuously improves classification accuracy with every dataset, minimizing operator subjectivity and ensuring compliance with global standards such as USP <776>, <1776>. AI-based particle characterization is transforming analytical decision-making in R&D and QC by enabling predictive, data-driven insight into formulation behaviour empowering scientists to design more robust, reproducible, and regulatory-ready pharmaceutical products.

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**Jyothi Tegginamath**

Managing Director - Nia Pharmaceuticals

Committee Member - Australia India Business Council

Teacher - Curtin University

Nia Pharmaceuticals, Australia

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Founder Director at NiA Pharmaceuticals wherein I lead by example and strive to strike the right team spirit with a mission to map the company footsteps into new emerging and regulated pharma markets. I am passionate about pharmaceutical industry and I believe in learning and growing. My key knowledge areas include global regulatory requirements, regulatory filings and vertically integrated models. I spent my early career in pharmaceutical research, academia and clinical research. Ironically, I started all over again when I came to Australia wherein I was gravitated


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by the Australian pharmaceutical industry opportunities. My previous research approach had to change to fit in my new appetite for entrepreneurship and eventually I enrolled for MBA. Finally, I started NiA Pharmaceuticals, a company into pharmaceuticals, medical devices and pharmacy ownership. In this journey of self discovery, I set up Jyothi Kiran Foundation in Bengaluru, India - primarily focusing on rural girls education and empowerment. First project is on 22 blind girls - It feels good to bring a smile!

**Topic: Women and Entrepreneurship: Leading with Innovation and Purpose in a Transforming Pharma Landscape**

Entrepreneurship is not only about starting a business—it is about breaking barriers and driving innovation that empowers communities. At the 74th Indian Pharmaceutical Congress (IPC 2025) in Bengaluru, themed "AI & Technology in Pharma: Educate, Innovate, Empower," this talk explores how women entrepreneurs can harness education, technology, and leadership to shape the future of healthcare and pharmaceuticals.

I will share my personal journey from India to Australia—navigating cultural and professional landscapes to establish a company focused on quality, technology, and global collaboration to set up NiA Pharmaceuticals in Australia and a sister company Bes Pharma in Bangalore. My entrepreneurial experience reflects the broader transformation of women in science and business—women who are leveraging technology and global knowledge networks to build sustainable enterprises.

The session will explore the opportunities and challenges women face in entrepreneurship, particularly in science-driven industries. It will highlight how technology and AI can help bridge gender gaps by enabling access to knowledge, networks, and global markets. Drawing from personal experience, I will discuss the value of resilience, vision, and ethical leadership in scaling an enterprise while staying true to a mission of patient-centric innovation. Ultimately, this talk celebrates the spirit of women (everyone indeed) entrepreneurs who dare to innovate, empower others, and lead with purpose.

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**Anant Ketkar**

Principal Scientist and Scientific Lead – India

Simulations Plus, Inc. (NASDAQ: SLP)

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Anant Ketkar is working with Simulations Plus, inc., as a Principal Scientist in the role of 'Scientific Lead – India'. He is involved in the application of PBPK/PBBM modelling and simulation to meet the objectives of various client projects. He also provides scientific input both in terms of software applications and project proposals to Indian distributors to support their marketing and sales efforts. In partnership with Indian distributors, Electrolab and Molecular Solutions, he supports Simulations Plus's many customers in India and serves as a thought leader to increase awareness and adoption of PBBM/PBPK modelling throughout the country. He delivers modelling and simulation projects to address client objectives and inform regulatory interactions. Anant earned his doctorate in Pharmaceutical Sciences from Poona College of Pharmacy (Bharati Vidyapeeth Deemed University), Pune, India. He carries around 25 years of experience in formulation research, including around 10 years of experience in PBPK-PBBM modelling for immediate release and extended-release solid orals of NCEs and generic compounds, and subcutaneous extended-release formulations. His expertise covers IVIVR and IVIVC, virtual bioequivalence (VBE), defining clinically relevant drug-product specifications (CRDPS) and helping formulation research scientists in gaining model-based insights for designing the drug product and bio-predictive in-vitro dissolution methods. Prior to joining Simulations Plus in 2022, Anant was Head of Technical Services at


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IQGEN-X Pharma, where he led a team of formulation team leaders and scientists for development of solid and liquid orals, and injectables for the global market. Prior to that he worked in positions of increasing seniority with pharmaceutical research companies, including Bioved Pharmaceuticals Inc., Ranbaxy (now Sun Pharma), Pfizer Animal Health (now Zoetis), Sandoz and Sun Pharma Advanced Research Company (SPARC). He has also served as a PBPK/PBBM modelling consultant for one of the leading Indian multinational pharma companies and worked as a freelance PBPK modeller for Indian generic pharma client on US-FDA submission of a PBPK modelling project.

**Topic: Basics of PBPK Modelling and Introduction to GastroPlus® X (GPX) and its Integration with AI**

In silico modelling and model informed drug development (MIDD) play a vital role in pharmaceutical drug product development. Use of in silico modelling tools, such as PBPK M&S (physiologically based pharmacokinetic modelling and simulation) and PBBM (physiologically based biopharmaceutics modelling) has been acknowledged and encouraged by regulatory agencies across the globe. The applications of these tools span from early discovery to clinical phases of drug development and frequently forms a part of the regulatory approval of drug products. These tools enable informed decision making at various stages of product development, be it for NCE (new chemical entity) research or for Generic drug product research. The presentation will follow an introduction to the interface of GPX™ i.e. GastroPlus®X2 (10.2), which is the latest version of a leading PBPK/PBBM modelling software offered by Simulations Plus, Inc. It is highly appreciated by researchers and regulatory agencies across the globe. The new interface will also integrate with AI through AssessmentPlus™ AI and GastroPlusChat™ to assist the user in building the baseline model and gaining insights into various underlying mechanistic processes and generating reports.

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**Amol Kulkarni**

Scientist

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Dr. Amol A. Kulkarni is a Chief Scientist and Head of the Chemical Engineering & Process Development Division at the CSIR-National Chemical Laboratory (NCL), Pune (Since 2005). He is a chemical engineer by training (B.Chem.Eng.1998, M.Chem.Eng.2000, and Ph.D.2003, all from the Institute of Chemical Technology ICT- Mumbai, formerly UDCT Mumbai). He did his Post-Doctorate at MPI-Magdeburg (Germany) as a Humboldt Fellow and at Massachusetts Institute of Technology (MIT), USA as IUSSTF Research Fellow.

He works in the area of continuous flow synthesis, flow reactors and their applications for continuous syntheses of APIs, dyes, perfumery chemicals and nanomaterials. He has established the first of its kind microreactor laboratory and a mechanochemistry laboratory in India. He has developed several scalable continuous processes for organic compounds and inorganic functional materials including many solvent free synthesis protocols. He collaborates extensively with scientists from various disciplines.

His work has been recognized by many organizations viz. ICC D. M. Trivedi Lifetime Achievement Award (2022), Fellow, Indian National Academy of Engineering (2021), Shanti Swaroop Bhatnagar Award (2020) in Engineering Sciences, VASVIK Award (2016), CIPLA-Hameid Process Development award (2019,2023,2024), Young Scientist awards (INSA2009, INAE2009, CSIR2011, IASc2011, OPPI2015). He is a Selection Committee member of the Humboldt Foundation (2019-2026)

He has published over 125 papers in international journals, supervised 14 PhD students, filed 50 patents (32 granted) and designed several flow reactors that are licensed to Indian industries. He is on the Editorial Boards of many journals and he


ISBN: 978-81-980623-8-3

works with several industries on projects on continuous manufacturing at various scales.

**Topic: Continuous manufacturing in the pharmaceutical industry: Opportunities, Challenges and the path forward**

Scope-3 Emission Norms are going to be extremely pertinent and important for the Indian Chemical Industry, including the pharmaceutical industry. Considering sustainability as a significant driver, the pharma industry will also have to gear up for meeting newer challenges in the healthcare segment (viz. a visible movement towards biotransformation from the conventional chemical synthesis), the economic pressures from increasing import prices, challenges from the backward integration in Europe to become self-sustained in a few bulk drugs, forward integration in the Gulf countries to enter into new high value domain and a few unexpected scenario (viz. tariffs) over the next decade. Efforts need to be made to make manufacturing processes more energy efficient, smaller foot print, reduce or eliminate solvents, zero discharge approaches, using renewables etc. The conventional batch-oriented approach of manufacturing intermediates and drug molecules in the pharmaceutical industry is changing rapidly and the Indian industries are also visible in this change. This presentation will give an outlook of the continuous manufacturing relevant to the pharma industry at various scales of operation. A few case studies will be discussed followed by highlighting opportunities in this domain, realistic challenges and the way to mitigate them. The road ahead will focus on early stage adoption of flow chemistry, reduction in the excess reagents, use of passive cooling rather than direct contact heat transfer, designing catalysts that help reduce severity of reaction conditions, etc.

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**Dr. Rajesh Kumawat**

Head - Medical Services & Clinical Development,

Himalaya Wellness Company, India

Dr. Rajesh Kumawat serves as the Head of Medical Services & Clinical Development at The Himalaya Wellness Company, where he oversees global medical and clinical development for the company's range of modern medicine generics, novel formulations, and herbal products.

Dr Kumawat holds MBBS from J.L.N. Medical College, Ajmer, and MD in Pharmacology from SMS Medical College, Jaipur. He has over 30 years of total experience in the public health & pharmaceutical industry, with key roles at Lupin, Fresenius Oncology, and Ranbaxy/Sun Pharma. He had spearheaded the pilot project of RNTCP as MOTC (Medical Officer Tuberculosis control) sponsored by WHO. His expertise includes various domains such as Clinical Development, Scientific Strategy, Medical Writing and Clinical Operations. He spearheaded many Phase I - IV , clinical development & multicentric clinical trials in multiple therapeutic domains for DCGI, USFDA, MHRA submissions. Privileged to be one among the expertise in India to have exposure of strategy & execution of Global Phase 1 study. Currently, he oversees medical and clinical development for Himalaya's global products and implementation of Pharmacovigilance in herbal industry. Dr. Kumawat has many publications in his name at various prestigious journals & also has participated as guest speaker at various national & International platforms.

**Title: AI and clinical trial optimization - Clinical trials of Herbal Products – A GCP approach**

Artificial Intelligence (AI) is redefining clinical research by enabling smarter, faster, and more efficient trial processes, AI offers transformative potential in optimizing


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clinical trials of herbal products. Herbal products & trials often face challenges & complexity such as variability in phytochemical composition, patient response, uniform Regulatory Framework, Global Acceptance etc. AI-driven solutions like predictive analytics for patient recruitment, adaptive trial designs, automated data capture, and real-time safety monitoring—can significantly enhance trial efficiency while ensuring compliance with Good Clinical Practice (GCP) standards. By integrating AI, it can accelerate timelines, improve data accuracy, and strengthen global acceptance of scientifically validated herbal interventions. The synergy between traditional medicine and advanced technology will position ancient wisdom at the forefront of innovation, delivering ethical, reliable, and globally compliant clinical evidence for herbal products.

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**Mr. P. K. Dutta**

Chairman and MD

Systopic laboratories Pvt. Ltd, India

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Mr. P.K. Dutta serves as the Founder and Managing Director of Systopic Laboratories Pvt. Ltd., a trailblazing company in the Indian pharmaceutical industry since its establishment in 1984. Often referred to as "Shri P.K. Dutta," he is a visionary leader with a philosophy centered on "Excellence through People and Innovation" and a commitment to providing affordable, quality healthcare solutions. Under his leadership, Systopic, initially known as Savior Pharmaceuticals, has introduced several first-to-market innovations in India, including specific higher dosages of fluconazole and the popular brands Levosis and Telma (amlodipine and telmisartan). With over four decades of industry experience, he has grown the company to employ a sales force of over 1,150 professionals serving more than 91,000 medical professionals nationwide. Mr. Dutta's contributions to the sector have been recognized with a Lifetime Achievement Award by the AWACS Awards, and he currently serves as an advisory board member for several educational and research institutes, including the Institute of Applied Dermatology.

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**Dr. V. Kalaiselvan**

Secretary-cum-Scientific Director

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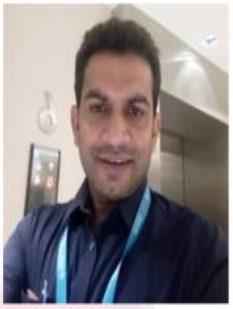

Dr. V. Kalaiselvan is currently serving as the Secretary-cum-Scientific Director of the Indian Pharmacopoeia Commission (IPC), Ministry of Health & Family Welfare, Government of India. He holds a Ph.D. in Pharmaceutical Sciences from the University of Delhi. Dr. Kalaiselvan has been associated with IPC since 2009, contributing significantly to the domains of pharmacopoeial standards, rational use of medicines, drug safety, and regulatory systems. He played a key role in the conceptualization and nationwide implementation of the Pharmacovigilance Programme of India (PvPI) and the Materiovigilance Programme of India (MvPI), which have strengthened India's surveillance framework for the safety of medicines and medical devices. Dr. Kalaiselvan has represented IPC on various national and international platforms, including the World Health Organization (WHO), and continues to contribute to global initiatives for strengthening pharmacovigilance systems in low- and middle-income countries. In recognition of his work, the WHO Headquarters in Geneva acknowledged him as one of the significant contributors to global pharmacovigilance in their 50th Celebratory Album of the International Drug Monitoring Programme. He has authored 11 chapters and published over 130 research and review articles in national and international journals. He is also a recipient of prestigious fellowships awarded by the Department of Science &


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Technology (DST) and the All India Council for Technical Education (AICTE). With deep expertise in regulatory science and a forward-looking approach, Dr. Kalaiselvan brings strong leadership to IPC in its mission to ensure the quality, safety, and efficacy of medicines in India.

**Topic: Indian Pharmacopoeia in ensuring quality and safety of Medicines Beyond Borders - role of Pharmacists**

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**Prof. Pulok Kumar Mukherjee**

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Prof. Pulok Kumar Mukherjee is a globally acclaimed distinguished Pharmaceutical scientist and a Visionary Leader in Pharmaceutical Sciences whose work spans pharmaceutical education, natural product research, chemical biology, and translational drug discovery. Currently Professor at the Department of Pharmaceutical Technology and the School of Natural Product Studies, Jadavpur University, Kolkata. His work reflects a unique blend of traditional medicine with modern pharmaceutical sciences, establishing new paradigms in evidence-based drug development and natural health product research. With over 30 years of R&D experience, Prof. Mukherjee is globally recognized for contributions in ethnopharmacology, pharmacognosy, toxicology, metabolomics, and traditional medicine-inspired drug discovery. His pioneering work bridges traditional knowledge systems with modern pharmaceutical sciences, driving innovation in bio-prospecting, metabolomics, quality control, and safety assessment of natural health products. His "Farm to Pharma" approach has strengthened India's bioeconomy by validating traditional knowledge, improving value chains, and developing products and processes of national relevance. For his outstanding globally acclaimed contributions he has been recognised as a Fellow of the Royal Society of Chemistry (FRSC), National Academy of Sciences (FNASc), National Academy of Agricultural Sciences (FNAAS), and West Bengal Academy of Science and Technology (FAScT). As the Founder of the Society for Ethnopharmacology (India) and Past President of the International Society for Ethnopharmacology (Switzerland), his leadership has fostered global collaboration in natural product research. His global mission of "Globalizing Local Knowledge and Localizing Global Technologies" continues to inspire innovation and international collaboration.

**Topic: Bridging Heritage and Innovation: Omics and Artificial Intelligence in Advancing Traditional Medicine."**

Traditional Medicine (TM), including Ayurveda, Siddha, Unani, Sowa-Rigpa, Traditional Chinese Medicine (TCM), Kampo, and diverse Indigenous systems, continues to support the health needs of the global population. Despite this wide reach, global therapeutic integration is limited because of fragmented documentation, variability in raw-material quality, inconsistent species authentication, and insufficient mechanistic and clinical evidence. This lecture synthesizes advances in omics technologies, including genomics, transcriptomics, proteomics, metabolomics, and microbiomics, together with Artificial Intelligence (AI) methods such as machine learning, deep learning, natural language processing, and computer vision. The goal is to demonstrate how these tools can decode traditional knowledge, validate mechanistic pathways, and support the translation of TM into modern therapeutics. The convergence of nature, knowledge, and innovation symbolizes India's scientific renaissance in the pharmaceutical domain. The convergence of omics technologies and artificial intelligence is reshaping the landscape of traditional medicine research and practice. Across knowledge digitization, mechanistic exploration, quality assurance, ecological conservation, clinical evaluation, and safety monitoring, AI and omics can


ISBN: 978-81-980623-8-3

provide tools for rigor, reproducibility, and global interoperability making ancestral wisdom more accessible, analyzable, and actionable. Although omics and AI provide transformative opportunities for traditional medicine, several challenges remain. These include limited data interoperability, insufficient multi-omics biobanks, variable validation standards, and ethical concerns related to community-owned knowledge. To address these gaps, we propose a seven-pillar strategic framework built on ethical integrity, interoperable infrastructure, mechanistic rigor, safety and quality assurance, ecological stewardship, regulatory readiness, entrepreneurship development and community participation.

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Dr. Uppugunduri holds a PhD Pharmacogenetics/Medical Pharmacology. He is currently working as an Assistant professor in Department of Medical Oncology, JIPMER, Puducherry. He completed PhD at Department of Pharmacology, JIPMER, Puducherry in 2010 during which he received the Indo-Swiss Research Fellowship. Following completion of PhD, he continued to work in pharmacogenetics/omics at CANSEARCH Research platform of pediatric oncology and hematology of University of Geneva and headed the experimental research division until May 2024. He is a recognized Clinical Pharmacologist from Swiss Society of Clinical Pharmacology and Toxicology (SSCPT). He is also serving as a visiting faculty at Department of Pharmacology, Kasturba Medical college, Mangalore and as a guest faculty at AIMSR, Hyderabad, India. His research focuses on pharmacogenetics and personalized medicine with contributions in elucidating drug responses, drug-drug interactions in relation to genetic variants. He founded the forum on personalized medicine on nature network in 2010 (currently available at www.personalizedmedicine.in). He is also an active member of a few national and international pharmacological and pharmacogenomic organisations including Clinical Pharmacogenomics Implementation Consortium (CPIC) and Pharmacogenomics Research Network (PGRN).

**Topic: Optimizing therapeutic outcomes in oncology using pharmacogenomics**

Past few decades, evidence has been generated for the utility of Pharmacogenomic (PGx)testing for pairs of many gene–one drug, or one gene-many drugs. However, practice is confined to a few domains such as oncology and cardiology that have shown a high impact. Pre-emptive PGx testing also demonstrated reductions in serious adverse events. Various studies across the globe have also demonstrated that each individual carries a number of actionable PGx variants ranging from one to many depending upon their ethnicity. Though most of the drug labels do not require or recommend PGx testing, having this genetic information preemptively could be of help in their lifetime for guided dosing of drugs where there is clear demonstrated benefit in terms of treatment outcomes and costs. Evidence generation for other relevant medication in use, development and novel approaches, e.g. immunotherapy, remains a work in progress. Continued education, expanding the list of guidelines for PGx guided dosing and therapies, electronic health record system implementation systems with integration of PGx information is the key to successful implementation of PGx testing in clinics.

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ISBN: 978-81-980623-8-3

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Dr. Murali M is an Additional Professor in the Department of Translational Medicine, AIIMS, Bhopal, with over 15 years of research experience in pharmacogenomics, clinical pharmacokinetics and translational research. He earned his Ph.D. in Pharmacogenomics (2004-2010) from AIIMS New Delhi, M. Pharm in Pharmaceutics from BIT, Mesra, Ranchi (1999-2001) and B. Pharm from JSS College of Pharmacy, Ooty, Tamilnadu (1995-1999). He has international postdoctoral research experience from Centre for Pharmacogenomics and Translational Research, College of Pharmacy, University of Florida, Gainesville, Florida, USA, where he worked on Genome-wide association studies on antihypertensive drug response, and at the Pharmacotherapeutics Unit, Faculty of Medicine and Health Sciences, University of Putra Malaysia, where he contributed to pharmacogenetic studies in oncology, with a focus on docetaxel response in metastatic breast cancer. He serves as a Principal Investigator and Co-Investigator on numerous national and international funded projects supported by ANRF, DHR-ICMR, DST-SERB, ISID-Pfizer (USA) and National Institute of Health (USA), spanning precision oncology, metabolomics, multi-omics biomarker discovery, environmental health assessment, public health pharmacy model for antimicrobial stewardship programme and pharmacogenomics-guided therapy optimization. He also serves as a grant reviewer for the Department of Biotechnology (DBT) India), Health Research Council (New Zealand), and King Abdulaziz City for Science and Technology (KACST), Saudi Arabia.

**Topic: From Bench to Bedside: Translating Pharmacogenomics (PGx) To Clinics.**

Translational research forms the cornerstone of personalized medicine, enabling a paradigm shift from the conventional "one-size-fits-all" treatment model to individualized therapeutic strategies based on a patient's molecular and genetic profile. In India, where the population exhibits significant genetic diversity, translational research holds immense potential to improve the understanding and clinical applications of personalized care in a wide spectrum of diseases. The rapid advancements in genomics, particularly pharmacogenomics have opened new avenues for precision healthcare. However, bridging the gap between laboratory discoveries into routine clinical practice remains a major challenge. This presentation will explore the journey from "bench to bedside," focusing on how pharmacogenomic profiling are translated into healthcare settings to improve drug efficacy, minimize adverse drug reactions and improve overall patient outcomes in the domain of A. Neuro-Oncology (Glioma): Exploring how polymorphisms in ATP-Binding Cassette (ABC) transporter genes can serve as predictive markers for temozolomide efficacy and treatment outcomes in glioma patients. B. Cardio-Oncology (Breast Cancer): Examining the genetic markers associated with anthracycline-induced cardiotoxicity, and how pharmacogenomic insights can help mitigate adverse outcomes in Indian breast cancer patients undergoing chemotherapy. Through these research studies, participants will gain valuable insights into the practical implementation of pharmacogenomic testing in Indian healthcare settings and the future directions of personalized drug therapy.

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**Dr. Chung Yong-ji**

Founder and Chief Executive Officer (CEO)

Caregen Co. Ltd.,

ISBN: 978-81-980623-8-3

Dr. Chung Yong-ji is the Founder and Chief Executive Officer (CEO) of Caregen Co. Ltd., a leading South Korean biotechnology company specializing in the research, development, and commercialization of biomimetic peptides and growth factors. He founded Caregen in August 2001, focusing on peptide technology applications in cosmetics, medical devices, dietary supplements, and pharmaceuticals, and successfully listed the company on the KOSDAQ stock exchange in 2015. Dr. Chung holds a robust academic background, including a Ph.D. in Molecular Biology from Cornell University, a Master's degree in Biochemistry from the University of Texas at San Antonio, and a Bachelor's degree in Genetic Engineering from Sungkyunkwan University. Known as a pioneer and a self-made billionaire in the global peptide industry, he continues to drive innovation with a vision to develop new treatments for conditions like diabetes and macular degeneration, while expanding Caregen's global reach to over 130 countries.

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**Pardeep K. Gupta**

Burroughs Wellcome Professor of Pharmaceutics, Director, Industrial Pharmacy Laboratory

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Dr. Pardeep Gupta is a professor of pharmaceutics at the Philadelphia College of Pharmacy at Saint Joseph's University in Philadelphia. He also serves as the Burroughs Wellcome Endowed Chair and Director of the Industrial Pharmacy Laboratory. His areas of research interest include study of physical properties and delivery of peptide and proteins, and lipid-based delivery systems. He will be sharing some recent work from his laboratory in the area of molecular dynamics simulation of lipid self-assemblies.

**Topic: Coarse-Grained Molecular Dynamics Simulation of Lipid Self-Assembly Using the Martini Force Field: A Comparative Study of Liposomes, Niosomes, and Solid Lipid Nanoparticles**

Introduction: Lipid-based nanocarriers such as liposomes, niosomes, and solid lipid nanoparticles (SLNs) are widely explored in drug delivery due to their biocompatibility and capacity to encapsulate both hydrophilic and hydrophobic drugs. A molecular-level understanding of their self-assembly and structural stability is critical for rational formulation design. In this study, we employed Martini coarse-grained (CG) molecular dynamics simulations to investigate and compare the self-assembly behavior and drug–lipid interactions of these three vesicular systems.

Methods: CG models of phospholipids (DOPC, DOPS for liposomes), non-ionic surfactants (Span 60 for niosomes), and glyceride-based lipids (e.g., glyceryl monostearate for SLNs) were constructed using the Schrödinger Materials Science Suite. To study electrostatic interactions, negatively charged lipids such as DOPS were included for Minoxidil, which was modeled as a positively charged molecule. Paclitaxel, a hydrophobic drug, was also incorporated. Each simulation box contained ~900 lipid/surfactant molecules, ~60,000 water molecules, and 5 drug molecules. Simulations were run under NPT ensemble conditions at 300 K for 3000 ns with a 10 fs time step.

Results: The self-assembled morphologies differed significantly among the systems. Liposomes and niosomes formed bilayered structures, observed as either spherical vesicles or elongated cylindrical assemblies. In contrast, SLNs formed compact, amorphous nanoparticles lacking a bilayer organization, characteristic of solid lipid aggregates. The inclusion of negatively charged lipids in liposomes enhanced electrostatic interactions with cationic Minoxidil, promoting surface binding and partial insertion into the bilayer. Paclitaxel preferentially localized within the hydrophobic core regions of liposomes and SLNs. Structural metrics such as radius of


ISBN: 978-81-980623-8-3

gyration (Rg), RMSD, RDF, and cluster analysis confirmed the stability and integrity of the self-assembled structures over the simulation timescale.

Conclusion: This comparative CGMD study demonstrates that lipid architecture and charge play key roles in dictating nanocarrier morphology and drug interaction profiles. While liposomes and niosomes favor bilayer-based vesicular structures, SLNs self-assemble into non-bilayered nanoparticles. The Martini force field simulations provide mechanistic insight into the self-assembly and stability of lipid nanocarriers and support rational design strategies for drug delivery applications involving hydrophobic and charged drugs like Paclitaxel and Minoxidil.

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**Rakesh Tekade**

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Professor Rakesh K. Tekade, currently Associate Dean (R&D), Professor & Head, Department of Pharmaceutics at NIPER-Ahmedabad, is an academic-researcher with over 15 years of experience in teaching and research. He received his doctoral degree from Dr. Hari Singh Gour Central University of Sagar (India). He worked as a as a Postdoctoral fellow-I in University of Hawaii, USA; and as Postdoctoral fellow-II in University of Texas Southwestern Medical Center, USA.

He is a Recipient of several acclaimed awards, including Commonwealth Fellowship- UK, National Doctoral Fellowship (AICTE-India), IRISH Government Postdoctoral Fellowship (Ireland), CSIR Research Fellowship (CSIR-India), to name a few. He is a recipient of a British Council Split-site research Fellowship (awarded at the University of Central Lancashire, UK), and has served in industry (R&D, Ranbaxy, India).

He has been listed as a Top 2% Scientist in the field of Pharmacy and Pharmacology, by Stanford University, USA, successively from 2021 to 2025 (database published by Elsevier).

Dr. Tekade's research goal is to expand the research program through extramural funding, thereby translating preclinical findings into a clinical setting. Current research involves the development of fit-to-purpose, translational, and novel targeted specific nano-biomaterials for biomedical applications.

He co-authored > 450 publications in (>19500 citations; H-index: 68), including ACS-Chemical Reviews (Impact Factor 65.61); and Progress in Materials Science (Impact Factor: 48.21). He has EDITED 12 Books with ELSEVIER/SPRINGER/Taylor and Francis (as Editor-in-Chief), 05 invited editorial articles, and 12 Patents. He has successfully transferred one of his products to the Pharma Industry. To date, he has supervised #19 Ph.D students, #6 Postdoctoral Researchers, and over #80 Master's Dissertations. He has completed several extramural projects funded by DST,, DBT, ICMR, FRGS-Malaysia. Recipient of the Pharma Innova Award and Best Research Mentor Award by Troika Pharmaceuticals Ltd.

He is a reviewer for several international journals, serving as Grant reviewer for the Mitacs (France), FONDECYT FUNDS (Chile), National Science Centre (Poland), French National Research Agency (ANR), France, Khwarizmi International Award (KIA) (Iran), as well as an Editorial Board member and reviewer for several international journals.

**Topic: Next-generation platforms for targeted cancer treatment via technological transformation**

The paradigm of cancer therapy is undergoing a transformative shift driven by converging technological innovations across genomics, bioinformatics, nanotechnology, and AI-enabled diagnostics. Next-generation platforms for targeted cancer treatment are


ISBN: 978-81-980623-8-3

redefining precision medicine by integrating concepts such as drug targeting, gene therapy, laser therapy, 3D printing, and adaptive therapeutic delivery systems. These platforms leverage gene editing, smart nanoparticles, and AI-guided drug design to enhance specificity, minimize off-target effects, and personalize interventions at the molecular level. Furthermore, regulatory frameworks are evolving to accommodate these agile technologies, fostering accelerated approvals and collaborative innovation. This lecture explores the strategic convergence of these advancements, highlighting their potential to revolutionize oncology by making cancer treatment more predictive, preventive, and participatory

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**Narasimha Murthy**

CSO

Topical Products Testing LLC, USA

Dr. S. Narasimha Murthy is the Chief Scientific Officer of Topical Products Testing (TPT) LLC, USA (www.TopicalProductsTesting.com). Dr. Murthy is a pioneer in topical and transdermal drug delivery technologies. His research programs are funded by NIH, USFDA, and Pharmaceutical companies. He is currently the Principal Investigator on a U01 grant and co-investigator on three U01 research projects funded by the USFDA. Formerly, Dr. Murthy served as a Professor of Pharmaceutics at the University of Mississippi School of Pharmacy for over 16 years. Dr. Murthy has published over 150 research papers and presented over 250 scientific posters at national and international scientific meetings. He has authored two books and over twenty book chapters. Dr. Murthy is also the Chief Scientific Adviser of Fitbac Pharma, USA.

Dr. Murthy has received several awards, such as the New Investigator award and Cumberland Researcher of the Year from the University of Mississippi, the Global Indus Technovator award from MIT, the Endowed Chair for Research at the Ohio Northern University, and was inducted as a Fellow of the American Association of Pharmaceutical Scientists in 2017. He was bestowed with the Distinguished Scientist award by the American Association of Indian Pharmaceutical Scientists in 2018. Dr. Murthy was honored with the prestigious 2022 AAPS Pharmaceutical Global Health Award. In 2023, the Academy of Pharmaceutical Sciences, UK, awarded him a Fellowship, the highest award given to a select few, recognizing his research accomplishments across the pharmaceutical sciences.

Dr. Murthy served as one of the subject-matter experts to the National Academies of Sciences, Engineering, and Medicine, USA, on the Assessment of the Safety and Effectiveness of Ingredients Used in Compounded Topical Pain Creams. Dr. Murthy is also one of the co-founders of a non-profit research organization in India, "The Institute for Drug Delivery and Biomedical Research (IDBR)" (www.IDBResearch.com), founded in 2013. The main goals of IDBR are to foster research in drug delivery and biomedical sciences to address unmet medical needs and to support aspiring scientists and students. The organization is also playing a significant role in several community service activities

**Topic: Novel Design Approaches In Microneedle-Mediated Drug Delivery**

Microneedle (MN) platforms have evolved from simple skin-piercing arrays to sophisticated delivery systems capable of overcoming multiple biological barriers. This presentation highlights a series of novel design strategies using polymer-coated polymeric microneedles (PCPM), dissolving MNs, adsorbent-integrated MNs for sampling, and ion-trapping MN systems. These approaches enable controlled drug deposition into the skin, ocular tissues, and mucosal surfaces, while modulating release via polymer grade, coating thickness, and formulation attributes. Additional advances in ungual microneedle delivery and a sublingual Microsert system reveal


ISBN: 978-81-980623-8-3

significant improvements in drug retention and systemic uptake. Collectively, these innovations showcase how rational MN engineering can expand therapeutic possibilities across topical, transdermal, ocular, ungual, and mucosal delivery pathways.

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Dr. N. Hemanth Kumar is a highly accomplished Doctor of Pharmacy with an MBA, recognized for his multidisciplinary expertise across pharmaceutical sciences, emerging technologies, and healthcare innovation. He holds over sixteen professional certifications in advanced domains such as Artificial Intelligence, Machine Learning, Blockchain, and the Internet of Things, awarded by globally reputed institutions including Google, IBM, the Blockchain Council, and the University of Maryland.

He is an accomplished innovator with more than thirteen national and international patents, reflecting his contributions to scientific and technological advancement. He has authored three books in the fields of Artificial Intelligence, Pharmacology, and related interdisciplinary areas.

With more than twelve years of diverse experience, Dr. Hemanth has built strong expertise in academia, clinical and preclinical research, regulatory affairs, and professional pharmacy practice. His work spans private, semi-government, and government organizations, contributing significantly to pharmaceutical education, scientific research, regulatory compliance, and patient-centered healthcare delivery.

**Topic: Artificial Intelligence in Healthcare Technology (From Innovation to Production)**

Artificial Intelligence (AI) is reshaping the landscape of healthcare technology by redefining the analysis of medical data, enhancing diagnostic precision, and optimizing patient care delivery. This presentation delves into the transformative journey of AI in healthcare, tracing its evolution from pioneering innovations to robust, production-ready solutions. We will explore state-of-the-art advancements, including AI-powered diagnostic tools, predictive analytics for patient outcomes, personalized treatment plans, and intelligent automation for clinical decision support. These technologies drive improvements in efficiency, diagnostic accuracy, cost-effectiveness, and equitable access to healthcare services. The talk will also address critical challenges in integrating AI into clinical workflows, such as ensuring ethical AI deployment, safeguarding data privacy, navigating regulatory frameworks, and mitigating algorithmic bias. By highlighting real-world case studies, emerging trends, and future opportunities, this presentation underscores how AI bridges the gap between cutting-edge innovation and scalable, production-level healthcare solutions, ultimately revolutionizing patient care and operational excellence.

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Currently working as a Chief Scientific Officer at Wexford Laboratories Pvt Ltd, Tumkur-Bangalore, also working as a Scientific Advisor to Indian Patent Office, New Delhi, India, also worked as an Chief Technnical Officer at MRHM Pharma Pvt Ltd,


ISBN: 978-81-980623-8-3

Bangalore, also worked as a General Manager-Production and Operations at Search Foundation Rajajinagar, Bengaluru, also worked as a PMT Head at MRHM Pharma Pvt Ltd, Bengaluru, Also worked as Assistant Vice President and Plant Head at KJD Pharmaceuticals Pvt Ltd, Bidar in Production, QA, QC Regulatory Affairs, IPR and R&D, I have over 25 years of rich experience in pharmaceutical industry and Pharmaceutical Education and Research Project identification, initiation, development, production and commercialisation.

I have developed 170 products (26 Nutraceuticals, 10 Veterinary, 07 Equine, 05 Fishery, 07 Poultry, 40 Pharmaceuticals, 02 Biopharmaceuticals, 30 Cosmetics, 07 Homeopathic 06 Probiotics, 07 Prebiotics, 03 Dental, 05 Ophthalmic and 15 Ayurvedic) for Domestic and International market. Developed formulations and transferred successfully of tablets, capsules, liquids, ointment, cream, gel, dry powder and Injections of CNS, CVS, and Diabetic Class API. Formulation of Immediate and other release tablets, Capsules and Liquids, developing prototype formulations successfully for sublingual drops and formulation and development of Nutraceutical and Ayurvedic products are of my current interest.

I have a good experience right from brain Storming techniques, product identification, product selection, product development, scale up, production, QA & QC, co-ordinating with Clinical development of the new products. I also have experience in organising and conducting small business conferences with doctors in promoting the new products (Pharmaceuticals and Nutraceuticals). I always use to prepare product promotion literatures for preparing Leaflets and other product promotion materials. I have special interest in designing novel packaging concepts like pillow packs (Unit dosage forms) and newer delivery systems for all type of dosage forms.

**Topic: AI in medical device development**

Artificial intelligence and machine learning is a upcoming technology in medical device discovery and development for diagnostics, personalized medicine, drug discovery and development, robotic surgery, predictive analytics, manufacturing and quality control, verification and validation, patient monitoring. Drug device combination for medical devices are therapeutic or diagnostic products biologics and pharmaceuticals that involve a drug component of dose optimization, pharmacokinetics (PK) and pharmacodynamics (PD) modelling individualized dosing and regulatory submissions. Beyond combination products modelling and simulation can be applied to quantitative systems pharmacology, clinical trial design, and risk benefit assessment and dosing algorithms for devices. Medical devices integrated with drug eluting stents, digital therapeutics also integration with biologics and pharmaceuticals understanding the GMP and cGMP requirements of each component. AI based medical devices applications and benefits can be improved efficacy, enhanced safety, better patient outcomes and increased convenience, personalized and smart devices, predictive maintenance, improved functionality and adherence. AI based empowered medical device innovator will fulfil the regulatory demands of FDA, EU-MDR and ISO 13485 to GDPR and beyond to meet the highest standards. AI based in medical device development meet the requirements of both drug cGMP , GLP and device QS regulations.

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Dr. Sneha R. Ambwani has 30 years of experience in teaching and clinical research. She received the Best Paper Award from the Indian Pharmacology Society at the IPS Conference in Ahmedabad in 2000 and a


ISBN: 978-81-980623-8-3

Certificate of Appreciation from the Principal, Dr. S. N. Medical College, Jodhpur, for her outstanding performance and dedication as a faculty member in 2013. She was awarded the FAIMER Fellowship in 2018. She currently serves as Chair of the Animal Ethics Committee at AIIMS Jodhpur and the Institutional Ethics Committee of IIT Jodhpur. She has also chaired the Drug Trial Committee and the Biomedical Waste Management Committee at AIIMS Jodhpur. Dr. Ambwani has more than 90 research publications in national and international journals. She has actively participated in numerous national and international conferences and workshops, presenting many papers and delivering several plenary lectures, particularly on Good Clinical Practice, Rational Use of Drugs, Research Methodology, and Medical Education. She is also involved in various research projects funded by multiple agencies.

**Topic: Artificial Intelligence: Ethical Issues, Bias, and Challenges in Therapeutics**

Artificial intelligence is increasingly integrated into therapeutic decision-making, clinical workflow, and drug development. Its deployment in healthcare requires careful appraisal of ethical safeguards, potential biases, and implementation challenges to ensure patient safety and equitable outcomes. Ethical concerns remain central, particularly around informed consent, transparency of algorithmic functioning, data provenance, privacy protection, and accountability. Current national guidance emphasises rigorous protocol review, participant comprehension, data quality checks, and mechanisms such as the right to be forgotten to preserve autonomy and confidentiality. Ensuring that clinicians and researchers understand the limitations of AI tools and retain supervisory authority is essential for maintaining trustworthiness.

Bias is a critical limitation of AI with direct implications for therapeutic decisions. Models trained on non-representative datasets may propagate or amplify disparities in diagnosis and treatment. Under-representation of demographic or clinical subgroups can lead to reduced accuracy and inappropriate therapeutic recommendations. Bias mitigation requires transparency in data sources, external validation across diverse populations, and continuous monitoring, as model performance may drift with evolving clinical contexts. These concerns are consistently highlighted in recent evaluations of algorithmic fairness in medicine.

Beyond ethics and bias, practical implementation challenges affect AI adoption in therapeutics. Inconsistent digital infrastructure hinders reliable deployment. The dynamic nature of AI systems complicates regulatory oversight, as updates may alter model performance without necessitating formal re-evaluation. Defining responsibility for adverse outcomes, including the roles of AI tool developers, hospitals, and clinicians, remains unresolved in many regulatory settings. Building and sustaining patient trust requires clear communication about the role of AI relative to human judgment, particularly when AI influences high-stakes treatment decisions.

A structured approach that addresses ethical processes, minimises bias, and anticipates implementation barriers is essential for safe and equitable use of AI-driven therapeutic tools in clinical practice, research, and drug development.

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Prof. Sanjay Jachak is a Professor in the Department of Natural Products at the National Institute of Pharmaceutical Education and Research (NIPER), SAS Nagar (Mohali). He has been a faculty member at


ISBN: 978-81-980623-8-3

NIPER since 1999 and has served as Professor since 2011. He holds a Dr.rer.nat. (Pharmacy) [Ph.D.] from the Institute of Pharmaceutical Sciences, Karl Franzens University, Graz, Austria (1997), and an M.Pharm. from Pune University (1994).

His work focuses on phytopharmaceutical and nutraceutical/functional food development, AYUSH medicines, ethnopharmacology of Indian medicinal plants, standardization of herbal drugs and formulations, and phytochemical analysis. His research also includes the discovery of anti-diabetic and anti-obesity natural products and natural product inhibitors of bacterial efflux pumps. Prof. Jachak holds 5 patents and has published over 125 peer-reviewed papers in international journals. His Google Scholar metrics include an h-index of 41, an i10-index of 75, and 6,132 total citations (as of 01-12-2025). He has guided 14 Ph.D. scholars (with 9 currently working under his supervision) and has mentored 134 master's students.

**Topic: Application of AI-Driven Ayurinformatics for Development of AYUSH Medicines and Phytopharmaceuticals**

The integration of artificial intelligence (AI) and data-driven technologies into traditional systems of medicine has given rise to a novel interdisciplinary field known as Ayurinformatics, which combines the wisdom of Ayurveda with modern computational and analytical tools. It also facilitates efficient, large-scale reverse pharmacological validation of the practices in Ayurveda [1]. Further considering wider interests in the field of in-silico analysis of medicinal plants and traditional medicine formulations, we have recently published Gupta and Jachak guideline for a Pre-Step analysis of medicinal plants for In Silico research (SAPPHIRE: Systematic assessment and Pre step protocol for herbal in silico research and evaluation) [2]. Keeping this in view, we at NIPER-SAS Nagar studied Ayurvedic formulations for their mechanism of action utilizing 'Ayurinformatics' approach. A case study of two such Ayurvedic formulations viz. Arogyamrit Kwath and Dashmoola Asthang Kwath developed by us in collaboration with Dhanwantary Ayurvedic College, Chandigarh; is being presented in this lecture [3]. Both the formulations were studied for metabolomics using LC-HRMS analysis, in vitro and in-silico studies. The study highlights the translational potential of these formulations toward modern antiviral therapy and demonstrates a significant step toward the global acceptance of Ayurvedic herbal solutions driven by AI and advanced technology. Artificial intelligence can be beneficial for development of phytopharmaceutical product development. In conclusion, the application of Ayurinformatics to Ayurvedic system of medicine is a novel approach and could unravel better and rationale use of Ayurvedic formulations.

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D. B. Anantha Narayana is a pharmaceutical scientist who has led development and successful marketing of pharmaceutical, Oncology drugs, Ayurvedic & Herbal products, cosmetics & Nutraceutical/ Food Supplements for more than 4 decades. He has championed notifications of a number of new regulations namely Nutraceutical Regulations, Phytopharmaceuticals Regulations, and more recently Ayurveda Aahara Regulations. He serves in various Expert Committees of FSSAI , CSIR, CCRAS, IPC, and other organizations.

He has also supported and led generation of evidence of benefit for drugs, ayurvedic, food supplements. He has also led contemporary dosage form development and technology development for a large no, of Ayurvedic/ Herbal products. He is recipient of Patanjali Life Time Achievement award of IUFOST, 2019, Mumbai, Eminent Pharmacist Award of Indian Pharmaceutical Association 2007,


ISBN: 978-81-980623-8-3

and IPA-IRF Life Time Achievement Award, 2022.

He has authored and edited four books, has published more than 35 research and strategy papers, reviewer of research papers for number of Journals.

**Topic: Phytopharmaceuticals Emerging Botanical Drug Development for Opportunities for Indian Pharma Industry -Attention Drawer**

India is bestowed with long History of usage of botanicals in our TK, which often gets criticised as "needing more evidence ". In 2015, many years post US FDA publication of Guidance to Botanical Drugs, Government of India amended the Drug Regulations by Introducing Regulations that govern Phytopharmaceuticals. This opened up new drug development from "purified fractions of botanicals, characterised with analysis of four marker compounds" for full scientific data generated to get reviewed as a New Drug by CDSCO. Such drugs will be on line with any NCE based drug approved by CDSCO. Differences between the Traditional medicines like Ayuirvedic drugs, scientific requirements for submission of an IND file to CDSCO, Global developments in Botanical drugs approvals so far, Current scenario in this filed, progress by National laboratories, Challenges, and Suggestions for successful developments will be elaborated. Indian Pharma needs to take leads in this area for Atma Nirbhar and Viksit Bharat contributions in addition to current generic drug development.

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**Dr. Raghavendra P Rao**

Senior Principal Scientist, Wellness,

Drug Discovery, AI/ML, and Healthcare Data Science

The Himalaya Wellness Company, India

Dr. Raghavendra P Rao currently holds the position of Senior Principal Scientist at The Himalaya Wellness Company in India, where he leads initiatives across Wellness, Drug Discovery, AI/ML, and Healthcare Data Science. He began this role in February 2015, bringing with him over 20 years of extensive post-doctoral research experience in the life sciences sector. Dr. Rao specializes in the scientific validation of natural and wellness products, as well as managing drug discovery projects with a specific focus on metabolic disorders like diabetes and liver conditions. He holds a Ph.D. in Biochemistry from the University of Mysore and completed further advanced training at institutions including the National Cancer Institute (NIH) in the US and the Indian Institute of Science. Recognized for his expertise in applying advanced data analytics and machine learning algorithms to healthcare R&D, he is an active speaker at industry conferences and contributes to various academic institutions.

**Topic: AI powdered Phytochemical screening and Lead Identification**

The identification and development of novel therapeutics from phytochemicals remain a cornerstone of innovative drug discovery. Despite the abundance of publicly available data detailing activity profiles of small molecules and phytochemicals, extracting meaningful patterns, and linking molecular structure to biological function continue to be a significant challenge. Conventional cheminformatics platforms, though valuable, often require substantial manual effort and are limited in their adaptability to the complexity and scale of contemporary phytochemical datasets.

Recent advancements in artificial intelligence (AI) and machine learning (ML) are transforming ligand-based drug discovery, providing sophisticated tools to unravel complex structure-activity relationships. These techniques—now accessible through user-friendly platforms—enable the automated mining of large, heterogeneous datasets, revealing subtle correlations that traditional analyses might overlook. In particular, prediction and clustering algorithms such as support vector


ISBN: 978-81-980623-8-3

machines, random forests, and various clustering methods play a important role in classifying molecules, predicting activity spectra, and prioritising potential leads. The adoption of agentic AI approaches further enhances this process, introducing intelligent agents that automate repetitive tasks, and deliver actionable insights for decision-making.

This talk covers key aspects of selecting and preparing datasets, as well as applying AI and machine learning algorithms—especially those used for prediction and clustering—in phytochemical screening and identifying drug leads. It will also explore how agentic AI techniques can be adapted to speed up the process of discovering new phytochemical drugs.

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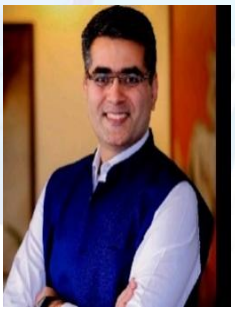
**Dr. Vikas Bansi**

OTC Business Head-India
Himalaya Wellness Company



Vikas Bansi is a highly focused and result-oriented executive serving as the OTC Business Head – India at Himalaya Wellness Company (formerly The Himalaya Drug Company). In this strategic leadership role, he oversees the overall business strategy, sales, marketing, and expansion of the company's Over-The-Counter (OTC) consumer healthcare portfolio in India—one of Himalaya's most critical global markets. Under his leadership, the India OTC division has emerged as one of the fastest-growing worldwide, consistently delivering growth rates more than three times the category average.

Bansi is the chief architect of Himalaya's OTX Business Model, a robust framework designed to build scientific credibility while ensuring deep market penetration. This model is anchored on three strategic pillars. The Ethical Channel focuses on engaging healthcare professionals to establish scientific rigor, with outreach to over 75,000 doctors exclusively for OTC products. The Trade Channel drives widespread availability, targeting distribution across nearly 200,000 retail outlets through general trade, modern retail, and e-commerce platforms. The Consumer Marketing Channel delivers integrated 360-degree campaigns leveraging digital media, influencers, and radio to build awareness, trial, and trust.

His strategic vision aligns closely with evolving consumer behavior, particularly the growing preference for preventive healthcare and wellness in the post-pandemic era. Bansi is actively integrating Himalaya's strong Ayurvedic heritage with modern scientific validation, while introducing innovative formats such as gummies, drink mixes, and organic variants tailored to contemporary lifestyles.

A respected industry voice, Bansi regularly contributes thought leadership on India's nutraceutical and consumer health landscape, emphasizing the importance of innovation, digital transformation, GMP compliance, and clinically validated quality standards to build sustainable and trusted wellness brands

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**G. Narahari Sastry**

Professor (HAG scale)

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Dr. G. Narahari Sastry is a professor at the Department of Biotechnology, IIT Hyderabad. His research interests are working in the interdisciplinary areas of chemistry, biology, material science, software development and artificial intelligence. In the last decade, the GNS group was involved in developing indigenous software that aims to strengthen


ISBN: 978-81-980623-8-3

computational drug discovery called the Molecular Property Diagnostic Suite (MPDS), thereby working towards Aatma Nirbhar Bharat. Dr. Sastry has also made fundamental contributions in the field of non-covalent interaction, Bucky bowl chemistry, aromaticity, and pericyclic reaction. He has made a great contribution in open-source software development in the field of Computer-Aided Drug Discovery, databases, and web servers; all the resources developed by his group are freely accessible to the scientific community. Prior to joining IITH in 2024, Professor Sastry was the Director of CSIR-North East Institute of Science and Technology (NEIST), Jorhat, Assam from February 2019. Before working at CSIR-NEIST, he was the chief scientist and head of the Canter for Molecular Modelling Division at CSIR-IICT, Hyderabad from 2002-2019. Prior to that Dr. Sastry has served as a Lecturer, Department of Chemistry, Pondicherry University, Pondicherry. Dr. Sastry has obtained his Postdoc studies from Israel and Switzerland (1994-1997) and Ph.D. degree from University of Hyderabad, Hyderabad.

Dr. Sastry was awarded with Shanti Swarup Bhatnagar Prize in Chemical Sciences (2011), National Bioscience award, DBT (2009), (one of the highest for Life sciences in India), Swarnajayanti Fellowship (2005) (DST), B.M. Birla award (2001), Dr. B.C. Deb Memorial award (2009), CRSI Bronze Medal (2011), CRSI Silver Medal (2024) and Alexander von Humboldt Fellowship. He is also Sir J. C. Bose National Fellow. He was a visiting professor at IMS, Japan; LMU, Munich, Germany; Jackson State University, USA, and Kyushu University, Japan. He is a Fellow of INSA (FNA), National Academy of Sciences (FNASc), Fellow of the Indian Academy of Sciences (FASc), Fellow of Royal Society of Chemistry (FRSC), Fellow of Association of Biotechnology and Pharmacy, Telangana State Academy of Sciences (Founder Fellow), Andhra Pradesh Academy of Sciences (FAPAS) and also Fellow of Biotech Research Society, India (BRSI).

**Topic: Machine learning and AI Applications in Protein Structure-Function, Drug Discovery, and Healthcare**

The technological revolution being witnessed today largely owes to the emergence of Artificial Intelligence, and particularly machine learning, which has impacted both basic and applied sciences. The ability to ask scientific questions and probe the new technological space was greatly enhanced due to the new roads made by intelligent technologies. In this talk, I would like to focus on three areas: a) protein structure-function relationships, b) drug discovery and c) health care, and how these emerging technologies have metamorphosed the research practices in these fields. The impact of the AI-driven technologies in hit and lead identification, lead optimization, animal and clinical trials will be analyzed with some illustrative case studies. Examples will be given where the top-niche human skills are being slowly replaced by machine unusual correlations between these areas. Some of the fundamental questions on aging, metabolic disorders, degenerative diseases, and geriatric care will be addressed. Importantly, how these questions can be effectively addressed by using AI and ML approaches will be explained.

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**Aarshit Mittal**

Chief Product Architect

Chief Technology Officer,

Aarth Software Pvt. Ltd. | Co-Founder, OCSR.ai

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Aarshit Mittal is a deep-tech entrepreneur and AI systems architect focused on transforming scientific discovery through intelligent automation. He leads OCSR.ai, the world's first unified scientific intelligence platform that digitizes R&D data and accelerates drug discovery from years to weeks.

His collaboration with the Institute of Chemical Technology (ICT) Mumbai led to India's first AI-designed dual COX-2/mPGES-1 inhibitors. His expertise spans


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cheminformatics, retrosynthesis, ADMET modeling, and large-scale knowledge graphs. building the next generation of AI infrastructure that unifies data, reasoning, and discovery into one intelligent ecosystem.

**Topic: Reimagining Drug Discovery with Unified Scientific Intelligence**

Modern drug discovery suffers from fragmented data, slow iteration, and high attrition. In this talk, Aarshit Mittal presents how OCSR.ai integrates multimodal AI.. combining document intelligence, chemical reasoning, retrosynthesis, protein modeling, and ADMET prediction.. into a single cohesive platform. By bridging silos between chemistry, biology, and knowledge graphs, OCSR.ai enables discovery timelines to shrink from years to weeks. The session highlights India's first AI-generated dual COX-2/mPGES-1 inhibitor series co-developed with ICT Mumbai, demonstrating how unified AI systems can accelerate innovation, enhance reproducibility, and unlock the true potential of R&D intelligence at scale.

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**Praful R. Naik, Ph.D.**

Director & CEO

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Praful Ramachandra Naik has Bachelors (1985), Masters (1987) and Doctorate (1992) degrees in Pharmaceutical Sciences from the Department of Pharmaceutical Engineering & Technology, Indian Institute of Technology, Banaras Hindu University. During 32 years of Industrial experience, Praful steered creation of diverse inventions resulting in over 50 globally granted patents & over 200 patent applications globally, in diverse industrial segments A proponent of innovations, Praful also steered the invention of path-breaking "nonClonableID (nCiD) Technology" which was formally launched by Late Respected Dr. A P J Abdul Kalam, Former President of India and got adjudged by CSIR as "Being the first disruptive technology from India to the world" based on outcomes of its sponsored national project. Praful founded Prashak Techno Enterprises Pvt. Ltd. in 2014 (www.prashak.com), which is engaged in development and deployment of revolutionary Habitech-NivaraTantra® Building and Onsite Sanitation technologies with Praful as an co-inventor, for creation of greener, cleaner, energy efficient, sustainable and affordable community housing clusters and buildings. Praful was nominated to various national & international committees, conferred awards and invited as speaker to several national / international conferences including being invited as speaker at the prestigious Science and Technology Forum 2010 at Kyoto, Japan.

**Topic: Integrated Innovations: Converging Pharma And AYUSH Sciences To Propel Next-Gen Divergent Innovations & Solutions For Unmet Medical Needs**

India stands at a unique crossroad in the global healthcare innovation landscape — possessing, on one hand, a robust modern pharmaceutical research ecosystem, and on the other, an unparalleled legacy of traditional AYUSH knowledge systems rooted in Ayurveda, Yoga & Naturopathy, Unani, Siddha, and Homeopathy. Despite their shared goal of restoring and maintaining health, these domains have historically evolved in isolation. The integration of their principles, methodologies, and technological strengths presents an extraordinary opportunity to create HYBRID, ADAPTOGENIC INNOVATIONS in a convergent, translational framework for holistic, affordable, and evidence-based healthcare. India's traditional systems of medicine (AYUSH) represent a vast repository of empirically validated phytochemical knowledge. However, these systems often remain disconnected from modern pharmaceutical discovery pipelines. This presentation introduces an integrated innovation framework that bridges this divide by


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uniting phytochemical wisdom with advanced pharmaceutical technologies such as molecular docking, NDDS, nano-formulation, personalized medicine and AI-based compound synergy mapping. The model focuses on (a) scientific validation of AYUSH actives, (b) formulation using advanced development pharmaceutics, (c) co-formulation with allopathic APIs to achieve multi-target efficacy, (d) sustainable extraction and manufacturing aligned with circular economy principles, and (e) translation of these technologies into accessible, affordable community healthcare solutions. Case illustrations include curcumin-based nanoemulsions for inflammatory disorders, adaptogenic formulations and co-formulations integrated into controlled-release delivery systems, botanical antioxidants paired with anti-diabetic APIs to minimize adverse effects and hybrid co-formulations for unmet medical needs with a special focus on Cancer, Viral, Blood Purification, Obesity, Neurological ailments. The integrative approach an Integrated Pharma–AYUSH Innovation Platform (IPAI), if done in a proper and systematic manner will enable advances in preventive and personalized medicines, strengthen India's R&D and regulatory frameworks, and position the Nation as a global leader in evidence-based holistic health innovations combining sustainability, innovation, and ancient wisdom into a unified health paradigm which in turn will substantially advance India's health innovation goals under the "Atmanirbhar Bharat" and One Health missions.

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**Indiran Pather, D. Pharm**

Professor: Department of Pharmaceutical Sciences

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Dr. Pather holds B Pharm, M Pharm and Doctor of Pharmacy degrees. The research work for his terminal degree was done at the University of Missouri – Kansas City and at the pharmaceutical company, Marion-Merrell Dow, while it was awarded by the University of the Western Cape, South Africa. He has worked in retail pharmacy, hospital pharmacy and has been a founding member of a few start-up companies. He was also a founding faculty member and inaugural chair of the Pharmaceutical Sciences Department at an American University. Dr. Pather has extensive teaching experience both in South Africa and in the United States. He has also worked for 10 years in the US pharmaceutical industry, rising to the position of Director of Pharmaceutical Sciences, before returning to academia.

Dr. Pather's expertise is in novel delivery systems, particularly buccal and sublingual delivery. His work has covered basic science as well as the development of novel drug delivery products and he has, in a few instances, developed industrial test methods where no compendial or standard methods existed. He has developed novel tablet formulations, including effervescent, orally disintegrating, and externally lubricated tablets. He has also worked in the areas of emulsions, cosmetic formulation and development, and novel sunscreen formulations.

Dr. Pather played the lead role in the development of two FDA-approved products and has published several papers and book chapters. He co-edited a book, Oral Mucosal Drug Delivery and Therapy, and was the sole author of the recently published textbook, Pharmaceutics for Pharmacy Students (McGrawHill Professional). He has 21 US patents and several international patents to his credit. He has served as consultant to pharmaceutical companies both in the US and internationally (including India). He serves as an expert witness in patent infringement litigation.

**Topic: Some Contributions to Buccal and Sublingual Drug Delivery**

The presentation begins with a brief introduction to buccal and sublingual drug


ISBN: 978-81-980623-8-3

delivery and the advantages of this route over swallowed medication. This is followed by a description of some basic science issues, including the methods for the preparation and storage of animal buccal tissue for ex vivo experiments, that were investigated. The resolution of some of these issues contributed to science in this area of drug delivery. In some instances, widely accepted methods were found to be defective. The effects of temperature on drug absorption through the oral mucosa were also investigated and generalizable information, gleaned from this work, is described.

The development of novel buccal-and-sublingual drug delivery systems for specific molecules are then described. The advantages of these products over conventional medications are elucidated and their contributions to therapy are mentioned. One of these was recognized by the FDA as a new indication.

Beyond these areas of experimental investigation, there are some new directions that the presenter is exploring which could be used advantageously and they are also briefly presented. Some of the learnings from buccal and sublingual drug delivery have implications for an alternate, novel route of drug delivery and the presentation ends with a forward-thinking discussion of these implications.

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**Muralikrishnan Dhanasekaran**

Professor &
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Alumni Professor

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Dr. Muralikrishnan Dhanasekaran is an Alumni Professor and Administrative Fellow in the Graduate School at Auburn University, USA. He has mentored numerous undergraduates, Honors College, graduate, and professional (Pharm.D.) students, and has authored nearly 160 peer-reviewed international publications, over 500 scientific abstracts, and nearly 90 book chapters. He has also served as Editor for more than twelve scientific books and is an active reviewer for multiple international journals and grant agencies. Dr. Dhanasekaran's research laboratory specializes in preclinical neuropharmacology and drug development, with a focus on the neuroprotective and neurotoxic effects of natural bioactives and synthetic molecules. His current research aims to identify and develop novel therapeutic agents for epilepsy, Alzheimer's disease, and Parkinson's disease. As an Administrative Fellow, Dr. Dhanasekaran has served as both a member and leader on various college, departmental, and university committees. He is actively involved in national and international graduate student recruitment and is dedicated to enhancing the welfare, engagement, and professional development of postdoctoral associates. In recognition of his academic, research, and outreach contributions, he has received numerous prestigious national and international awards for teaching, mentorship, research, and service.

**Topic: Empowering Pharmacists in Bridging Global Healthcare Gaps: The Crucial Role of Outreach in the Subcontinent and Beyond**

Pharmacist-led outreach activities are pivotal in addressing critical global healthcare gaps within underserved populations, not only in India but also in neighboring countries such as the Maldives and Sri Lanka. In the subcontinent, silicosis is an irreversible occupational respiratory pathology which continues to affect countless manual workers exposed to silica dust yet remains a largely derelict public health challenge. As trusted and accessible healthcare professionals, pharmacists are uniquely positioned to drive early detection, patient education, prevention, and medication adherence for silicosis management. Through targeted outreach,


ISBN: 978-81-980623-8-3

pharmacists can initiate impactful awareness campaigns, conduct health screenings, and collaborate with community leaders to reduce the burden of this debilitating condition. Beyond silicosis, pharmacist outreach programs in the subcontinent have the potential to transform health outcomes by addressing a spectrum of unmet needs, from chronic disease management to health promotion in rural and peri-urban settings. In geographically isolated regions such as the Maldives, pharmacist-led initiatives serve as a vital bridge to healthcare, delivering medication management, education, and support to remote island communities. Empowering pharmacists as leaders in community outreach not only strengthens healthcare systems but also enhances community engagement, advances preventive care, and ensures equitable access to essential health services. As India continues to navigate its healthcare challenges, prioritizing and expanding pharmacist-led outreach is essential for achieving health equity and improving public health outcomes. This keynote will highlight the transformative impact of pharmacist outreach in the subcontinent and share insights for advancing these efforts in 2025 and beyond.

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**Dr. Zeenat Iqbal**

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Dr. Zeenat Iqbal, Professor in the Department of Pharmaceutics at the School of Pharmaceutical Education & Research (SPER), Jamia Hamdard, is recognized for her outstanding contributions to Pharmaceutical sciences and academic leadership. A Gold Medalist in both B. Pharm and M. Pharm and a PhD in Pharmaceutics, from Jamia Hamdard, she has established a strong footprint in advanced drug delivery, nanotechnology-based therapeutics, topical formulations, and biofilm-targeted systems with current areas of research in cancer, (Women- Reproductive centric) vaginal and periodontal drug delivery. With over 239 peer-reviewed publications, 47 book chapters, and 8 patents to her credit, she exemplifies scholarly excellence and innovation in drug delivery research. She has consistently contributed high-impact work to pharmaceutical sciences. She has supervised 69 M. Pharm and 20 PhD researchers and led multiple government-funded projects from ICMR, SERB, CSIR, DBT, AYUSH, and AICTE. Current projects include immune-modulatory formulations (UNIM series) and nanofiber-based periodontal therapies, with significant grants exceeding ₹76 lakhs. She is also involved in consultancy collaborations with Ayurvedic and pharmaceutical industries for evaluating hepatoprotective, anti-diabetic, and permeation studies of herbal/UNANI products. She has organized more than 60 conferences, symposium and workshops.

**Topic: Quality by Design (QbD) approaches for periodontotherapy: Insights into biofilm disruption based advanced drug delivery systems**

Periodontotherapy has recently witnessed a paradigm shift from using traditional systemic antibiotics or mere mouth rinses or washes to loco-regional advanced drug delivery systems which are inserted into periodontal pocket ensuring prolonged drug release whilst reducing the undesirable effects. Plaque construction alongwith biofilm deposition is a challenging fallout of periodontitis which often compromises therapeutic outcomes. Our research team has formulated advanced drug delivery systems namely nanoencapsulated microparticles and nanofibers using QbD approaches. The current presentation would dwell upon the design , development and evaluation of such systems with a a focus on the associated attributes of biofilm disruption alongwith assessing the in vitro and in vivo success.

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ISBN: 978-81-980623-8-3

**Pranjal Chandra**

Associate Professor and Ramanujan Fellow, Coordinator

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Prof. Pranjal Chandra is an Associate Professor and coordinator / head at the School of Biochemical Engineering, Indian Institute of Technology (BHU), Varanasi, India. He earned his Ph.D. from Pusan National University, South Korea and did post-doctoral training at Technion-Israel Institute of Technology, Israel. His research focus is highly interdisciplinary, spanning a wide range in biotechnology, nanobiosensors, material engineering, and nanomedicine. He has designed several commercially viable biosensing prototypes that can be operated for onsite analysis for biomedical diagnostics. He has also been appointed as Advisor for the Biomedical Sensors Domain and Sensor Networks Systems at the Institution of Engineering and Technology (IET), Michael Faraday House, LONDON, United Kingdom. Prof. Chandra is author of over 210 high impact publications including research / reviews papers and invited book chapters. He has published 25 books on various aspects of biosensors/medical diagnostics / material engineering. His publications are cited over 11,000 times with the h-index of 65. Prof. Chandra is the recipient of many prestigious awards, coveted honours, and fellowships such as: Fellow of National Academy of Sciences (FNASc), Fellow of Royal Society of Biology (FRSB), Shakuntala Amirchand Award 2020 by Indian Council Of Medical Research; Fellow Indian Chemical Society (FICS), DST Ramanujan fellowship (Government of India); Early Career Research Award (ECRA) (DST, Government of India); BK -21 and NRF fellowship, South Korea; Technion Post-Doctoral Fellowship, Israel; Nano Molecular Society India Young Scientist Award; Biotech Research Society India Young Scientist Award; Young Engineers Award 2018; Highly Cited Corresponding authors in The Royal Society of Chemistry (RSC), Cambridge, London; Top 10% cited article in the General Chemistry Section RSC Journal, Cambridge, London, Gandhian Young Technology Innovation Award (GYTI) 2020, etc.

**Topic: Field Deployable Point-of-Care Sensing Technologies in Decentralized Diagnosis**

Robust, reliable and quantitative detection of biomarkers at ultra-low concentration is of great importance in clinical settings. Sensor, an analytical device used for sensitive and selective detection of biomarkers offers various advantages over the conventional clinical diagnosis, which is both time consuming and not suitable for point of care/onsite diagnosis. The bioreceptors embedded in the sensing chip include antibodies, aptamers, enzymes, bio bodies etc. for detection as well as providing the analytical signals. A revolution in the understanding and synthesis of nanomaterials in the last couple of decades has also contributed significantly to the development of the biosensors in terms of sensitivity, catalytic activity, biocompatibility, and robustness. Additionally, nanomaterial engineering helped in miniaturization of the sensing platform eventually helping in the commercial success of portable biosensing devices. Such platforms have tremendous promise in detecting various analytes including disease biomarkers, microbes, chemical compounds. This presentation is focused on the engineering design of sensor systems using engineered bioreceptors and nanocatalytic systems etc. Recently developed nanoscale materials-based transduction systems will be discussed with clinical biomarkers that can be further directed towards the detection of various biomarkers in clinical research. Recently reported signal transductions strategies, promising personalized smart phone assisted electrochemical sensing platform for disease diagnosis will also be discussed.

Keywords: Nanobioengineering; Disease; Biosensors; Human Heath, Material Engineering.


ISBN: 978-81-980623-8-3

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**Dr. Pooja Goswami**

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Dr. Pooja Goswami is an accomplished Clinical Scientist and Entrepreneur with a rich background in Molecular Biology, Clinical Research, and Infection Detection Technologies. With over 13 years of experience at the All India Institute of Medical Sciences (AIIMS) and her entrepreneurial journey since 2018. Dr. Pooja Goswami has made groundbreaking strides in the development of cutting-edge biosensor technologies for healthcare applications. As the Founder and Director of RAMJA Genosensor Pvt. Ltd., she has been pivotal in creating the world's first Point-of-Care Electrochemical DNA Biosensor for detecting microbial infections and antimicrobial resistance (AMR) in just 90 minutes. Her company has developed and validated several pioneering products such as NANOSHOT (Infection prevention nanoparticle solution stays for any surface for 4 days after one spray) and PRATHAMASESNE -infection detection in 90 minute, UTI, SEPSIS, PNEUMONIA Antimicrobial resistance. , which are now available in the market, providing critical solutions in infection prevention and detection. Recognized by multiple prestigious awards and grants, Dr. Goswami has played a vital role in advancing healthcare diagnostics and infection control, leveraging AI, patented technology, and innovative approaches.

**Topic: Accelerating the AMR Pipeline: How 90-Minute DNA Biosensing Re-defines Drug Discovery, Clinical Trials, and Antibiotic Repurposing**

The escalating crisis of Antimicrobial Resistance (AMR) demands a paradigm shift in both diagnostics and drug development. RAMJA Genosensor presents a transformative solution with its proprietary PRATHAMASENSE platform—a DNA biosensor that delivers gene-specific AMR profiles directly from clinical samples in just 90 minutes. This technology moves beyond the 24–72 hour delay of conventional methods, establishing a new foundation for precision medicine and pharmaceutical innovation.

The RAMJA Genosensor is not merely a diagnostic tool; it is a scalable foundation for a unified drug discovery and surveillance ecosystem. By bridging the critical gap between rapid detection and genomic intelligence, the platform offers the pharmaceutical industry an essential weapon to redefine its response to AMR.

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**Mr. Vijaykumar Shivpuje**

Director– Intellectual Property Rights,

Patlex Business Solutions,

Co-founder, Pharma Literati, Mumbai, India

Mr. Vijaykumar Shivpuje is M. Pharm + LLB + MBA by qualification. He brings with him 20 plus years of experience in Pharma Corporates, Law firms, Knowledge Process Outsourcing firm. With experience in both innovation and generics with leading organizations like Sun Pharma (erstwhile Ranbaxy Research Laboratories), Wockhardt Research, Glenmark Pharmaceuticals, and Micro Labs, he started his entrepreneurial ventures Patlex Business Solutions and Pharma Literati. His team is guiding more than 100 academic institutions and 50 plus corporates for IPR strategy, patent filings and commercialization. With more 400 plus IPR filed and 150 plus IPRs granted, he has been instrumental in bridging the gap between MSMEs, Policy makers, Startups, Corporates and Academic Institutions.

**Topic: Breaking the Myths: What Pharma Innovators Should Really Know About Patents.**


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The talk covers significance of Patents in the pharmaceutical area both for academics and industries.

Patents are often surrounded by misconceptions that lead to missed opportunities, inadequate filings, and legal challenges. This session aims to clarify the fundamental principles of patentability in pharmaceutical inventions and guide pharma innovators in making informed, strategic decisions about patent filings.

The talk also covers opportunities for Academicians, MSMEs and Startups about commercialization of the patents and technology transfer related to the same and not just restricting the patents for NIRF/ NAAC or Investor pitches.

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**Prof. Mirza R. Baig**

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Prof. Dr. Mirza R. Baig currently serves as the Program Director-Post Graduate studies at College of Pharmacy, Dubai Medical University. He earned his Ph.D. in Clinical Pharmacy from the esteemed Universiti Sains Malaysia (USM) and brings over 22 years of international experience in academia and research, having worked extensively in Malaysia, India, and the United Arab Emirates. Prof. Baig has been recognized among the top scientists globally in the 2024, 2025 in Scientific Index. His innovative research has led to the awarding of one German patent in 2022 and two U.S. patents in 2024, in collaboration with King Abdulaziz University, Saudi Arabia. He has coauthored seven books on Clinical Pharmacy, including a recent editorial contribution to a Springer publication titled Drug Development, released in April 2024. His scholarly work comprises more than 120 peer-reviewed research articles published in reputable international journals, with his latest paper appearing in Oct 2025. Prof. Dr. Baig is frequently invited to serve as a chairperson, speaker, and moderator at high-profile international conferences and seminars. He holds editorial board memberships in several prestigious journals and is a peer reviewer for multiple Elsevier publications. He has mentored numerous master's and Ph.D. candidates and served as an external examiner for postgraduate theses at both Indian and international universities. Throughout his distinguished career, Prof. Dr. Baig has been honored with numerous accolades, including the Distinguished Alumnus Award (2024) from KLE University, India; Best Research Project Awards at conferences hosted by Al Ain University (2023) and the University of Sharjah (2019); and the Best Professor in Clinical Pharmacy Award at the Middle East Educational Awards (2018). His presentations have earned top honors at major forums such as DUPHAT Dubai and the Indian Pharmaceutical Congress (IPC), and he was recognized as an Outstanding Scientist by a prominent research foundation in India (2016).

**Topic: Smart Simulations: Redefining Pharmacy Education for the AI-Driven Healthcare Era**

This presentation will focus on how advanced simulation techniques, including virtual patient simulations and AI-driven models, can revolutionize pharmacy education and training. By integrating these technologies into curricula, we can better prepare pharmacy students and professionals to navigate complex patient care scenarios, make data-driven decisions, and enhance therapeutic outcomes. This approach aligns with the broader theme of innovation and empowerment in healthcare and patient care.

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ISBN: 978-81-980623-8-3

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Biomedical Educator and researcher with a neuroscience background, dedicated to transforming education through innovative pedagogies that bridge artificial intelligence, and medical learning. I strive to inspire curiosity, empower students to reach their full potential, and foster a lifelong passion for science and discovery. ACADEMIC EXPERIENCE INSTRUCTOR, DEPARTMENT OF PHARMACOLOGY, NUSMED. July 2024 – Present. Lead and contribute to teaching, student mentorship, curriculum development, and course coordination across interdisciplinary programs—including undergraduate life sciences, Master's in Medical Pharmacology, and medical and nursing education. Drive innovation in pharmacology education through learner-centered strategies and evidence-based practices.

**Topic: AI as a Teaching Partner: Shaping the Future of Pharmacology Education at NUS Medicine**

Artificial intelligence (AI) is redefining the educational landscape, offering novel possibilities for enhancing engagement, personalization, and competency-based learning. In pharmacology education, AI's potential extends far beyond automation — it can serve as a teaching partner that supports both educators and learners in transforming how complex biomedical concepts are understood, applied, and retained.

At the National University of Singapore (NUS) Yong Loo Lin School of Medicine, we have begun integrating AI-powered tools into pharmacology and precision medicine curricula to promote active learning and critical thinking. These include the use of generative AI for formative assessment design, automated feedback in concept-map assignments, and AI-based flashcard and case-simulation platforms that encourage retrieval practice and spaced repetition. By embedding these innovations within undergraduate and Master's-level modules, we aim to cultivate adaptive learners equipped to navigate data-rich and technology-driven healthcare environments.

This talk will share insights from our teaching innovations, student feedback, and preliminary outcomes showing improved learner engagement and knowledge retention. It will also discuss challenges such as ensuring academic integrity, ethical use of AI, and balancing human mentorship with technological facilitation.

Ultimately, this presentation envisions AI not as a replacement for educators, but as an empowering collaborator that enhances creativity, efficiency, and inclusivity in pharmacology education — shaping the next generation of scientifically grounded and AI-literate healthcare professionals.

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**Karthik Raman**

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Karthik Raman is a Professor at the Department of Data Science and AI at the Wadhwani School of Data Science & AI (WSAI), IIT Madras. Karthik's research group employs a three-pronged strategy, combining networks, models and AI, to understand, predict and manipulate complex biological networks. Karthik's group has developed multiple scalable algorithms and computational frameworks, applicable across synthetic and systems biology. Key focus areas in his research encompass microbiome systems biology, in silico metabolic engineering, biological network design, and biological big data analysis. Karthik also co-ordinates the Centre for Integrative Biology and Systems mEdicine (IBSE) at IIT Madras, fostering interdisciplinary collaborations. Karthik's


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group has extensive collaborations with industry partners, exploring how data science and AI can deliver impactful insights for pharma, healthcare, and life sciences.

Alongside his research, Karthik is deeply invested in teaching and mentoring. At IIT Madras, he teaches first-year undergraduate courses in programming, data structures, and algorithms, as well as advanced courses in computational and systems biology. He has also authored a textbook on Computational Systems Biology.

Beyond his core research and teaching, Karthik is actively engaged with the emerging landscape of AI literacy and education. He has contributed to national AI curriculum development, including initiatives like AI Samarth, which aims to empower students across India to engage with AI meaningfully, safely and responsibly. He is also an advisor at the Office of Global Engagement, IIT Madras, where his team has enabled funding and smooth execution of several major international conferences at IIT Madras.

**Topic: AI, Models and Networks: A trifecta reshaping early-stage drug discovery**

Early drug discovery remains one of the most demanding stages in pharmaceutical development, where pivotal choices about targets, pathways, and candidate molecules largely determine future clinical outcomes. In this talk, I will argue that the integration of AI, networks, and models offers a powerful means to reduce uncertainty and guide discovery more systematically. I will begin with PURE, our recently developed framework for structure-constrained molecular generation. PURE combines self-supervised learning with policy-guided reinforcement learning to address limitations of current deep learning methods. By avoiding biases from task-specific metrics and working directly in the discrete molecular space, it produces novel, diverse molecules that balance structural similarity to reference compounds with desirable properties. Next, I will trace how complementary network- and model-based approaches broaden the possibilities of early discovery. Model-based analyses, as in our work on metabolic vulnerabilities in Candida albicans and on synthetic lethality in metabolism, show how mechanistic insights can inform target identification. Similarly, predictive models of cancer driver genes highlight how AI can uncover potential therapeutic targets. Taken together, these examples show how AI, networks, and models work in concert: AI learns from heterogeneous data, networks expose key relationships and structures, and models supply mechanistic grounding. This synergy has the potential to transform early discovery from a largely trial-and-error process into a more systematic, data-driven science.

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**Debjani Paul**

Institute Chair Professor

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Prof. Debjani Paul is an Institute Chair Professor in the Department of Biosciences and Bioengineering at the Indian Institute of Technology Bombay, Mumbai. After obtaining a Ph.D. in Physics from the Indian Institute of Science, Prof. Paul did her postdoctoral research at the Curie Institute and the University of Cambridge. After a short stint at a pharma company in Mumbai, Prof. Paul started her research group at the Indian Institute of Technology Bombay. Her research group develops microfluidic technology platforms for different healthcare applications and to address research questions at physics-biology interface. ShapeDx, a patented sickle cell diagnosis technology, developed by her research group has recently been approved by the Indian Council for Medical Research. Prof. Paul is an Associate Editor of the journal Bioengineering and Translational Medicine. She is also a member of the Editorial Boards of the journals PLoS Global Public Health and NPJ Biomedical Innovations.


ISBN: 978-81-980623-8-3

**Topic: Microfluidic devices for healthcare and biomaterial applications**

Physical properties of cells, such as, size, shape and deformability have recently generated a lot of interest as potential biophysical markers for different diseases. For example, infection by the malarial parasites makes the infected red blood cells (RBCs) stiffer. Normally biconcave and deformable RBCs change their shapes and become stiffer in sickle cell anemia, thereby leading to blockage of blood flow. My research group uses microfluidic technology to probe physical properties of cells to diagnose different blood-related disorders. In my talk I will describe two technologies that measure different physical parameters of healthy and diseased red blood cells. The first technology can measure the Young's modulus of single red blood cells in a large, heterogeneous population [1]. The second technology is ShapeDx [2], a confirmatory test to distinguish between sickle cell disease and trait at the point of care.

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**Saikat Chakrabarti**

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Expertise: We are actively involved in identification and subsequent analysis of important bio-molecular interactions involving proteins, DNA and other macro-molecules in systemic diseases like cancer and infectious diseases, like malaria, leishmaniasis, etc. Primary objectives and/or contributions of our research group are to develop robust and efficient approaches to understand the hidden properties of protein-protein interaction (PPI) systems leading to infection/systemic disease by a) integrating large scale "multi-omics" data through network biology/graph theoretical algorithms, mathematical modelling and machine learning techniques, b) in-depth analysis of molecular interaction patterns using state-of-the-art molecular modeling, docking and dynamics strategies, and c) experimental characterization/verification of the identified bio-markers and/or therapeutic targets. We utilize large-scale genomics, transcriptomics, proteomics, and metabolomics data to construct disease or context specific bio-molecular interaction networks and further study them to understand and decipher their biological significance using meta-interactome analysis. Our group also develops various computational tools, techniques and web servers, which are freely available for users and are beneficial to the scientific community throughout the world. We have also ventured into developing image processing and machine learning / deep learning based software packages to process and analyze brain MRI and CT images for detection of early features of Alzheimer's disease and stroke, respectively. These tools may have immense value in clinical and industry setting and hence we are preparing/filing patents for the developed tools and systems. Please visit our lab website (http://www.hpppi.iicb.res.in/saikatlab/) for more detailed overview and description of the previous and ongoing projects and to use various tools (servers and databases) that we have developed over the years. Research: Full time scientific research and providing guidance to PhD students and post-doctoral fellows. Teaching: Teaching PhD coursework and other skill


ISBN: 978-81-980623-8-3

development programs (115-120 hours per year). Supervising/Mentoring: Mentoring PhD students, Postdocs, and Masters Students in their scientific and educational endeavors. Administrative: Member of the various academic and administrative committees responsible for smooth functioning of the institute. Past and present membership and chairmanship in committees like student's affair committee, IT committee, computer division (deputy head), local purchase committee, PhD selection committee, recruitment committee, tender committee, disaster management committee, etc.

**Topic: AIDIAS: Artificial Intelligence based Diagnostic and Analytical Systems**

Machine learning (ML) and deep learning (DL) are two very critical components for development of an artificial intelligent system/apparatus. ML and DL are software and algorithms that need to be trained with existing data and information so that it can identify/predict and/or distinguish the categories for which they have been trained. However, based on the training and prediction if the system can take independent decisions related to the outcome of the prediction then it can be qualified as artificial intelligent system.

I will talk about potential of ML in identification of disease biomarker and correct molecular interaction pattern/pose for protein-protein and protein-small molecule interactions. Identification of novel biomarker and correct protein-protein and protein-small molecule interaction is very critical for drug development protocols. Hence, our approach and algorithms will be quite useful for new drug target and drug discovery initiatives.

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**Santosh Dixit**

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Dr Santosh Dixit is the Chief Domain Expert ( Healthcare and LifeSciences) at the Innovation Labs, Persistent Systems. In this capacity , Dr Dixit works with multi-disciplinary teams of clinicians , healthcare professionals, data scientists and technologists for developing AI/GenAI powered digital innovations for biomedical ecosystems with special focus on Oncology.

Dr Dixit has 20+ years of experience in Preclinical and Clinical Pharmacology, Translational R&D, Drugs/Diagnostics/Medical device development, Regulatory Affairs, Public health and Policy initiatives. Dr Dixit has a received his Ph.D. in Pharmaceutical Sciences from University of Cincinnati , USA and post-doctoral fellowships from Vanderbilt University , USA and University of Western Ontario , Canada.

**Topic: AI-Driven Image Analysis: Accelerating Pharmaceutical R&D and Precision Medicine**

Artificial Intelligence (AI) is transforming image analysis in pharmaceutical research, enabling faster and more accurate interpretation of complex and multimodal biomedical data. Traditional manual approaches to histopathology, microscopy, and radiology are often slow and prone to variability. AI-driven algorithms now automate segmentation, feature extraction, and anomaly detection, improving precision and accelerating workflows.

For pharmaceutical scientists, these capabilities support high-throughput screening, digital pathology, and biomarker discovery. Deep learning models trained on diverse imaging datasets can identify subtle morphological changes, predict therapeutic responses, and optimize trial design—advancing precision medicine and reducing drug development attrition.

However, adoption challenges remain. Data quality, algorithm transparency, and regulatory compliance require robust governance and continuous validation. Ethical considerations, including patient privacy, demand explainable AI and


ISBN: 978-81-980623-8-3

federated learning approaches. Regulatory bodies are increasingly recognizing AI's role, but frameworks for reliability and accountability are essential.

This talk will cover the key trends in AI-guided Image analysis for Pharmaceutical R&D applications with a reality check for regulatory compliant workflows and practical applications.

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**Dr. H.B. Pushpalatha**

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Dr. Pushpalatha H.B. is a highly accomplished pharmaceutical professional with over 26 years of extensive industrial experience, currently serving as the General Manager and Lead for Formulation Development (FD) across the Pharma, Animal Health, and Food divisions at Himalaya Wellness Company. Her career trajectory, beginning as a Junior Scientist in 1998, reflects significant leadership and technical ascension within the global, research-driven organization.

A core strength of Dr. Pushpalatha lies in her proven expertise in the Formulation and Development of both conventional and innovative herbal and unconventional dosage forms and wellness products. She has been instrumental in facilitating international regulatory acceptance for herbal medicines and wellness products in over 100 countries, showcasing deep expertise in navigating complex and dynamic global regulatory environments, including submissions for the US, EU, Middle East, and Asia Pacific markets. Her technical domain spans the development of diverse product formats, such as preservative-free tablets, capsules, liquids, gummies, effervescent tablets, probiotics, and functional foods, often challenging conventional approaches to ensure product safety and commercial value.

As a strategic leader, she manages a 27+ member multidisciplinary team and oversees the smooth functioning of the International Regulatory Affairs division. Her administrative and strategic acumen includes setting up world-class pilot facilities, managing annual budgeting and Capex, and driving cost optimization through Alternate Vendor Development and Formula Optimization. Furthermore, she champions R&D and operational process improvements, conceptualizing novel dosage forms and online documentation systems. Dr. Pushpalatha applies a Quality by Design (QbD) approach, leverages lean process management, and uses risk-based assessments to ensure fast-to-market strategies, underscoring her commitment to blending scientific excellence with business-focused outcomes.

**Topic: Development of Herbal Pharmaceuticals – An Approach from Academia to Industry**

The development of herbal pharmaceuticals provides a unique opportunity to bridge traditional knowledge with modern scientific innovation. This work presents an integrated approach that connects academic research with industrial requirements to create safe, effective, and standardized herbal products. The academic framework emphasizes phytochemical profiling, mechanistic understanding, and early-stage proof-of-concept studies. These scientific insights enable the identification of bioactive markers, optimization of extraction processes, and establishment of robust analytical methods.

Transitioning to industry brings additional challenges including large-scale manufacturing, regulatory compliance, stability, and quality control across diverse botanical sources. This abstract outline a structured pathway in which academic findings are translated into scalable formulations using QbD principles, validated analytical procedures, and GMP-aligned processing. The collaboration also highlights the importance of supply-chain


ISBN: 978-81-980623-8-3

authentication, standardization of raw materials, and the integration of sustainability-driven practices.

Overall, this approach demonstrates how strong academia–industry partnerships can accelerate the development of evidence-based herbal pharmaceuticals, enhance quality and global acceptance, and support commercialization with scientific credibility.

**Dr. Muthu Dhandapani**

Vice President – Quality & Regulatory Compliance

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Dr. Muthu Dhandapani is the Vice President – Quality & Regulatory Compliance at Tricog Health, Bangalore, where he leads regulatory strategy, digital health compliance, quality management, and governance initiatives for AI-enabled medical technologies. With over a decade of experience spanning digital health, medical devices, regulatory science, and healthcare quality systems, he has significantly contributed to advancing safe and effective technology adoption in clinical practice.

Dr. Dhandapani has played a key role in shaping regulatory pathways for AI-based diagnostic solutions in India and globally. His work focuses on building robust frameworks for algorithm validation, real-world performance monitoring, clinical risk management, and post-market surveillance for digital health products.His areas of expertise include SaMD (Software as a Medical Device), AI/ML in healthcare, QMS implementation, medical device regulations, data integrity, and digital health policy.He continues to contribute to capacity-building initiatives and interdisciplinary collaborations aimed at strengthening India's digital health and medical device landscape.

**Topic: From Algorithm to Bedside: Ensuring Quality, Safety, and Regulatory Compliance in Real-World Deployment of AI Healthcare Solutions**

Artificial Intelligence has moved rapidly from research labs into frontline healthcare, yet its safe and effective deployment in real-world clinical settings remains a complex challenge. This talk will explore the end-to-end journey of translating AI healthcare solutions—particularly Software as a Medical Device (SaMD)—from development to bedside implementation. Drawing from practical experience in scaling AI-enabled cardiac diagnostics across diverse healthcare environments, the session will discuss core elements of quality-by-design, clinical risk management, and regulatory preparedness. Key considerations such as data variability, model drift, workflow integration, human–AI interaction, and post-market performance monitoring will be highlighted. The talk will also outline the role of global standards, emerging regulatory frameworks, and robust quality management systems in enabling trustworthy, compliant, and clinically meaningful AI systems. By bridging technological innovation with regulatory rigor, this session will offer actionable insights for innovators, clinicians, and policymakers working to build scalable digital health solutions that deliver measurable patient impact.

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**Dr. Prakash NS**

Associate General Manager, Analytical Development, R&D,

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Dr. N.S. Prakash is a Principal Scientist in the Research and Development department at The Himalaya Wellness Company in Bengaluru, India, where he applies his extensive expertise in analytical chemistry to ensure the quality and efficacy of the company's herbal products. A recognized expert in the field, Dr. Prakash specializes in advanced analysis methodologies such as


ISBN: 978-81-980623-8-3

HPTLC and HPLC for characterizing herbal ingredients, guiding product development and ensuring regulatory compliance. He is a published researcher with a focus on scientifically validating the therapeutic properties of various herbs. Dr. Prakash actively contributes to the scientific community, speaking at academic institutions and conferences on the latest advancements and challenges in the analysis of natural healthcare products.

**Title: Digitalization of Lab Notebook (e-LNB) with Integrated LIMS: A Paradigm Shift in R&D**

The integration of an e-Lab Notebook application with the Laboratory Information Management System (LIMS) in the R&D division represents a significant advancement in laboratory digitalization. The primary objective was to enhance operational efficiency, data integrity, data retrieval and global collaboration through a unified digital platform. The implementation involved deploying digitalization of LNB and LIMS to enable centralized data management, workflow automation, real-time inventory tracking, secure digital archival, and live status monitoring. Post-implementation indicated substantial improvements in data handling, reduced manual interventions, minimized errors, optimized resource utilization, and enhanced transparency across projects. Furthermore, the system facilitated seamless collaboration among geographically dispersed teams, accelerating decision-making processes. In conclusion, this initiative establishes a new benchmark for the pharmaceutical industry by reinforcing scientific excellence, compliance, and innovation-driven growth through digital transformation.

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**Dr. Rafiq Mohamad**

Head, Discovery Sciences Group

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Dr. Rafiq is presently serving as Head-Discovery Sciences Group at R&D Center, Himalaya Wellness Company, Bangalore. He comes with more than 26 years of rich experience in the field of pharmacology, cell & molecular biology pertaining to the discovery & development of new pharmaceutical/ wellness products. His area of expertise is leveraging the rich traditional knowledge and applying modern technologies to bring products which are not just AYUSH compliant, but also of marketed as suppliements and functional foods across the globe. Instrumental in bringing out researched pharmaceutical products, and has vast experience in applying modern technologies to contemporize traditional wisdom to promote wellness. Dr. Rafiq is incharge of driving consumer technical insights (CTI) of personal care and wellness products with a responsibility of claims and claims substantiation along with consumer testing program of relevant products. He provides a critical link between the R&D, Legal and Marketing teams with respect to product claims. He has more than 50 research publications to his credit, published in a reputed national/ international peer-reviewed journal. Also, he holds 2 global patents, apart from being a part of various scientific & professional bodies, he is also in the editorial board of a few peer-reviewed journals. Dr. Rafiq is also currently discharging the responsibilities as Deputy-Head, GLP- Toxicology and also serving as senior Study Director at the GLP test facility of Himalaya Wellness Company. He has attended training programs conducted by various professional and regulatory bodies on this aspect including the National GLP Compliance Monitoring Authority (NGCMA), Government of India.

**Topic: Regulatory Framework of Product Label Claims: Design and Compliance**

The regulatory landscape governing product label claims in India is evolving rapidly to ensure consumer safety, transparency, and compliance. This presentation examines the design and substantiation of claims across


ISBN: 978-81-980623-8-3

three critical categories—OTX supplements, AYUSH drugs, and cosmetics—within the framework of national regulations.

For nutraceuticals and health supplements, the Food Safety and Standards Authority of India (FSSAI) mandates adherence to the Food Safety and Standards (Health Supplements, Nutraceuticals, Food for Special Dietary Use) Regulations, emphasizing approved ingredients, dosage limits, and prohibition of therapeutic claims.

AYUSH products are regulated under the Drugs and Cosmetics Act, 1940, with specific provisions under Rules 158B and 106-A, alongside restrictions imposed by the Drugs and Magic Remedies (Objectionable Advertisements) Act, 1954 to curb misleading claims.

Cosmetic products, governed by the Cosmetics (Amendment) Rules, 2025, require clear labelling, standardized definitions, and compliance with BIS norms to prevent consumer deception and enhance safety. The session will also address global best practices, claim substantiation strategies—including clinical, instrumental, and consumer studies—and emerging compliance challenges such as clean labelling, QR-based transparency, and harmonization with international standards. By integrating regulatory insights with practical design principles, this talk aims to guide stakeholders in creating compliant, credible, and consumer-centric product claims.

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**Dr. Samba Reddy, PhD, RPh,**

Regents Professor & Director

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Dr. Samba Reddy is Regents Professor and Director of Institute of Pharmacology and Neurotherapeutics at Texas A&M University School of Medicine, Texas, USA. He obtained B. Pharmacy from Kakatiya University (1992) Warangal Telangana, M. Pharmacy (1994) and Ph.D. degrees (1998) from Panjab University Chandigarh, and then completed postdoctoral fellowship at the NIH in Washington-DC, USA. He is a board-certified pharmacist & renowned pharmacologist developing new medicines for epilepsy and brain disorders. He is the PI of multiple NIH-funded projects focusing on novel neurosteroid treatments for epilepsy and neurotoxicity. He directs multiple US DOD-funded projects on brain injury and chronic illness. His seminal contributions include the "discovery of a neurocode for treating epilepsy" and launching "novel neurosteroid therapy" to treat epilepsy and women's brain disorders. His transformational contributions led to developing two new medicines: ganaxolone (Ztalmy), the first neurosteroid for epilepsy, and brexanolone (Zulresso), the first FDA-approved drug for postpartum depression in women, which are now used worldwide to treat patients. Dr. Samba Reddy is the first Indian scientist to discover 2 new medicines from an academic setting. In addition, his research paved the way to zuranolone, the first FDA-approved oral neurosteroid for postpartum depression. He developed a novel chemical antidote as lifesaving medicine for pesticide neurotoxicity.

**Topic: AI & Neurosteroid-based New Drug Development: FDA Approval of Brexanolone and Ganaxolone for Complex Brain Disorders**

New drug discovery and development is a complex and tedious process with high risks and rewards. In this talk, the speaker Dr. Samba Reddy will highlight the intricate landscape of AI & new drug discovery and development, focusing on the challenges and prospects associated with FDA approval, particularly in the realm of complex brain medicines. His pioneering work unveils a revolutionary neurosteroid platform, crafted to unlock novel molecules for brain disorders. Neurosteroids, a class of naturally occurring steroid molecules, emerge as compelling therapeutic agents for neurological disorders, leveraging their robust capacity to regulate neuronal


ISBN: 978-81-980623-8-3

excitability and confer neuroprotection. Over a span of 25 years, Dr. Reddy has significantly advanced our understanding of the mechanistic functions of neurosteroids in the brain. This journey has unraveled critical insights into extrasynaptic GABA-receptor--neurosteroid pathways. Notably, his groundbreaking research has led to the identification of the neurocode for treating epilepsy and the invention of "neurosteroid replacement therapy" for conditions such as premenstrual syndrome and post-partum depression. The pinnacle of these two-decades work and achievements manifests in the FDA approval of two groundbreaking new medicines: Brexanolone (allopregnanolone) for post-partum depression in 2019 and Ganaxolone for seizures in pediatric epilepsy in 2022. The neurosteroid-based products are making significant strides in improving global healthcare, including thousands of patients in India, USA and Europe. A new anticonvulsant product from his lab is currently in advanced clinical trials for the life-threatening brain condition called status epilepticus. But the research pursuit continues, to discover and develop better and efficacious new medicines from the AI and neurosteroid platform. Challenges such as biopharmaceutical and formulation hurdles persist, inspiring his team to discover "second-generation" neurosteroids with improved therapeutic profile. This opens doors to potent treatments for chronic brain disorders such epilepsy, depression, brain injury and dementia, offering hope for millions worldwide. The AI based new generation drug research is rewriting the future of brain health.

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**B. S. Shankaranarayana Rao**

Professor, Department of Neurophysiology

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Dr. BS Shankaranarayana Rao obtained his MPhil. and PhD degree in Neurophysiology NIMHANS, Bengaluru. After completing his Postdoctoral training at National Center for Biological Sciences and specialized training in Electrophysiology from Woods Hole, USA, he joined NIMHANS as Faculty in 2002. He has several administrative positions including Registrar of NIMHANS, Professor and Head of Neurophysiology and Basic Neurosciences Departments, and coordinator of Neurobiology Research Centre. Dr. Rao's research has led to the discovery of the cellular and molecular mechanisms of rewiring and remodeling of developing and adult brain circuits in neurodegenerative and cognitive disorders such as stress, anxiety, depression, epilepsy, mental retardation and aging by invasive and noninvasive brain manipulative procedures including activation of resident stem cells in the adult brain by employing contemporary neurophysiological techniques at multiple levels of neural organization. The discovery of cellular and molecular mechanisms of activation of brain circuits are helping in the designing of new drugs for the prevention and restoration of cognitive deficits in neurological and psychiatric disorders.

**Topic: Novel Strategies of Treat Temporal Lobe Epilepsy-induced Cognitive Deficits and Abnormal Synaptic Plasticity**

Epilepsy is one of the most common neurological disorder affects all age groups. Epilepsy is the third leading contributor to the global burden of disease for neurological disorders and affects approximately 65 million people worldwide. Epilepsy is characterized by an enduring predisposition to generate epileptic seizures and the associated cognitive, psychological and social consequences. Temporal lobe epilepsy (TLE) is a chronic neurological disorder characterized by recurrent, unprovoked focal seizures that originate in the temporal lobe of the brain, specifically from the hippocampus. TLE is the most common form of epilepsy with focal seizures and constitutes about 40% of adult epilepsies and most often refractory to medication. Spontaneous recurrent seizures (SRS) are the hallmark of TLE and are often associated


ISBN: 978-81-980623-8-3

with neurodegeneration and cognitive impairments. The mechanisms of generation of SRS, epileptogenesis and associated abnormal sleep wake behaviour, synaptic plasticity and cognitive deficits are yet to be understood. Accordingly, we have used an animal model of TLE to assess the seizure characteristics, neurodegeneration, spatial learning, sleep, synaptic plasticity, memory and depressive-like behaviour. We have also evaluated the effect of levetiracetam (LEV) treatment, exposure to enriched environment (EE) and the combination of EE and LEV on TLE-induced deficits. Epileptic rats were video-monitored using phenotyper to behaviourally characterise seizure frequency and duration followed by analysis of EEG and field potentials from the hippocampus, somatosensory and parietal cortices. TLE was associated with increased SRS, altered EEG coherence, hippocampal neurodegeneration, abnormal synaptic plasticity, gliosis and cognitive deficits. Interestingly, enriched environment, levetiracetam and combination therapy reduced SRS in TLE rats. The epilepsy results decreased basal synaptic transmission and enhanced paired-pulse facilitation (PPF) ratios with abnormal hippocampal long-term potentiation (LTP). The epileptic rats subjected to EE showed partial restoration of basal synaptic transmission, PPF and LTP. We observed an increased hyperexcitable behavioral response and decreased sociability in epileptic rats and 14 days of enriched environment reversed behavioral hyperexcitability and improved sociability. In epileptic rats, there was reduced REM duration and decreased density of parvalbumin positive interneurons in the hippocampus and amygdala. However, EE partially restored REM sleep and the density of parvalbumin-positive interneurons.

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**Dr. Arnab Barik**

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Arnab earned his B.Tech in Biotechnology from SRM University, Chennai, and completed his PhD in Neuroscience under the guidance of Dr. Lin Mei at the Medical College of Georgia. His doctoral work focused on the cellular and molecular mechanisms that govern the development and maintenance of neuromuscular junctions. Seeking to understand somatosensation, he joined Dr. Alexander Chesler's lab at the National Institutes of Health. There, he discovered a population of parabrachial nucleus neurons critical for affective pain responses. In 2020, Arnab became an Assistant Professor at the Center for Neuroscience, where he now investigates the molecules, cells, and circuits underlying pain and itch.

**Topic: Pain & Itch: The good, the bad, & the ugly**

Pain and itch protect us from potential injury and diseases from our immediate surroundings. However, pain and itch lose their protective purpose in chronic disorders such as peripheral neuropathy and psoriasis. Moreover, patients with these chronic disorders often suffer from stress and anxiety, which in turn can make the pain and itch worse. In my talk, I will elaborate on two stories. First, I will talk about a novel circuitry between the brainstem and thalamus, that is instrumental in driving the defensive behaviors and aversiveness associated with pain. Second, we find a novel circuit mechanism for how the aversiveness associated with the itch is encoded in the brain. We employed fluorescent gene-carrying viral vectors to interrogate the anatomy, optogenetic/ chemogenetic tools to manipulate the activity, and record from the circuits of interest. Together, we shed light on the molecular, cellular, and circuit mechanisms that underlie the emotional distress caused by chronic pain and itch.

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ISBN: 978-81-980623-8-3

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**Panelist for NEP session**

Dr. Sohan Chitlange is presently working as Vice Chancellor at Alard University, Pune. He has 26 years of Professional experience and has more than 125+ research papers, 6 books and 12 monograms in reference book and 20+ Published patents to his credit. He is actively associated with various professional bodies. Presently he is Vice-President, APTI (National) west Zone. He has served as Chairman BOS, Pharmaceutical Chemistry & Pharm.D. at Savitribai Phule Pune University, Pune, Nominated by His Excellency Governer of Maharashtra as Member of Academic council SPPU, Member Research and Recognition committee SPPU and Nanded University, Member BOS @ Amravati University, KLE University, BAMU Aurangabad, DIPSRU New Delhi, MIT world Peace University, PA Inamdar University. He is a recipient of "Best Principal Award 2018" by oriental university, Indore and "Best Principal Award 2019" by Savitribai Phule Pune University, Pune and "IPER Best Principal Award 2020" at National level by Association of Pharmaceutical Teachers of India. He is a expert in Accreditation and rankings and delivered many talks at National Level.

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**Panelist for NEP session**

Dr. Deependra Singh is presently working as Professor at University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, India. He is a central council member and chairman of the education regulation committee, Pharmacy Council of India. He is governing council member- Life Sciences Sector Skill Development Council (LSSSDC); Mentor-QCI (Quality council of India) and invited member- HECI (Higher Education council of India). He is also serving in various administrative positions in University such as Chairperson International relation cell, NAAC Core committee, co-cordinator-Innovation and incubation centre, PRSU etc.

He has received the highest acclaim as being featured among the top 2% scientists across the world in the field of pharmacy and pharmacology since 2020 to date by Stanford University, USA, Elsevier for 5 years consecutively. He has around 21 years of teaching and research experience. His prime research area includes formulation of multiple bioactive delivery systems for chronic wound management, advanced statistical and mathematical modelling methods, and designing novel delivery systems. He has around 165 research and review papers, 41 book chapters published in national and international journals. His five books are published with Elsevier and CRC press and two are in press with CRC and Bentham. He has citations of more than 7500, with an h-index of 39 and i10 index of 97 (Google Scholar) and Scopus h-index 34, with 4419 citations. He has two international, three Indian patents granted and three published. He has completed several projects and several in pipeline funded by university grants commission UGC, AICTE, ICMR, DST, IBITF (IIT Bhilai Technology foundation), ITC Bangalore and ANRF amounting to 1298 lakhs. He also provides consultancy services to various start-ups in dosage form designing and stability studies.

He is the recipient of the prestigious APTI CJ Shishoo Award for research in pharmaceutical sciences 2023, the Department of Health Research-ICMR Young Indian Biomedical Scientist Award 2019,


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UGC RAMAN International Award 2014, and UGC Research Award 2012 by the University Grants Commission, New Delhi, India. He has also won a number of prestigious awards at the state level for excellence in research, namely the Young Scientist Award of the state of Chhattisgarh 2006 in medical sciences, SPSR Life time achievement award 2025, Indira Gandhi Sadbhawana award 2014, Bharat Shiksha Ratan Award 2012, Eklavya Award 2024 in Global interdisciplinary Conference organized by International council for education, Research and Training India and USA, Next Gen Pharmacist Award, in Pharma meet 2020 by IPA and CG society of pharmaceutical science. He is a state evaluator and trainee for the National Children Science Congress. He is a life member of various professional bodies such as Indian Pharmaceutical Association (IPA), Association of Pharmacy Teachers of India (APTI), Indian Society of Pharmacognosy (ISP) and serving as vice president, central zone APTI (elected); vice president, central zone IPGA (elected); Founder secretary, Chhattisgarh state branch IPA.

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**Dr. Atmaram Pawar**

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**Panelist for NEP session**

Presently serving as Principal and Professor of Pharmaceutics at Poona College of Pharmacy (PCP) Pune, a Grant-in Aid institute of Govt. Of Maharashtra. I have earned Doctoral degree in pharmacy from Pune University and nurtured a career in academics at alma mater PCP. The 33 years of educational experience in the institute of repute has provided me an opportunity to develop myself as a teacher, a researcher, administrator and a pharmacist.

I have actively pursued research in the area of particle engineering and targeted anticancer drug delivery systems, where have credit of 15 Granted Indian patents, 160 international & 43 national peers reviewed research papers with Cumulative Impact factor of 300+, Google Scholar h- index 45 and 64003 citations and listed in top 2% scientist by Elsevier Sept 2022 to 2025. I have guided 13 PhD students and 7 more are registered under me.

I have particular interest in incorporating new concepts in teaching and modernization of the curriculum. I have incorporated modern concepts in teaching of Dispensing Pharmacy with practice based experiments from 2004. For that, he has been awarded with IJPER Prof. BM Mithal national Award 2007. Acceptance of 12 books that authoured by me is reflected by inclusion of new subject by many Indian universities on name of my book entitled 'Modern Dispensing Pharmacy' in the UG curriculum. To promote and ease implementation of NEP 2020, I have been delivering talks since 2021with You Tube Series NEP Parayan.

I have served as Member Scientific services at various Indian Pharmaceutical congress and Chairman Scientific services 19th APTICON and in organization of at IPC, APTICON, IAPC & SFEC conferences. Also served as Member, Pharm.D. committee and Member B.Pharm. syllabus committee of Pharmacy Council of India, and as Dean BVDU; BOS member at more than 10 universities.

I have been designing programmes to reach out to society to explain and uplift the image of pharmacy profession. In the wake of this, I have published 03 books in Indian languages, published more than 75+ articles in leading newspapers. I participated in 03 panel discussions and 8 expert opinions on TV media; and from Sept 2018, I have launched YouTube Channel 'Yes, I am Pharmacist" addressing the patient related concerns about drugs.

Through more than 150+ invited talks at national and international conferences/seminars and 250+ talks at institutes, community pharmacists and


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common men I could promote pharmacy profession. During my President-ship of IPA Pune, I started mega celebration of NPW, initiated 'IPA Pune Life Time Achievement Award'

I am recipient of 11 prestigious awards that includes an international award – Healthcare Leadership award by World Health & wellness congress Feb 2020, 4 national awards viz. Best Teacher Award of 54th IPC Trust 2005, Prof. BM Mithal national Award 2007, APTI's Teacher for the Year Award 2015, IPA Fellowship Award 2018, Maharashtra Sahiytya Parishan Award 2021, Dr. K. M. Parikh IASTAM Award 2022 and in house awards like Outstanding Teacher 2011 & Best Researcher Award 2015 of Bharati Vidyapeeth University.

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**Dr. Vishal Gupta**

Dean (Academics)

JSS Academy of Higher Education and Research, Mysuru

Dr. Vishal Kumar Gupta is a senior academic leader and pharmaceutical scientist with over nineteen years of experience spanning higher education governance, academic administration, research, and international capacity building. He currently serves as Dean (Academics) at JSS Academy of Higher Education & Research (JSS AHER), Mysuru, and is a Professor of Pharmaceutics at JSS College of Pharmacy, Mysuru. In these roles, he provides strategic oversight for curriculum development, accreditation, internationalization, digital learning systems, student enrolment, and institutional quality assurance across multidisciplinary health and life science programs.

Dr. Gupta has played a pivotal role in global public health training initiatives as Nodal Officer for World Health Organization (WHO) training programs, coordinating landmark international cGMP and blood safety programs that trained thousands of professionals across India and WHO South-East Asia Region countries. Notably, he was instrumental in implementing the world's first WHO-led online cGMP capacity-building initiative, collaborating with WHO headquarters, international regulatory agencies, government ministries, and pharmaceutical industry bodies. He has also contributed to international regulatory training for Ethiopian FDA officials and coordinated the establishment of JSS AHER, Mauritius, including governance frameworks, academic programs, and international accreditation.

His leadership has been central to securing prestigious ACPE (USA) certification for Pharm. D and pharmacy programs in India and Mauritius, marking several global firsts. An accomplished researcher, Dr. Gupta has published extensively, holds patents in advanced drug delivery systems, and has guided numerous postgraduate and doctoral scholars. His contributions have been recognized through international honors, including the Outstanding Services Award from the Asian Association of Schools of Pharmacy, alongside multiple national academic distinctions.

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**Subham Banerjee**

Associate Professor

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Dr. Subham Banerjee currently working as an Associate Professor in the Department of Pharmaceutics, National Institute of Pharmaceutical Education and Research (NIPER)-Guwahati, Assam. He is also a Visiting Staff Faculty of the University of Texas (UT) at Austin, USA. In addition, he also


ISBN: 978-81-980623-8-3

served as a coordinator cum co-principal investigator in the National Centre of Pharmacoengineering (State-of-the-art-facility) funded under the Drugs Pharmaceuticals Research Programme (DPRP), DST, Govt. of India. Dr. Banerjee did his doctoral degree from Birla Institute of Technology (BIT), Mesra in collaboration with Defence Research Laboratory (DRL), DRDO, Tezpur, Assam in the year 2015. After completion of his doctoral degree he was selected as an "Innovation Awardee in Devices" at Translational Health Science & Technology Institute (THSTI), NCR-Biotech Science Cluster, Faridabad. In the same year, he received "Fast-Track Young Scientist Research Grant" by Science & Engineering Research Board (SERB), Govt. of India.

Dr. Banerjee's research area focuses on Pharmacoengineering including Pharmaceutical Additive Manufacturing (AM)/3D & 4D Printing, New Materials for Pharmaceutical AM, Drug Delivery, and Cutting-edge Translational Pharmaceutical Research.

**Topic: Additive manufacturing mediated platform technology in pharma: Educate, Innovate, Empower**

Additive manufacturing (AM), or 3D/4D printing, creates three-dimensional solid objects of practically any shape from 3D model design files in layer-by-layer manner. The implementation of 3D/4D printing using various platform technologies has gained immense potential in the pharmaceutical sector. In pharmaceuticals, 3D/4D printing has been used not only to produce customized drug delivery systems/devices but also to fabricate personalized medicine for individual patient-centric needs. The most popular platform technologies in AM technique used in pharmaceuticals are fused deposition modeling (FDM)/fused filament fabrication (FFF), vat-photopolymerization (VP)/stereolithography (SLA), selective laser/powder-bed sintering (SLS), semi-solid extrusion (SSE), direct powder extrusion (DPE), etc. With the advent of these cutting-edge advanced platform technologies, numerous efforts have been made in the pharmaceutical segment to create both personalized & customised next-generation future medicines in order to improve quality of life. This approach is equally important for paediatric, visually impaired and geriatric patients, as well as for certain medicines that require exact tailoring (e.g., narrow therapeutic index drugs). A major benefit of 3D printing/AM is that it enables 3D printed tablets to be designed, each with tailored aesthetics (shape, size, flavor and color), drug release, dose content and multiple drug combinations, enabling a truly personalized treatment approach for patients. Implementation of AM or 3D/4D printing technology can realize the long-due dreams of personalized patient-specific requirements.

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**Dr. Subhadeep Roy**

Assistant Professor, MRSB

Birla Institute of Technology (BIT) Mesra, India

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Dr Subhadeep Roy is currently an Assistant Professor in the Department of Pharmaceutical Sciences and Technology at Birla Institute of Technology, Mesra, Ranchi. Dr Roy did his doctoral degree from Babasaheb Bhimrao Ambedkar University, Lucknow, India. He has also worked as a visiting senior research fellow at Translational Health Science & Technology Institute (THSTI), NCR-Biotech Science Cluster, Faridabad. After completion of his doctoral degree, he joined the Regenerative Engineering Laboratory, IIT, Delhi, as a DBT Research Associate. He has also worked as a Postdoctoral Fellow at Penn State College of Medicine, Hershey, USA. After his post-doctoral study, he has also worked as an Assistant Professor in the Department of Pharmacology and Toxicology, National Institute of Pharmaceutical Education and Research, Kolkata.

He is a member and section officer of the Organoids and Microphysiological Systems working panel, MHD20/P5, Bureau of Indian


ISBN: 978-81-980623-8-3

Standards (BIS). He has been selected as the 3D GEM Ambassador, 2025, IISC, Bangalore. He has also featured as an RSC Journal of Materials Chemistry B 2024 Emerging Investigator. He is a member of the American Association of Pharmaceutical Scientists. (AAPS), American Society of Biochemistry and Molecular Biology, Society for Biomaterials, Tissue engineering & regenerative medicine (TERMIS), Member of the Royal Society for Biology. (MRSB). Dr Roy's research area focuses on Tissue Engineering, 3D Microphysiological Disease models, biomaterials, 3D organoids and 3D Bioprinting.

**Topic: 3D Microphysiological Disease Modeling and Tissue Engineering: Drug screening to personalized therapy**

The Caco-2 monolayer model, recognized as a gold standard by the FDA, was optimized by culturing cells on transwell inserts for 21 days. The barrier integrity, evidenced by elevated transepithelial electrical resistance (TEER), reduced paracellular flux of impermeable markers (Lucifer Yellow, Dextran-40K), and enriched expression of tight junction proteins (zonula occludens-1, occludin). To validate functional performance, drugs spanning all four Biopharmaceutics Classification System (BCS) classes were assessed, representing low (<50%), moderate (50–84%), and high (≥85%) absorption profiles. Further, different formulations, including nanocrystals, co-crystals, and drug–polymer premixes, were tested to evaluate formulation-dependent permeability differences. The model demonstrated improved predictive accuracy for oral bioavailability, underscoring its translational relevance. Expansion to coculture systems (Caco-2/HT-29, and Caco-2/HT-29 with THP-1) further enabled simulation of intestinal biology under inflammatory conditions, supporting broader applications in inflammatory bowel disease (IBD) drug development.

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**Kaushik Chatterjee**

Professor, Departments of Materials Engineering & Bioengineering; Chair, Department of Bioengineering

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Dr. Kaushik Chatterjee received his Ph.D. in Bioengineering from the Pennsylvania State University. He worked as a postdoctoral fellow jointly at the National Institute of Standards and Technology and the National Institutes of Health. He then joined the Indian Institute of Science, where he is currently a Professor in the Department of Materials Engineering and the Department of Bioengineering. He also serves as the Chair of the Department of Bioengineering at IISc and an Associate Editor for the Journal of Materials Chemistry B and Materials Advances. His research group focuses on materials for biomedical applications and particularly on the use of 3D printing and additive manufacturing technologies for healthcare.

**Topic: 3D and 4D Bioprinting for Advancing Healthcare**

Recent advances in additive manufacturing and 3D printing have opened transformative pathways for creating implants and tissue scaffolds with intricate architectures tailored to individual patient needs. In this talk, I will discuss emerging trends in harnessing 3D printing for the processing of biomaterials across diverse biomedical applications. I will highlight our recent work on fabricating patient-specific implants and scaffolds with complex geometries aimed at regenerating both soft and hard tissues. By integrating smart materials and responsive design principles, these technologies can be extended to develop deployable and functional biomedical devices. Finally, I will present our ongoing efforts to utilize 3D printing for constructing in vitro tissue models that recapitulate native organization, enabling deeper insights into disease


ISBN: 978-81-980623-8-3

mechanisms and accelerating drug discovery.

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**Indu Pal Kaur**

Professor & Dean
Faculty of Pharmaceutical Sciences

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Professor Kaur is currently Dean, Faculty of Pharmaceutical Sciences and Professor of Pharmaceutics, UIPS Panjab University (PU). She has held eminent positions, viz. Chairperson, UIPS (2020–2023); Director, Sophisticated Analytical Instrumentation Facility, PU (2012-15); DPIIT-IPR Chair Professor (2023-2025) and Secretary, Indian Pharmaceutical Association, Punjab Branch (2017-25). She is amongst top 2% most cited scientists worldwide in the area of Pharmacy and Pharmcology, according to data promulgated by Stanford University, USA (2019-20 to 2024-25). Her research forte is enhancing the bioperformance of drugs, plant extracts/phytochemicals, and biomolecules, viz., siRNA, proteins, peptides, and probiotics, using active-tailored solid lipid nanoparticles (SLNs), nanovesicles, and electrospun scaffolds as novel platform nanotechnologies. Emphasis of her work lies on Industrial and clinical translation and is reflected through licensing of 4 of her technologies to the industry and 22 granted patents (including one US) out of 44 filed applications. She has produced 27 (+7 currently guiding) PhDs and 70 (+7 currently guiding) postgraduates and has received funding of around 100 million INR from the Government and Industry. She has delivered >80 Invited Talks and published around 175 articles with an h-index of 58, 8 books, 4 journal volumes, and >25 book chapters to her credit. She is a US-Fulbright fellow (2017-18), & has received National Intellectual Property Award 2021 & 2022 for Top Indian Individual for Patents Filing, Grant & Commercialization; World Intellectual Property Organisation (WIPO) Medal for Inventors (2023), Best Pharmaceutical Scientist (Association of Pharmacy Teachers of India, APTI 2023 & Organisation of Pharmaceutical Producers of India, OPPI 2018); Technology Awards (BIRAC Regional Innovation Centre (BRIC) 2019 & 2020, Grand Innovation Challenge by Indian Pharmaceutical Alliance (2021); Leadership in Research Excellence Award, 2023 and Researcher of the Year award (2019 & 2022), by Sunpure Research Incubation centre.

**Topic: WomaniaPharmayan: A Journey of God's Grace, Courage, and Unconventional Reinvention in Pharma**

WomaniaPharmayan captures my journey from a 17-year-old with little awareness of professional possibilities to a scientist driven by the mission of "Innovation to Reality." My evolution was shaped by a powerful blend of influences—my intellectual Punjabi writer-mother who taught me the art of weaving stories into science; my logical, rational father whose Ardaas (prayer) and disciplined thinking grounded me in clarity, sincerity, and purpose; and later my husband who helped me recognise my inherent beauty and confidence Together, they seeded in me a fearless curiosity, an unconventional mind, and the courage to take risks and tread paths less travelled. I did not begin with ambition; I began with small, unsure steps—but each step was strengthened by prayer and guided by providence. What I prepared for with sincerity, God completed with grace. These values propelled me from being a computer-illiterate generation till graduation to becoming an innovator navigating AI-driven pharmaceutical science. My 44 patents (22 granted) and 4 successful technology transfers stand testimony to a journey led by bold thinking and relentless perseverance. At IPC 2025, I hope to inspire women to trust their path, embrace reinvention, and lead fearlessly in the transformative era of AI and technology. "Learn boldly. Lead authentically. Let both technology and grace expand what you believe is possible."

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ISBN: 978-81-980623-8-3

**Dr. Vishakha Oza**

Associate Director – Global Safety Sciences, Enterprise role, Global aggregate report office and PV writing Lead

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Vishakha is an experienced and strategic professional with a robust background in the pharmaceutical industry, boasting around 20 years of experience. She has worked across diverse international cultures, including India (6yrs), Italy (5yrs), and Germany (9yrs). Vishakha demonstrates expertise in global team management, vendor management, change management, and integrations. She possesses a strategic mindset and holds a master's in Pharmaceutical Sciences and master's in international healthcare management. Vishakha is a CAL 1 certified agile leader and fitness enthusiast. Featured in "9 Women, 9 Success stories" by Consulate General of India: Frankfurt – 2022 Honored with "Women in Science" scholarship by Frankfurt School of Finance and Management – 2020

**Topic: Leadership Strategies for Thriving in the Age of Artificial Intelligence.**

In the talk, Leadership Strategies for Thriving in the Age of Artificial Intelligence, I will cover the topics: how leaders (future leaders-students) can navigate the evolving landscape of AI-powered operations and will share strategies for cultivating a mindset of continuous learning, leading resilient and collaborative teams, and making ethical, data-driven decisions — all while embracing the opportunities AI brings to the pharma industry.

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**Dr. Geetha Manjunath**

Co-founder and CEO

NIRAMAI Health Analytix, Bangalore, India

geetha@niramai.com

Dr. Geetha Manjunath is the Founder, CEO and CTO of NIRAMAI Health Analytix, and has led the company to develop a breakthrough AI solution for detecting early stage breast cancer in a non-invasive radiation-free manner. Geetha is a Gold Medalist and PhD holder from Indian Institute of Science with management education from Kellogg Chicago. She comes with over 30 years of experience in IT innovation. Before starting NIRAMAI, Geetha was a Lab Director heading AI Research at Xerox and a Principle Scientist at Hewlett Packard Labs.

Geetha has received many international and national recognition for her innovations and entrepreneurial work, including CSI Gold Medal, BIRAC WinER Award 2018 and is on the Forbes List of Top 20 Self-Made Women 2020. She was the winner of Women Health Innovation Showcase Asia in Singapore, Accenture Vahini Innovator of the Year Award from Economic Times and Women Entrepreneur of the Year 2020 by BioSpectrum India. Geetha is an inventor of 50+ US patents, a senior member of the IEEE and a Fellow of the Indian National Academy of Engineering (INAE).

**Topic: Artificial intelligence for equitable breast cancer screening**

Breast cancer is the top cancer in females today and early detection is very critical to save lives. In this talk, Dr Geetha will present a novel AI-based breast screening test that is affordable, portable, accurate and enables screening for all women. With this innovation, first time ever women can detect their cancer in a privacy-conscious way with no-touch and no-radiation. This affordable, accessible and high-quality cancer screening test is creating a breakthrough in cancer care for developing countries.

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**Ajit Singh**

Chairman,

ACG

Ajit Singh is the Founder and Chairman of the ACG Group (formerly Associated Capsules Group of Companies), a global provider of integrated manufacturing, packaging, and R&D solutions for the pharmaceutical industry. He co-founded the business with his brother Jasjit Singh in Mumbai in 1962.

Mr. Singh holds a graduation degree from Cambridge University, UK, and a post-graduation degree from Harvard Business School, USA. With over 50 years of experience, he is recognized as a pioneer in pharma packaging and has played a prominent role in the development of the Indian pharmaceutical and allied industries.

Throughout his career, he has held numerous leadership positions in industry associations, including serving as an executive committee member of the Federation of Indian Chambers of Commerce & Industry (FICCI) and heading its Task Force on Nutraceuticals. He also served on the Central Governing Council of the Indian Institutes of Technology (IITs) and is the Founder & President of the Health Foods & Dietary Supplements Association (HADSA).

Ajit Singh's leadership has been recognized with multiple national and international accolades, including a recent Lifetime Achievement Award from Hurun India. Under his guidance, ACG has grown into a global company with operations in over 100 countries and a strong focus on innovation, quality, and affordability of medicines.

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**Vishakha Metkar**

Director,

Colorcon, Asia Pvt. Ltd.,

Vishakha Metkar is the Regional Regulatory Director for South Asia at Colorcon Asia Pvt. Ltd., a position she has held since November 2023. With a career at Colorcon spanning nearly three decades, she is a recognized expert in global regulatory compliance and excipient qualification within the pharmaceutical industry. Ms. Metkar holds an M.Sc. in Analytical & Medicinal Chemistry from the University of Mumbai and applies her extensive knowledge of regulatory submissions, GMP, and Quality by Design (QbD) to manage compliance across the region. She is an active and influential member of the International Pharmaceutical Excipients' Council of India (IPEC India), where she serves as a Managing Committee Member and the Chairperson of the Regulatory Affairs Committee, often speaking at industry events to promote best practices in excipient regulation.

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**Dr. Jitendra Amrutkar**

Head – Process Technology and Support,

APT Shirwal,

ACG Engineering

jitendra.amrutkar@acg-world.com

Dr. Jitendra Amrutkar currently serves as Head – Process Technology and Support at APT Shirwal, ACG Engineering. He brings over 20 years of experience in pharmaceutical sciences, specializing in formulation development, polymer science, and excipient technologies. Holding a Ph.D. in Pharmaceutical Sciences, his expertise spans formulation & process development, technology transfer, troubleshooting, and supporting commercial manufacturing of solid oral dosage forms.

A recognized thought leader, Dr. Amrutkar has authored more than 30 international research papers and presentations and holds two patents. His career includes product development for the generic market, techno-commercial roles, and application lab operations, with strong emphasis on


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excipient functionality and performance. Prior to joining ACG, he led R&D and technical services at Ideal Cures, Evonik, Dr. Reddy's Laboratories, and Alembic, driving innovation for global markets.

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**Pankaj Deore**

Senior Scientist,

Formulation and Technology

Merck KGaA

pankaj.deore@merckgroup.com

Pankaj Deore is a Senior Scientist in the Formulation and Technology Center, R&D division, at Merck Life Science Pvt. Ltd., based in Mumbai, India. He has been with Merck since April 2016, progressing from a Research Associate role to his current position, which he assumed in June 2025. In his capacity as a formulation specialist at the company's Global Formulation Application Lab, he focuses on actives, excipients, and developing innovative solutions for solid dose formulations. Mr. Deore's expertise lies in providing pre-sales and post-sales support in chromatography troubleshooting and application- specific training to clients. He holds a Master's degree in Pharmacy (M.Pharm) with a specialization in Pharmaceutics from the University of Pune, earned between 2014 and 2016. His work involves collaborating with internal teams and external clients to drive innovation and excellence in the pharmaceutical industry.

********

**Shrikant Pawar**

General Manager Sales

SPI Pharma

spawar2@spipharma.com

Shrikant Pawar currently holds the position of General Manager Sales - ASPAC Region at SPI Pharma, a role he began in March 2025. Based in Mumbai, Maharashtra, India, he also serves as the India Site Director, managing a large cross-functional team that includes Global R&D, Quality & Regulatory, Sales, Customer Service, Finance, and HR.

Mr. Pawar is a seasoned professional with over 18 years of experience spanning research and development, formulation, and commercial strategy within the life sciences and pharmaceutical industries. Prior to joining SPI Pharma, he was the Regional Sales Director for Lifesciences (South Asia) at Ashland from July 2023 to March 2025. His career trajectory includes significant sales and management roles at other key industry players, including nearly nine years at Croda (as Regional Sales Head South Asia - Croda Pharma and Sector Sales Manager - Healthcare), The Lubrizol Corporation, and DKSH. His background also includes R&D formulation development experience at Cipla Ltd from September 2006 to March 2010. He holds a Master's degree and has participated in a program at the Indian Institute of Management, Lucknow.

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**Kaushik Desai**

Secretary General,

IPEC India

kaushikdesai10@gmail.com

Postgraduate in Pharmaceutical Technology with an Industrial Management diploma

Career spanning over 35 years of multifunctional experience in various leadership roles with reputed pharmaceutical companies, Sanofi, Pfizer, Johnson & Johnson, Charak Pharma and Global Pharmatech (Maiva)

Pharmaceutical consultant for Projects, Technical Due Diligence and QMS


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Board Member of EXCiPACT, Executive Committee member of the Industrial Pharmacy section and Editorial

Advisory Board member of International Pharmacy Journal of FIP

Secretary General for IPEC India, Health Foods & Dietary Supplements Association and Advisor to Indian Pharma Machine Manufactures' Association

Member of the WHO Expert committee on Specifications for Pharmaceutical Preparations (ECSPP)

Member of the working group for Excipient Monographs of Indian Pharmacopoeia

Former India Director of DIA INDIA; Former Vice President, Chairman - Industrial Pharmacy Division, National General Secretary, Hon. Treasurer and Editor - Pharma Times of Indian Pharmaceutical Association

Recipient of IPA Fellowship award, IPA Eminent Pharmacist award and Excellence in Pharma Profession award by Indian Express group of publications

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**Dr. Md Azeemuddin**

Principal Scientist,

Preclinical Pharmacology, Discovery Sciences Group, R&D

Himalaya Wellness Company, Bengaluru

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Dr. Mohammed Azeemuddin M. currently holds the position of Principal Scientist in the R&D department at The Himalaya Wellness Company in Bengaluru, India, a role he assumed in April 2022. Working as a Principal Scientist in the Pharmacology Department of Discovery Sciences Group of R&D, he is responsible for the evaluation of efficacy and safety of herbal medicine/ phytopharmaceuticals by performing pharmacology and toxicology studies. His areas of research interest include metabolic disorders, GIT disorders, neurological disorders, etc.

He brings a wealth of experience in preclinical pharmacology and toxicology, having spent over 16 years with the company, starting as a Senior Research Scientist in 2006. Dr. Azeemuddin holds a Ph.D. in Pharmacology from the Manipal Academy of Higher Education (2021) and a Master of Pharmacy (M.Pharm) in Pharmacology from the Rajiv Gandhi University of Health Sciences (2005). His research background includes work on Sarcopenia and Cancer cachexia, and he is a published academic researcher with contributions to peer-reviewed journals focusing on the pharmacological activities of traditional medicinal plants.

**Topic: Preclinical Pharmacology and Toxicology Assessment of Herbal Products**

The understanding of the approach of nutraceutical/herbal drug manufacturers in the development of new products or new herbal entity (NHE). The process of establishing the efficacy and safety of herbal drugs/NHE, which should be at par with synthetic/modern medicine. The importance of pharmacodynamic and pharmacokinetic studies in deriving the human equivalent dose and mechanism of action of herbal drugs. The role of preclinical pharmacology studies and dose range finding studies in the extrapolation of preclinical dose to human equivalent dose. Though the herbal drugs are considered to be safe but a through safety profile should be established by performing different short term and long-term toxicity studies, following global guidelines like OECD in the good laboratory practice (GLP) approved lab. The advantages of adopting holistic approach against the reductionist.

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**Dr. Chandrika Mahendra**

General Manager - Personal Care and Baby Care R&D


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The Himalaya Wellness Company, India

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With over twenty years of expertise in the development of natural dermaceutical and cosmeceutical formulations, I have worked extensively across the full spectrum of derma and personal care products. My professional journey has been distinguished by a focus on transforming scientific knowledge into formulations that are not only stable and effective but also cater to the needs of the consumer. This includes creating advanced skin-delivery systems and high-performance products for both derma and personal care applications.

Throughout my career, I have played a pivotal role in driving major innovations within the industry. I have influenced product strategy and contributed significantly to elevating the importance of natural science in contemporary topical formulations. My efforts have helped to shape and redefine categories, ensuring that scientific advancements translate into tangible benefits for consumers.

**Topic: Designing of Herbal Dermaceuticals: Overcoming Challenges through Science, Standardization and Scalable Innovation**

The development of herbal dermaceuticals presents unique scientific and operational challenges—including variability in phytochemical composition, limited solubility and bioavailability of herbal actives, complex absorption pathways, and the need for consistent large-scale supply with stringent standardization. In this talk, how our organization has systematically addressed these challenges by integrating contemporary pharmaceutical technologies with evidence-based botanical research will be deliberated.

Our approach combines advanced phytochemical characterization, standardized extract development, and innovative delivery systems to enhance solubility, penetration, and dermal efficacy of herbal actives. We employ robust sourcing frameworks supported by traceable supply chains, sustainability practices, and high-precision analytical methods to ensure batch-to-batch consistency at commercial scale. Through multidisciplinary formulation science—spanning biopolymer matrices, and synergistic botanical blends—we translate traditional herbal wisdom into clinically relevant, consumer-centric dermaceutical solutions.

This session will highlight our development model, key technologies, case studies, and the scientific principles that enable us to design differentiated herbal dermaceutical products with reproducible quality, safety, and performance. It will also outline the strategic roadmap required for the next generation of advanced, standardized, and globally competitive phytoderma innovations.

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**Dr. Kamal Dua**

Professor

University of Technology Sydney
Australia

Dr. Kamal Dua is an esteemed academician and award-winning pharmaceutical scientist, currently holding the position of Associate Professor in the Graduate School of Health, Discipline of Pharmacy at the University of Technology Sydney (UTS), Australia. He is a highly accomplished researcher in pharmaceutics and drug delivery, renowned for his work on nanomedicine and targeted drug delivery systems for chronic inflammatory diseases, particularly airway conditions and lung cancer. Dr. Dua holds dual doctorates—a Ph.D. in Pharmaceutical Sciences from an Indian public university and a second Ph.D. in Immunology and Microbiology from the University of Newcastle in Australia—giving him unique dual expertise. His prolific career spans industry and academia across three nations and two continents, resulting in over 190 peer-reviewed publications, 70 book chapters, and 11 books. Recognized as a top researcher in Pharmacology & Pharmacy in


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Australia for 2025, Dr. Dua actively mentors early-career researchers, coordinates a suite of Good Manufacturing Practice (GMP) courses at UTS, and fosters significant industry collaborations to translate laboratory discoveries into clinical applications.

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**Vasundhra Bhandari**

Assistant Professor &
Faculty in charge,
Department of
Pharmacoinformatics

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Dr. Vasundhra Bhandari, PhD (Biological Sciences), serves as the Faculty Incharge of the Department of Pharmacoinformatics at the National Institute of Pharmaceutical Education and Research (NIPER), Hyderabad. With more than ten years of post-doctoral research experience, she has built a strong scientific profile in the areas of antimicrobial resistance—particularly involving ESKAPE pathogens—host-directed therapeutics, pharmacogenomics, and drug discovery. Her research integrates a multidisciplinary approach, leveraging microbiology, immunology, genomics, and computational biology to address critical challenges in infectious disease management.

Her research contributions are reflected in an impressive publication record of over 75 international peer-reviewed articles and various extramural grants. She holds an H-index of 27 and an i10-index of 41, underscoring the significant impact and global reach of her work. Dr. Bhandari's excellence has been recognised through several prestigious awards, including the DST INSPIRE Faculty Award (2015), the Fast Track Young Scientist Award from DST-SERB (2014), the Sri Ramachari Young Scientist Award (2012), and an International Travel Grant from the European Commission under FP7 (2010). She was also selected by TWAS to participate in the International Conference for Young Scientists on Infectious Diseases in 2017.

In addition to her research achievements, Dr. Bhandari contributes to the scientific community as an editor for leading international journals, including those of the American Society for Microbiology, PLoS Pathogens, and BMC Microbiology. Her work continues to advance innovation in infectious disease research and therapeutic development.

**Topic: Precision Antimicrobial Strategies Through Host-Pathogen Multi-Omics**

Acinetobacter baumannii is a high-priority risk pathogen with limited treatment options. It causes mortality and morbidity and is associated with respiratory tract, ventilator-associated, and nosocomial infections. Due to the emergence of multidrug resistance (MDR), new alternative treatments are warranted. Multidrug-resistant pathogens use various strategies to evade host defenses and ensure their survival in the host. One of the mechanisms is to alter host histone acetylation by upregulating histone deacetylases (HDACs), creating an immunosuppressive environment. However, the detailed mechanism by which carbapenem-resistant A. baumannii (CRAB) evades host immunity, and the impact of HDAC inhibition on this process, remain unclear.

In this study, we used comparative transcriptomic analysis to explore host cell signaling changes during A. baumannii infection and after treatment with SAHA, a pan-HDAC inhibitor. Our results reveal that CRAB promotes immune suppression by modulating signaling pathways to support its persistence. We also found that the expression of ACOD1, a gene associated with immunometabolism, was upregulated during infection. Treatment with SAHA reduced the expression of key inflammatory and immune-related genes, including IDO1, ACOD1, IL10RA, IL10, TNFα, IL6, IFNB1, and CCL3L3. Moreover, SAHA induced autophagy by enhancing phagosome maturation, antigen processing, and autophagosome-lysosome fusion through the regulation of autophagy-related and SNARE proteins,


ISBN: 978-81-980623-8-3

leading to bacterial clearance. Overall, our findings highlighted the key mechanism modulated by A baumannii and provided insights into several new drug targets to tackle MDR bacteria using next-generation technologies.

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Dr. S. Jubie, M. Pharm., Ph.D. currently serves as Associate Professor in the Department of Pharmaceutical Chemistry at JSS College of Pharmacy, Ooty, under JSS Academy of Higher Education & Research, Mysuru. With over 23 years of academic and research experience, she has established herself as a leading pharmaceutical researcher specializing in the discovery and design of novel anticancer chemical entities, scaffold/drug repurposing, and computational drug design. She holds a B.Pharm (1999), M.Pharm (2002), and Ph.D. (2014) from JSSAHER. Her intellectual property portfolio includes seven granted Indian patents, additional published patents, five authored books, and nine book chapters. She has secured major research funding from agencies including AICTE, ICMR, DST, Shaqra University (Saudi Arabia), and multiple internal grants as Principal or Co-Investigator. She is an active academic leader, serving as Academic Coordinator and contributing to institutional quality frameworks such as NAAC, NBA, NIRF, and ACPE. She has guided six Ph.D. scholars to completion, supervised numerous postgraduate and undergraduate research projects, and currently mentors additional doctoral candidates. A frequent invited speaker, she has participated in more than 60 scientific conferences and delivered lectures in national and international academic platforms. Dr. Jubie is a life member of professional bodies including IPA, APTI, APP, IFERP, and SBTI, and holds Associate Fellowship in the Antiviral Research Society of India. Her work has earned multiple recognitions, including Pharmacy Woman of the Year (APTI, 2023), Pharmacy Woman Teacher Award (2023), Young Researcher Award (2019), and Research Excellence Award (2025). Featured in Famous India: Nation's Who's Who, she continues to inspire future scientists and healthcare professionals with her philosophy rooted in the belief: "The mind is everything. What you think, you become."

**Topic: Precision Oncology in the AI era: From biomarker discovery to Targeted Therapeutics**

Cancer therapy is shifting from conventional, broad-spectrum treatments to biomarker guided precision oncology, where therapeutic decisions are made by the unique molecular features of each patient's tumor. Biomarkers such as gene mutations, differential protein expression, disrupted signaling pathways, and immune microenvironment signatures now help determine which targets should be modulated to achieve better clinical outcomes. Translating these complex datasets into effective therapeutic strategies is greatly enhanced by Artificial Intelligence (AI), which has become a central driver in modern drug discovery. AI-powered molecular modelling enables accurate prediction of drug–target interactions, assessment of mutation impacts on binding affinity, and rational optimization of molecular structures. Alongside this, AI integrated network pharmacology helps reveal interconnected pathways and combination therapy opportunities, while drug repurposing models supported by machine learning accelerate the identification of already-approved compounds with new relevance in oncology. Furthermore, stimuli-responsive and tumor-microenvironment–specific delivery systems enhance therapeutic precision by ensuring that drugs act selectively at the disease site. By combining biomarker intelligence with AI-driven modelling, researchers can now prioritize targets more effectively, design and refine molecules faster, predict resistance mechanisms early, and tailor therapeutic choices to individual


ISBN: 978-81-980623-8-3

patient profiles. Looking ahead, this integrated approach has the capacity to transform oncology drug discovery by enabling the development of therapies that are more precisely targeted, clinically effective, and economically sustainable, thereby improving patient survival and quality of life while easing the overall burden on healthcare systems and society.

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**Siddhesh Kamat**

Professor

IISER Pune, India

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Siddhesh S. Kamat is a Professor of Biology at the Indian Institute of Science Education and Research (IISER) Pune, where he leads a multidisciplinary research program focused on lipid biochemistry, enzymology, and chemical biology. He obtained his Ph.D. in Chemistry from Texas A&M University and completed postdoctoral training at Scripps Research as the 9th Irving S. Sigal ACS Postdoctoral Fellow. Since establishing his laboratory at IISER Pune in 2016, his group has made significant contributions to understanding lipid-signaling pathways, metabolic enzyme function, and host–pathogen interactions. Professor Kamat is a SwarnaJayanti Fellow and recipient of several major recognitions, including the Infosys Prize in Life Sciences (2024), EMBO Young Investigator Award, the INSA Young Scientist Medal and the Tarun Tejankit Award. His research has been featured on multiple journal covers and spans fundamental mechanistic biochemistry to metabolomics and disease-relevant lipid biology. He serves on the editorial boards of the British Journal of Pharmacology and the Journal of Biological Chemistry, and contributes to national scientific committees within India's DBT and ANRF. Beyond research, he is deeply involved in scientific training, outreach, and community-building, organizing courses and mentoring young investigators across India.

**Topic: An Integrated Chemoproteomics and Metabolomics Approach Towards Enzyme Function Annotation**

Our research group is interested in assigning functions to proteins involved in diverse aspects of mammalian metabolism and physiology. To achieve their goals, the group integrates aspects of chemical biology, biochemistry, molecular and cell biology, immunology, animal and/or cellular models, in conjunction with mass spectrometry (LC-MS) based metabolomics and proteomics techniques. The long-term goal is to identify and understand as-of-yet uncharacterized signalling and metabolic pathways in vivo, annotate enzymes and receptors that regulate their biology and provide new insights and therapeutic paradigms for various human diseases. In this talk, I will discuss an integrated LC-MS based chemical proteomics and metabolomics approach towards mapping function to an enzyme involved in phagocytosis.

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**Rachit Agarwal**

Associate Professor

IISc Bangalore, India

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Rachit Agarwal is an Associate Professor in the Department of Bioengineering at the Indian Institute of Science (IISc), Bengaluru, where he has been a faculty member since June 2017, first as Assistant Professor and now as Associate Professor since 2023. He completed his Ph.D. in Biomedical Engineering at the University of Texas at Austin under Prof. Krishnendu Roy, focusing on the effect of nanoparticle shape on cellular internalization, and subsequently pursued postdoctoral research with Prof. Andres J. Garcia at Georgia Institute of Technology. His research integrates biomaterials, drug delivery, and


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bioengineering strategies to develop innovative therapies for infectious and inflammatory diseases, including tuberculosis and osteoarthritis, with a strong focus on nanoparticle-based delivery systems, bacteriophage therapeutics, and hydrogel models for disease. Dr. Agarwal has received numerous national and international recognitions, including the OPPI Young Scientist Award (2024), the Har Govind Khorana Innovative Young Biotechnologist Award (2019), and the Ramanujan Fellowship (2017), and has served on editorial boards of prominent journals such as the *Journal of Biomedical Materials Research Part A*. He has authored over 50 peer-reviewed articles, contributed to book chapters and review articles, and holds multiple patents in the field of biomaterials and drug delivery. In addition to research, Dr. Agarwal is actively involved in teaching undergraduate and graduate courses on bioengineering and drug delivery, mentoring students, and serving as a reviewer for national and international funding agencies and scientific journals.

**Topic: Long acting injectables for the treatment of tuberculosis**

Tuberculosis (TB) claimed 10.7 million cases and 1.23 million lives in 2024. The approved WHO treatment includes a rigorous oral 4 to 6-month regimen involving several drugs for drug-susceptible TB. Owing to the short half-lives of first-line TB drugs, frequent daily dosing is required. Associated side effects and inability to carry on with everyday life result in a high rate of non-compliance amongst the patients, leading to drug resistance, increased treatment duration and economic burden. This renders the need for sustained-release drug formulations that maintain constant therapeutic concentrations and reduce dosage frequency, thereby increasing patient compliance, evident. In this talk, I will talk about my laboratory efforts in formulating long acting injectables of rifapentine and moxifloxacin. We developed injectable, extended-release, dissolution-controlled depots of nanocrystalline rifapentine with loading levels exceeding 85%, reducing the dosage frequency for patient-compliant treatment. Our injectable RPT nanocrystal formulation (CRPT) maintains RPT levels above 2 µg/mL in serum for over a week with a single intramuscular (IM) administration. A single IM injection administered in mice at 60 mg/kg once a week or once every two weeks showed non-inferior efficacy compared to the clinically used daily oral administration of rifapentine at a dose of 20 mg/kg.

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**Dr. Sahadev A. Shankarappa**

Professor
Ramaiah University of Applied Sciences,
Bangalore, India

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Dr. Sahadev is a neuroscientist by training, specializing in neurobiology, neurophysiology, and drug delivery research. With postdoctoral training in the laboratories of Professors Robert Langer at MIT and Daniel Kohane at Boston Children's Hospital, Harvard Medical School, his research focuses on understanding the impact of neural inputs on complex cellular systems with applications in tissue engineering and chronic lifestyle disorders.

His lab explores how neural inputs, both secreted and electrical, modulate non-neuronal cell functions. Results from these studies aim to be translated into human studies for tissue engineering and disease-specific applications. Sahadev holds a Ph.D. in Neurosciences from Loyola University Chicago, an MPH from the University of North Carolina at Chapel Hill, and an M.B.B.S. from Bangalore University. A recipient of the Ramalingaswami reentry fellowship from the Department of Biotechnology, Government of India, Sahadev is not only passionate about neuroscience, but also practices meditation and enjoys long-distance running.

**Topic: Drug Delivery Using Neural Pathways: Nanoparticle Design for Axonal Transport**


ISBN: 978-81-980623-8-3

Delivering nanoparticles to the nervous system is promising for treating neurological disorders but is limited by vascular barriers. This study exploits axonal transport as an alternative route for intraneuronal delivery. Isolectin B4 (IB4)-functionalized gold nanoparticles were designed to selectively target sensory neurons, and their uptake and axonal transport were evaluated using in vitro and in vivo models with confocal microscopy, SEM, microfluidic systems, and ICP-AES. In parallel, a membrane-stretching method was used to generate non-spherical polymeric nanoparticles to probe how geometry affects entry into high-curvature structures such as axons. Non-spherical particles showed enhanced uptake compared to spherical counterparts, indicating that both neurotropic ligand targeting and shape modulate internalization in high-curvature neuronal membranes. Overall, the work demonstrates that axonal transport of ligand-functionalized and shape-optimized nanoparticles provides a viable strategy for targeted neuronal drug delivery and informs the design of nanomedicines for neurological disorders.

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**Prof Sanjay Garg**

Professor

School of Pharmacy and Biomedical Sciences,

Adelaide University,

City West Campus,
Bradley HB6-11, Adelaide, SA, Australia

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Professor Sanjay Garg is a globally recognized pharmaceutical scientist and a pioneer in translational research. As Director of the Centre for Pharmaceutical Innovation (CPI), Adelaide University, Professor Garg is dedicated to advancing drug discovery, development, and delivery for both human and animal patients. His innovative work spans critical areas, including anti-cancer drug targeting, nanotechnology, and novel antimicrobial compounds to combat resistant infections (AMR). A testament to his innovation is his role in developing patented formulations, notably Acidform, which led to the US FDA-approved contraceptive Phexxi. With a staggering 101 patents and technology transfer for 15 products, Professor Garg bridges cutting-edge science with practical, patient-centric solutions, shaping the future of pharmaceutics.

**Topic: Transforming Patient Care Through Technology-Driven Pharmaceutical Innovation**

Improving patient compliance has been a defining challenge in modern healthcare, motivating a long-standing research focus on translation-ready technologies that simplify treatment, reduce burden, and enhance clinical outcomes. The presentation will exemplify a structured progression, i.e. from idea generation and technology development to real-world outcomes and societal impact.

The Long-Act™ platform originated as a conceptual solution to counteract poor adherence, fluctuating drug exposure, and limitations of frequent dosing. Through systematic development within the Pharmaceutical Innovation and Development Group (PIDG), this idea evolved into a versatile in-situ forming delivery system capable of accommodating virtually any drug, irrespective of physicochemical properties. The platform supports hydrophilic and hydrophobic molecules, offers customisable release profiles from days to weeks, and can be tuned to achieve disease- or patient-specific therapeutic objectives.

One flagship success is Long-Act™ loaded with Omeprazole, a once-weekly formulation delivering rapid onset and long-lasting relief. With over 200,000 doses administered globally across horses, dogs, and cats; and emerging potential for human translation. This technology exemplifies measurable societal benefit through improved convenience and reduced treatment fatigue.

Similarly, Long-Act PD™, engineered for levodopa/carbidopa, addresses the critical unmet need in Parkinson's disease by


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enabling week-long release and potential self-administration, significantly reducing dosing frequency while maintaining therapeutic stability. Collectively, these advances position Long-Act™ as a strong contender within the US$50B+ long-acting delivery market.

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**Dr. Matam Vijay-Kumar**

Professor (Tenured),

Dept. of Physiology and Pharmacology,

Dept. of Medical Microbiology and Immunology,

The University of Toledo College of Medicine & Life Sciences, Toledo, Ohio, USA

matamvijay.kumar@utoledo.edu

Dr. Matam Vijay-Kumar is a highly distinguished and tenured Professor in the Department of Physiology and Pharmacology, with a joint appointment in the Department of Medical Microbiology and Immunology, at The University of Toledo College of Medicine & Life Sciences, Ohio, USA. He also serves as the Director of the UT Microbiome Consortium (UT-MiCo). Dr. Vijay-Kumar is a world-renowned scientist in the fields of gut microbiota, nutrition, metabolism, and immunology, known for his groundbreaking discoveries on the interplay between intestinal inflammation and metabolic disorders like type 2 diabetes and obesity. He holds a Ph.D., completed a tenure-track position at the Pennsylvania State University, and moved to the University of Toledo in 2018, where he was promoted to full professor in 2020. His research, which has garnered multiple R01 grants from the NIH and resulted in numerous high-impact publications, explores topics such as the potential carcinogenic effects of certain dietary fibers, the role of innate immunity in gut homeostasis, and neutrophil extracellular traps (NETs) in gastrointestinal infections. He is the recipient of several national and international honors, including the prestigious Outstanding Research and Scholarship Award from the University of Toledo in 2023.

**Topic: Gut Microbiota in Health and Disease**

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**Dr. Dharmendra Ahuja**

Dean Faculty of Pharmaceutical Science at Jayoti Vidyapeeth Women's University, Jaipur, India

Dr. Dharmendra Ahuja, Ph.D. in Pharmacology, is a distinguished academician, mentor, and researcher with over 25 years of experience in the pharmaceutical domain. He serves as the Principal Mentor for Experimental Pharmacology Software under the Bureau for Health and Education Status Upliftment, India, and is a Guest Professor of Pharmacology at Rajasthan University of Health Sciences, Jaipur. Dr. Ahuja is a Patron Member of the Indian Pharmaceutical Association and a Member of the Board of Management at JV Women's University, Jaipur. He is empanelled as an Assessor with the National Assessment and Accreditation Council (NAAC), Government of India, and as an Inspector with the Pharmacy Council of India (PCI), Government of India. He has also served as a Fellow with the Department of Planning, Government of Rajasthan, and the Ministry of Human Resource Development, Government of India. Dr. Ahuja has been recognised and honoured by several dignitaries, including the Health Minister and the Women and Child Development Minister of the Government of Rajasthan, as well as the Mayor of Jaipur. He holds multiple patents and publications, reflecting his significant contributions to pharmaceutical education, research, and policy.


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**Topic: Application of AI in Preclinical Pharmacology using "Experimental Pharmacology**

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**Medam Venkata Komali**

Medam Venkata Komali is a pharmacist, researcher, and student leader with a strong commitment to professional service and academic excellence. A proud daughter of Indian Naval personnel, she embodies discipline, integrity, and leadership in her professional journey. She currently serves as the President of the IPA–SF National Executive Committee (2025–2026) and has demonstrated sustained leadership within IPA-SF at state and national levels. Her IPA-SF journey includes key roles as IPA Divisional Head, Liaisons Subcommittee (2024), Projects Subcommittee Member (2023), Contact Person for the IPA-SF Goa State Chapter, and Secretary, IPA-SF KLE Belagavi Student Chapter, where she actively contributed to chapter establishment, membership growth, national conferences, and professional outreach initiatives. She is also the Assistant Editor of IPA-CPD e-Times and has coordinated and led a student team for IPA-CPD projects under the guidance of Dr. Raj Vaidya. Academically, she holds a Master of Pharmacy (Pharmaceutical Chemistry) from KLE College of Pharmacy, Belagavi (August 2025) and a Bachelor of Pharmacy from Goa College of Pharmacy, Panaji (September 2023). Her research work spans medicinal chemistry, computational drug design, and synthesis of heterocyclic compounds, supported by research grants, conference presentations, and publications in progress. She was awarded the Best Outgoing Female M. Pharm Student 2025 at KLE College of Pharmacy, Belagavi. She is among the 85 pharmacists in India trained as a Vaccinator Trainer under the FIP–IPA Vaccination Project, and maintains a strong interest in sports, including swimming, water polo, table tennis and basketball.

**Topic: "NextGen Pharmacy Leaders: IPA-Students' Forum"**

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# Scientific Program Schedule

**Date: December 19, 2025** **Venue: Main Inauguration Hall 2 BIEC**

| | |
|---|---|
| 09.30 AM to 1.00 PM | **Inauguration of Indian Pharmaceutical Congress 2025** |
| 1.00 to 2.00 PM | **LUNCH BREAK** |
| 2.00 to 3.30 PM | **Presidential Panel Discussion**<br>**Chair: Dr. Milind J. Umekar & Dr. T. V. Narayana** |
| | **Viksit Bharat 2047: India's Potential in Shaping the Future of Global Pharma and Healthcare: Role of Academia, Industry & Regulatory Agencies**<br>Moderator: **Mr. Harish Jain**, LOC Chairman, 74th IPC & National President,<br>FOPE Panelists:<br>**Dr. Annam Visala,** Joint Drugs Controller (India)<br>**Dr. Suresh Bhojraj,** Pro-Chancellor, JSS AHER; Former President-PCI<br>**Shri Sudarshan Jain,** Secretary General, India<br>**Shri Mehul Shah,** CMD, Encube Ethicals<br>**Shri. Namit Joshi,** Chairman, Pharmexcil<br>**Dr. Ravleen Singh Khurana,** CEO, Nitika Pharmaceuticals<br>**Dr. Gaurav Pratap Singh**, Senior Principal Scientist, Indian Pharmacopoeia Commission |
| 3.30 to 5.00 PM | AIOCD sponsored session on Pharmacists as advocates of vaccination<br>Speaker: **Dr. T. V. Narayana,** Secretary IPCA |
| | MSPC sponsored session Pharmacy Practice Regulations-2014<br>Speaker**: Dr. B. Suresh,** Pro-Chancellor, JSS AHER; Former President, PCI, India |
| | Session on Vikasit Bharat Vision 2047: Pharma<br>Speaker: **Dr. B. Suresh,** Pro-Chancellor, JSS AHER; Former President, PCI, India<br>**Mr. Jagannath Shinde,** President – All India Organization of Chemists & Druggists<br>**Mr. Atul Ahire,** President Maharashtra State Pharmacy Council<br>Contributors: IPCA Constituents & AIOCD followed with the formation of the steering committee of all stakeholders. |
| 5.00 to. 5.30 PM | TEA BREAK |
| 7.00 to 8.30 PM | Entertainment and Dinner |


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**Date: December 19, 2025** **Venue: JACARANDA HALL**

| Symposium - 1: AI in Drug Discovery and Development<br>Chair: Dr. R. K. Khar & Dr. P. D. Choudhari | | |
|---|---|---|
| **Time** | **Speakers** | **Title** |
| 2.00 to 3.30 PM | **Dr. Sukuru Karunakar**<br>Global Vice President- Pharma Product Development & Head-Scientific Advisory, Pharma and Consumer Health<br>Catalent Pharma Solutions, USA | Challenges and Opportunities in Oral Delivery of Macromolecules in the AI Era |
| | **Dr. Twan Lammers**<br>Chair of Experimental Molecular Imaging; RWTH Aachen University<br>Germany | Artificial intelligence and advanced imaging technologies to improve cancer nanomedicine clinical performance |
| | **Dr. Joanne Chun**<br>Director, Postgraduate Education Programs, Bioengineering and Therapeutic Sciences, Schools of Pharmacy and Medicine, UCSF, USA | AI in Pharmaceutical Education: Preparing the Next Generation for a Technology-Driven Future |
| **Plenary Lecture Series – 1**<br>**Chair: Dr. B. Bhoop and Dr. O. P. Katare** | | |
| 3.30 to 5.00 PM | **Dr. Mahendra Patel**<br>Director, Centre for Research Equity<br>Oxford University London, UK | Transforming Community Pharmacy: The NHS Pharmacy First Model and the Expansion of Clinical Practice in the United Kingdom |
| | **Dr. M. Raj Rajasekaran**<br>Professor of Urology, Research Pharmacologist<br>UCSD; VA San Diego Healthcare System USA | Engineered Silk Fibroin Hydrogels as a Controlled Release Platform for Sustained Antifibrotic Therapy: Targeting Biochemical and Biomechanical Modulation of Fibrosis in Multidimensional in vitro Models |
| | **Dr. Ranjit Barshikar**<br>CEO,<br>QbD International, India | AI applications in Pharma Industry |
| 5.00 to. 5.30 PM | TEA BREAK | |
| **Micro Lab Sponsored Symposium – 2**<br>**Chair: Dr. Ramkishan & Dr. Swati Shrivastav** | | |
| **Time** | **Speakers** | **Title** |
| 5.30 to 7.00 PM | **Dr. Shrenik Kole**<br>VP/Head- Sterile Product Development,<br>Micro Labs Limited, Bangalore | AI – Changing Complex Generic Drug Product Development |
| | **Dr. Hari Krishna Maram**<br>Chairman,<br>Vision Digital India, India | Future of AI: scope and opportunities of Artificial Intelligence in education and industry |
| | **Dr. G. Jagadeesh**<br>Formerly Senior Expert Pharmacologist,<br>US-FDA, USA | The emerging trends in the US FDA's approval of new molecular entities and biologics over the past decade.<br>Therapeutic targets and drug innovation. |


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**Date: December 19, 2025** **Venue: GULMOHAR HALL**

| Symposium - 3 Writing Research Proposals and Funding Opportunities<br>Dr. Arun Patil & Dr. Mihir Kumar Kar | | |
|---|---|---|
| **Time** | **Speaker** | **Title** |
| 2.00 to 3.30 PM | **Dr. Manish Diwan**<br>BIRAC, New Delhi, India | Innovation ecosystem for Atmanirbhar Bharat |
| | **Dr. Dipti Kakkar Thukral**<br>Scientist G, ANRF | ANRF research schemes for biomedical researchers |
| | **Dr. Kailash Petkar**<br>Scientist-D Department of Scientific and Industrial Research (DSIR), India | Strengthening India's R&D Ecosystem: The pathway to Viksit Bharat |
| | **Dr. Ravleen Kaur Bakshi**<br>Scientist D, ICMR, New Delhi, India | ICMR Funding Schemes: Opportunities for Researchers |
| **Symposium - 4: Start-ups in Pharmaceutical Industry: Some Success Stories<br>Chair: Dr. Jaypal Reddy & Dr. G. Q. Jeyabalan** | | |
| 3.30 to 5.00 PM | **Speakers** | **Title** |
| | **Dr. Rahul Purwar**<br>Professor, Bioscience and Bioengineering<br>IIT Bombay, India | Journey of India's First Indigenous CAR-T therapy |
| | **Dr. Sandip Kulkarni**<br>Founder & CEO,<br>Image ProVision Technology, USA | Revolutionizing Particle Characterization through AI-Based Particle Morphology Analysis |
| | **Dr. Jyothi Teigginamath**<br>Managing Director,<br>NiA Pharmaceuticals Australia | Women and Entrepreneurship: A Journey Beyond Boundaries |
| 5.00 to 5.30 PM | TEA BREAK | |
| **Symposium - 5: AI-Based ADMET Prediction in Pre-clinical Drug Development<br>Chair: Dr. Sridhar Reddy & Dr. B. Vishvanath** | | |
| **Time** | **Speakers** | **Title** |
| 5.30 to 7.00 PM | **Dr. Anant Ketkar**<br>Principal Scientist and Scientific Lead – India Simulations Plus, India | Basics of PBPK Modelling and Introduction to GastroPlus® X (GPX) and its Integration with AI |
| | **Dr. Amol Kulkarni**<br>Scientist, CSIR-National Chemical Laboratory, Pune Maharashtra, India | Continuous manufacturing in the pharmaceutical industry: Opportunities, Challenges and the Path Forward |
| | **Dr. Rajesh Kumawat**<br>Head - Medical Services & Clinical Development at The Himalaya Wellness Company, India | AI and clinical trial optimization: Clinical trials of Herbal Products – A GCP approach |


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**Date: December 19, 2025** **Venue: CASSIA HALL**

| Shri. K. C. Chatterjee Memorial Lecture (IPGA sponsored)<br>Chair: Dr. Atul Nasa and Dr. Vijay Bhalla | | |
|---|---|---|
| **Time** | **Speakers** | **Title** |
| 2.00 to 3.00 PM | **Dr. P. K. Dutta**<br>Chairman and MD,<br>Systopic Laboratories Pvt. Ltd, India | Transformation and Innovation through Technological Skills of Value & Ethics |
| **Dr. B.D. Miglani Memorial Lecture (IHPA sponsored)<br>Chair: Dr. R. A. Gupta and Dr. Pankaj Bector** | | |
| 3.00 to 4.00 PM | **Dr. V. Kalaiselvan,**<br>Secretary-cum-Scientific Director, Indian Pharmacopoeia Commission, India | Indian Pharmacopoeia - Ensuring quality and safety beyond borders |
| **Prof. M. L. Khorana Memorial Lecture (IPA sponsored)<br>Chair: Dr. R. N. Gupta and Dr. Subhash Mondal** | | |
| 4.00 to 5.00 PM | **Dr. Pulok Mukherjee**<br>Professor, Jadavpur University, Dept. of Pharmaceutical Technology Kolkata, India | Bridging Heritage and Innovation: Omics and Artificial Intelligence in Advancing Traditional Medicine |
| 5.00 to 5.30 PM | TEA BREAK | |
| **Symposium - 6: Pharmacogenomics and Precision Medicine<br>Chair: Dr. Devendra Pathak & Dr. Venkat Ramana** | | |
| **Time** | **Speakers** | **Title** |
| 5.30 to 7.00 PM | **Dr. Chakradhara Rao S Uppugunduri**<br>Professor,<br>JIPMER, Puducherry, India | Optimizing therapeutic outcomes in oncology using pharmacogenomics |
| | **Dr. Murali M.**<br>Additional Professor, AIIMS<br>Bhopal, India | Pharmacogenomics and Precision Medicine |
| | **Dr. Chung**<br>CEO,<br>Caregen Co. Ltd, South Korea | Pharmacogenomics in drug discovery |


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**Date: December 19, 2025** **Venue: PARIJATHA HALL**

| | | |
|---|---|---|
| **Symposium - 7: Nanoengineered Drug Delivery system and recent trends in Pharm. Technology**<br>**Chair: Dr. Deependra Singh & Dr. Rohit Dutt** | | |
| 2.00 to 3.30 PM | **Dr. Pardeep Gupta**<br>Professor, Burroughs Wellcome Chair,<br>University of Wisconsin-Madison<br>Philadelphia, Pennsylvania, USA | Coarse-Grained Molecular Dynamics Simulation of Lipid Self-Assembly Using the Martini Force Field |
| | **Dr. Rakesh Tekade**<br>Professor,<br>NIPER Ahmedabad, India | Next-generation platforms for targeted cancer treatment via technological transformation |
| | **Dr. Narasimha Murthy**<br>CSO,<br>Topical Products Testing LLC, USA | Novel Design Approaches in Microneedle-Mediated Drug Delivery |
| **Plenary Lecture Series – 02**<br>**Chair: Dr. Rajendra Kakde & Dr. Sohan Chitlange** | | |
| 3.30 to 5.00 PM | **Dr. Hemanth Kumar Nambari**<br>Scientist-B, Kalam Institute of Health Technology Visakhapatnam, Andhra Pradesh, India | Artificial Intelligence in Healthcare Technology (From Innovation to Production) |
| | **Dr. Basavaraj Nanjwade**<br>Chief Scientific Officer,<br>Wexford Laboratories Pvt Ltd<br>Bengaluru, Karnataka, India | AI in medical device development |
| | **Dr. Sneha Ambwani**<br>Professor and Head of Pharmacology, AIIMS Jodhpur, India | AI ethical issues, Bias and Challenges in Therapeutics |
| 5.00 to 5.30 PM | TEA BREAK | |
| **Siddhayu Life Sciences Sponsored**<br>**Symposium 8: AI-Powered Phytochemical Screening and Lead Identification**<br>**Chair: Dr. Arun Garg & Dr. Raman Dang** | | |
| **Time** | **Speakers** | **Title** |
| 5.30 to 7.00 PM | **Dr. Sanjay Jachak**<br>Professor,<br>NIPER SAS Nagar, Mohali, India | Application of AI-Driven Ayurinformatics for Development of AYUSH Medicines |
| | **Dr. H. B. Pushpalatha**<br>General Manager,<br>The Himalaya Wellness Company, India | Development of Herbal Pharmaceuticals - An approach from academia to Industry |
| | **Dr. Raghavendra P Rao**<br>Senior Principal Scientist, Research & Development, The Himalaya Wellness Company, India | AI powered phytochemical screening and lead identification |


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**Date: December 19, 2025** **Venue: AI Pavilion HALL 3**

| Workshops and Demonstrations<br>Chair: Dr. Marina Koland | | |
|---|---|---|
| **Time** | **Resource person** | **Title** |
| 2.00 to 4.15 PM | **Dr. Achintya Das**<br>Head of Digital transformation and Modeling,<br>Syngene, Bengaluru | AI In Drug Discovery Current Status and Challenges |
| | **Dr. Raghu R**<br>CEO,<br>Molecular Solutions, Bengaluru | AI Powered Drug Discovery: Next Gen technologies for Pharma R & D |
| | **Dr. Jitesh**<br>Senior Research Scientist,<br>Peptris Technologies Pvt. Ltd, Bengaluru | From Pose to Potency: An AI based Approach to find activity from binding |
| 4.15 to 6.30 PM | **Dr. Viswanadhan**<br>Vice President,<br>Molecular Solutions, Bengaluru | AI-Accelerated Hit Identification and Virtual Screening |
| | **Dr. Faizans**<br>Applications Scientist | From Millions to Trillions: The New Era of Hyper-Scale Virtual Screening |
| | **Dr. Viswanath**<br>Principal Scientist- DMPK,<br>Jubilant Biosys, Bengaluru | Hero or Villain? AI & ML in Drug Metabolism and Pharmaco-kinetics |


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**Date: December 20, 2025** **Venue: Main Hall 2**

| | |
|---|---|
| 10.00 to 11.00 AM | **"NextGen Pharmacy Leaders: IPA-Students' Forum"**<br>**Medam Venkata Komali**<br>President, IPA-SF National Executive Council 2025-2026 |
| 11.00 to 11.30 AM | **Reimaging Ayurveda – Innovating for integrative health**<br>**Dr. Vikas Bansi,**<br>OTC Business Director, The Himalaya Wellness Company, India |
| **Himalaya led Panel Discussion on**<br>**From Tradition to Technology: Advancing Drug Discovery through Phytopharmaceuticals in India**<br>**Chair: Rangesh Paramesh,** Director -Intellectual Property, Himalaya Wellness Company, Bangalore | |
| 11.30 AM to 1.00 PM | **Dr. U. V. Babu**<br>Director, R&D, Himalaya Wellness Company, Bangalore<br>**Mr. Hitesh Patel**<br>Managing Director, K Patel Phytoextractions Pvt Limited, Mumbai<br>**Dr. Binu T. Kuruvilla**<br>R&D Head, Arjuna Natural Pvt Ltd, Kerala<br>**Dr. A. V. Krishna Raju**<br>R&D Head, Laila Nutra, Vijayawada<br>**Dr. Baidyanath Mishra**<br>Head – R&D Healthcare, Dabur India Ltd, Ghaziabad<br>**Dr. Sunil Kumar Dubey**<br>Senior General Manager, Emami Ltd<br>**Mr. Girish Soman**<br>Founder Chairman & CEO, Nisarga and Sanvardhini group<br>**Dr. Prasoon Gupta**<br>Principal Scientist and In-Charge, Natural Products and Med. Chem., IIIM, Jammu<br>**Dr. USN Murty**<br>Director, NIPER, Guwahati |
| 1.00 to 2.00 PM | **LUNCH BREAK** |
| 2.00 to 3.30 PM | Pharmacothon |
| 3.30 to 5.00 PM | Elocution Competition |
| 5.00 to 5.30 PM | TEA BREAK |
| 5.30 to 7.00 PM | Scientific Session |


ISBN: 978-81-980623-8-3

**Date: December 20, 2025** **Venue: JACARANDA HALL**

| Plenary Lecture series -3 ChemoNumerics: Decoding Molecules with AI, Algorithms and Predicative intelligence<br>Chair: Dr. Harish & Prof. Md. Ishaq Geer | | |
|---|---|---|
| **Time** | **Speakers** | **Title** |
| 10.00 to 11.30 AM | **Dr. G. Narahari Sastry**<br>Professor, Department of Biotechnology, IIT Hyderabad, India | Machine learning and AI Applications in Protein Structure-Function, Drug Discovery, and Healthcare |
| | **Mr. Aarshit Mittal**<br>Chief Product Architect,<br>Aarth Software Pvt. Ltd. Delhi, India | AI-Driven Chemical Intelligence: From Documents to Drug Discovery at Scale |
| | **Dr. Praful R Naik**<br>Director & CEO,<br>Prashak Techno Enterprises Pvt. ltd.<br>Pune, India | Integrated Innovations: Converging PHARMA And AYUSH Sciences to Propel Next-Gen Divergent Innovations & Solutions For Unmet Medical Needs |
| **LOC Organized CDSCO Special Plenary Session** | | |
| 11.30 AM to 1.00 PM | **Dr. Rajeev Singh Raghuvanshi**<br>Drugs Controller General of India (DCGI) | India Pharma 2047: Reinvent to lead |
| 1.00 to 2.00 PM | LUNCH BREAK | |
| **Plenary Lecture Series – 04<br>Chair Dr. M. D. Karvekar & Dr. Ketan Patel** | | |
| **Time** | **Speakers** | **Title** |
| 2.00 to 4.00 PM | **Dr. B. Suresh**<br>Pro-Chancellor, JSS AHER; Former President, PCI, India | Topic to be announced |
| | **Dr. Indiran Pather**<br>Howard University Washington, DC USA | Some Contributions to Buccal and Sublingual Drug Delivery |
| | **Dr. Muralikrishnan Dhanasekaran**<br>Harrison College of Pharmacy, Auburn University, USA | Empowering Pharmacists in Bridging Global Healthcare Gaps: The Crucial Role of Outreach in the Subcontinent and Beyond |
| | **Dr. Zeenat Iqbal**<br>Professor,<br>Jamia Hamdard, New Delhi, India | Quality by Design (QbD) Approaches for Developing Advanced Periodontal Drug-Delivery Systems |
| 4.00 To 4.30 PM | TEA BREAK | |
| 4.30 to 6.00 PM | AGM of IPA | |


ISBN: 978-81-980623-8-3

**Date: December 20, 2025** **Venue: GULMOHAR HALL**

| Patlex Business Solutions sponsored Plenary Lecture Series – 5<br>Chair: Dr. Rubina Bose and Dr. S. Bharath | | |
|---|---|---|
| **Time** | **Speakers** | **Title** |
| 10.00 to 11.30 AM | **Dr. Matam Vijay-Kumar**<br>Professor (Tenured),<br>Dept. of Physiology and Pharmacology,<br>The University of Toledo College of Medicine & Life Sciences, Toledo, Ohio, USA | Gut Microbiota in Health and Disease |
| | **Dr. Pooja Goswami**<br>Director,<br>RAMJA Genosensor Pvt Ltd. New Delhi, India | Accelerating the AMR Pipeline: How 90-Minute DNA Biosensing Re-defines Drug Discovery, Clinical Trials, and Antibiotic Repurposing |
| | **Mr. Vijaykumar Shivpuje**<br>Director,<br>Patlex Business Solutions, Mumbai, India | Breaking the Myths: what Pharma innovators should really know about the patents |
| **Plenary Lecture Series – 06 Synergy of AI in Pharmacy: Smart Classrooms, Smart Simulations, Smart Discovery<br>Chair: Dr. M. D. Burande & Dr. Sirse Krantikumar** | | |
| 11.30 AM to 1.00 PM | **Dr. Mirza Baig**<br>Professor, College of Pharmacy,<br>Dubai Medical University, Dubai, U.A.E. | Smart Simulations: Redefining Pharmacy Education for the AI-Driven Healthcare Era |
| | **Dr. Neelima Gupta**<br>Instructor NUS, Singapore | AI as a Teaching Partner: Shaping the Future of Pharmacology Education at NUS Medicine |
| | **Dr. Karthik Raman**<br>Professor, Department of Data Science and AI,<br>IIT Madras, India | AI, Models and Networks: A trifecta reshaping early-stage drug discovery |
| 1.00 to 2.00 PM | LUNCH BREAK | |
| **Symposium – 09: Biomaterials, Bioengineering, and Microfluidics<br>Dr. Arun Nanda & Dr. Kamla Pathak** | | |
| **Time** | **Speakers** | **Title** |
| 2.00 to 4.00 PM | **Dr. Debjani Paul**<br>Institute Chair Professor,<br>Indian Institute of Technology-Bombay, India | Microfluidic devices for healthcare and biomaterial applications |
| | **Dr. Saikat Chakrabarti**<br>Senior Principal Scientist,<br>CSIR-Indian Institute of Chemical Biology,<br>Kolkata, West Bengal, India | AIDIAS: Artificial Intelligence based Diagnostic and Analytical Systems |
| | **Dr. Santosh Dixit**<br>Chief Domain Expert,<br>Persistent Systems Pune, Maharashtra, India | AI-Driven Image Analysis: Accelerating Pharmaceutical R&D and Precision Medicine |
| | **Dr. D. B. Ananthanarayana**<br>CSO,<br>Ayurvidye Trust, Bangalore | Phytopharmaceuticals Emerging Botanical Drug Development for Opportunities for Indian Pharma Industry |
| 4.00 to 4.30 PM | TEA BREAK | |
| 4.30 to 6.00 PM | Meeting of APTI life members & APTI AWARDS | |


ISBN: 978-81-980623-8-3

**Date: December 20, 2025** **Venue: CASSIA HALL**

| | | |
|---|---|---|
| **Symposium - 10: Digital Therapeutics: Regulation and Integration into Pharma<br>Chair: Dr. Sanju Nanda & Dr. T. M. Pramod Kumar** | | |
| **Time** | **Speakers** | **Title** |
| 10.00 to 11.30 AM | **Dr. Muthu Dhandapani**<br>Vice President – Quality & Regulatory Compliance, Tricog Health, Bangalore, India | From Algorithm to Bedside: Ensuring Quality, Safety, and Regulatory Compliance in Real-World Deployment of AI Healthcare Solutions |
| | **Dr. Prakash NS**<br>Principal Scientist,<br>Research and Development,<br>Himalaya Wellness Company, India | Advanced Laboratory Instrumentation Management and Documentation Trackers with e-LNBs |
| | **Dr. Rafiq Mohamad**<br>Principal Research Scientist, Preclinical Services, R&D Center,<br>The Himalaya Wellness Company, India | Regulatory Framework of Product Label Claims - Design and Compliance |
| **Symposium – 11: Advancement in Neurotherapeutics drug discovery<br>Dr. Dadasaheb Kokare & Dr. Brijesh Taksande** | | |
| 11.30 AM to 1.00 PM | **Dr. Samba Reddy**<br>Regents Professor,<br>University School of Medicine Bryan, Texas, USA | AI & Neurosteroid-based New Drug Development: FDA Approval of Brexanolone and Ganaxolone for Complex Brain Disorders |
| | **Dr. B. S. Shankarnarayanrao**<br>Professor, Department of Neurophysiology, NIMHANS Bangalore, India | Novel Strategies of Treat Temporal Lobe Epilepsy-induced Cognitive Deficits and Abnormal Synaptic Plasticity |
| | **Dr. Arnab Barik**<br>Assistant Professor,<br>CNS, IISc Bengaluru, India | Pain & Itch: The good, the bad, & the ugly |
| 1.00 to 2.00 PM | **LUNCH BREAK** | |
| **Panel Discussion on National Education Policy (NEP)<br>Chair: Dr. S. K. Kulkarni & Dr. N. Venkateshan** | | |
| **Time** | **Policy to Practice: Integrating NEP 2020 Reforms in Pharmacy Institutions** | |
| 2.00 to 3.30 PM | **Panelists:**<br>1. **Dr. Sohan Chithlange,** Vice Chancellor, Alard University, Pune, India<br>2. **Dr. Deependra Singh**, Professor, Pt. Ravishankar Shukla University, Raipur, India<br>3. **Dr. Atmaram Pawar,** Principal, Poona College of Pharmacy, Pune, India<br>**Moderator: Dr. Vishal Gupta,** Dean (Academics), JSS AHER, Mysuru | |
| **Session on AI in Preclinical Pharmacology<br>Chair: Dr. Nitin Maniar and Dr. U. K. Patil** | | |
| 3.30 to 4.00 PM | **Application of AI in Preclinical Pharmacology using "Experimental Pharmacology Software**<br>**Dr. Dharmendra Ahuja,** Mentor, Bureau for Health and Education Status Upliftment, India | |
| 4.00 to 4.30 PM | TEA BREAK | |
| 4.30 to 6.00 PM | Meeting of IHPA life members | |


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**Date: December 20, 2025** **Venue: PARIJATHA HALL**

| Symposium – 12: 3D Printing of Pharmaceuticals: Challenges & Future Directions<br>Chair: Shri Raja Bhanu & Dr. Jayaselan | | |
|---|---|---|
| **Time** | **Speaker** | **Title** |
| 10.00 to 11.30 AM | **Dr. Subham Banerjee**<br>Associate Professor,<br>NIPER Guwahati, India | Additive Manufacturing Mediated Platform Technology in Pharma: Educate, Innovate, Empower |
| | **Dr. Subhadeep Roy**<br>Assistant Professor, MRSB<br>BIT- Mesra, India | 3D Microphysiological Disease Modeling and Tissue Engineering: Drug screening to personalized therapy |
| | **Dr. Kaushik Chatterjee**<br>Professor, Indian Institute of Science, Bangalore, India | 3D and 4D Bioprinting for Advancing Healthcare |
| **APTI Sponsored Plenary Session 07: APTI Women Researchers and Investigators Forum<br>Dr. Milind Umekar & Dr. Vandana Patravale** | | |
| 11.30 AM to 1.00 PM | **Prof. Indu Pal Kaur**<br>Professor,<br>UIPS, Chandigarh University, India | Womania Pharmayan: A Journey of God's Grace, Courage, and Unconventional Reinvention in Pharma |
| | **Dr. Vishakha Oza**<br>Associate Director – Global Safety Sciences, GCSP, Germany | Leadership strategies for thriving in the age of Artificial Intelligence |
| | **Dr. Geetha Manjunath**<br>Co-founder and CEO,<br>NIRAMAI Health Analytix, Bangalore, India | Artificial intelligence for equitable breast cancer screening |
| 1.00 to 2.00 PM | **LUNCH BREAK** | |
| **Symposium – 13: IPEC India on Excipients as Enablers: Compliance, Safety and Innovation in Drug Development<br>Chair: Dr. Kaushik Desai & Dr. Chandrakant Ranga** | | |
| **Time** | **Speakers** | **Title** |
| 2.00 to 4.00 PM | **Ajit Singh**<br>Chairman, ACG Worldwide | Opening Address |
| | **Dr. Ravleen Singh Khurana**<br>CEO, Nitika Pharmaceuticals | Support from excipients manufacture in ensuring the quality and safety of pharma products |
| | **Vishakha Metkar**<br>Director, Colorcon Asia | Supplier Qualifications |
| | **Dr. Jitendra Amrutkar**<br>Head, Process Technology and Support, ACG | Fluid Bed Excellence in Niche Applications |
| | **Pankaj Deore**<br>Senior Scientist,<br>Formulation and Technology, Merck | mPredict™ AI tool predicting Co-Crystal Solutions |
| | **Shrikant Pawar**<br>General Manager - Sales, SPI Pharma | Pushing Boundaries with Advanced Drug Delivery Systems |
| | **Kaushik Desai**<br>Secretary General, IPEC, India | Open Forum Q&A |
| 4.00 to 4.30 PM | TEA BREAK | |
| 4.30 to 6.00 PM | Meeting of AIDCOC Members | |


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**Date: December 20, 2025** **Venue: AI Pavilion HALL 3**

| Workshops and Demonstrations<br>Chair: Dr. Kusum Devi | | |
|---|---|---|
| **Time** | **Resource Person** | **Title** |
| 10:00 AM to 1.00 PM | **Dr. Raja**<br>Founder & CEO,<br>Genotypic Technology | The Magic never Stops: AI Driven Genomics in Drug Discovery |
| | **Dr. Anbu Dinesh**<br>Applications Scientist,<br>Molecular Solutions | AI-Powered Retrosynthesis and Process Chemistry |
| | **Dr. V. N. Balaji**<br>Drug Discovery Research Advisor,<br>Molecular Solutions | AI Powered JNK1 Hit Prediction: Descriptors Drive Superior Classification and Regression. |
| | **Dr. Viswanadhan**<br>Vice President,<br>Molecular Solutions | Free Energy perturbation for Accurate Binding affinity and Unbinding kinetics prediction. |
| 1.00 to 2.00 PM | **LUNCH BREAK** | |
| 2.00 to 4.45 PM | **Dr. Ravi**<br>Chief Scientific Officer,<br>Pharm DEM. | AI Powered Formulation Intelligence: Accelerating R & D by Eliminating Trial and Error |
| | **Dr. Sameer Agarwal**<br>Vice President,<br>Molecule.ai | AI Powered Precision in Drug Discovery: From Serendipity to Strategy |
| | **Dr. Sooriya Kumar**<br>Associate Director,<br>Jubilant Biosys. | Reinforcement learning based Molecular Generation |
| | **Dr. Jagadish**<br>Vice President,<br>Pharmaids | Domain Expertise: Preventing GIGO in AI Driven Drug Discovery |
| | **Dr. Kamaraj**<br>CSO,<br>Transgene IT Solutions | Moving Beyond Paper: Why ELNs Are the Foundation for AI-Ready Research |
| 4.45 to 5.00 PM | TEA BREAK | |
| 5.00 to 7.00 PM | Academic Partners Session | Career opportunities in pharma and what to do after B. Pharm. |


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**Date: December 21, 2025** **Venue: JACARANDA HALL**

| Plenary Lecture Series – 08<br>Chair: Dr. Sunil Attavar & Dr. Gajanan Darvekar | | |
|---|---|---|
| **Time** | **Speakers** | **Title** |
| 10.00 to 11.30 AM | **Dr. Md. Azeemuddin**<br>Principal Scientist,<br>The Himalaya Wellness Company, India | Preclinical toxicology assessment of Herbal Products |
| | **Dr. Chandrika Mahendra**<br>General Manager,<br>Personal Care and Baby Care R&D,<br>The Himalaya Wellness Company, India | Designing Herbal Dermaceuticals |
| 11.30 AM to 1.00 PM | **Selected Oral presentations (SR. No. 1-12)**<br>**Chair: Dr. Prabhakar Reddy & Dr. Prabodh Chander Sharma** | |
| 1.00 to 2.00 PM | **LUNCH BREAK** | |
| 2.00 to 4.00 PM | Valedictory Program Main Hall 2 | |

**Date: December 21, 2025** **Venue: GULMOHAR HALL**

| Plenary Lecture Series – 09<br>Dr. Sumalatha & Dr. Ramesh Alluri | | |
|---|---|---|
| **Time** | **Speakers** | **Title** |
| 10.00 to 11.00 AM | **Dr. Vasundhra Bhandari**<br>Assistant Professor,<br>NIPER Hyderabad, India | Precision Antimicrobial Strategies Through Host-Pathogen Multi-Omics |
| | **Dr. Jubie Selvaraj**<br>Professor,<br>JSS College of Pharmacy, Ooty, India | Precision Oncology in the AI era: From biomarker discovery to Targeted Therapeutics |
| 11.00 AM to 1.00 PM | **Selected Oral presentations (Sr. No. 13-24)**<br>**Chair: Dr. Muthusamy & Dr. Rakesh Somani** | |
| 1.00 to 2.00 PM | **LUNCH BREAK** | |
| 2.00 to 4.00 PM | Valedictory Program - Main Hall 2 | |


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**Date: December 21, 2025** **Venue: CASSIA HALL**

| Symposium – 14: Pharmaceutical Frontiers: Integrating AI, Innovation, and Sustainability for Future Therapies<br>Chair: Dr. Tejal Gandhi & Dr. Gopal Krishna Rao | | |
|---|---|---|
| **Time** | **Speakers** | **Title** |
| 10.00 to 11.30 AM | **Dr. Siddhesh Kamat**<br>Professor,<br>IISER Pune, India | An Integrated Chemoproteomics and Metabolomics Approach Towards Enzyme Function Annotation |
| | **Dr. Rachit Agarwal**<br>Associate Professor,<br>IISC Bangalore, India | Long acting injectables for the treatment of tuberculosis |
| | **Dr. Sahadev A. Shankarappa**<br>Professor, Ramaiah University of Applied Sciences, Bangalore, India | Drug Delivery Using Neural Pathways: Nanoparticle Design for Axonal Transport |
| 11.30 AM to 1.00 PM | **Selected Oral Presentations (Sr. No. 25-41)**<br>**Chair: Dr. K. R. Mahadik & Dr. Anjan Adhikari** | |
| 1.00 to 2.00 PM | LUNCH BREAK | |
| 2.00 to 4.00 PM | Valedictory Program Main Hall 2 | |

**Date: December 21, 2025** **Venue: PARIJATHA HALL**

| Plenary lecture series – 10<br>Chair: Dr. V. Murugan and Dr. Rajshekharan | | |
|---|---|---|
| **Time** | **Speakers** | **Title** |
| 10.00 to 11.00 AM | **Dr. Sanjay Garg**<br>Professor, School of Pharmacy and Biomedical Sciences, Adelaide University, SA, Australia | Transforming Patient Care Through Technology-Driven Pharmaceutical Innovation |
| | **Dr. Pranjal Chandra**<br>Associate Professor and Ramanujan Fellow, Coordinator, School of Biochemical Engineering, IIT BHU, India | Field Deployable Point-of-Care Sensing Technologies in Decentralized Diagnosis |
| 11.00 AM to 1.00 PM | **Selected Oral Presentations (Sr. No. 42-53)**<br>**Chair: Dr. S. Selvamuthukumar & Dr. S. D. Sawant** | |
| 1.00 to 2.00 PM | **LUNCH BREAK** | |
| 2.00 to 4.00 PM | Valedictory Program Main Hall 2 | |

**Date: December 21, 2025** **Venue: AI Pavilion Hall - 3**

| Workshops and Demonstrations | |
|---|---|
| **Time** | **Live Demonstration** |
| 10.00- 11.00 AM | Generative AI and High Throughput Screening – Demo |
| 11.00 - 11.45 AM | AI-Powered JNK1 Hit Prediction: Descriptors Drive Superior Classification and Regression |
| 11.45 – 12.45 PM | AI ML-based ADMET and Patent Analysis - Demo |


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## Poster Presentation Schedule

**Venue: Hall 3**

| DATE & DAY | TIME SLOT | SESSION | CATEGORY | POSTER SL. NO. | |
|---|---|---|---|---|---|
| | | | | FROM | TO |
| 19.12.2025 (FRIDAY) | 1 - 4 PM | I | PC | 1 | 540 |
| | 4 - 6 PM | II | PC | 541 | 1068 |
| 20.12.2025 (SATURDAY) | 9.30 - 11.30 AM | III | CH | 1 | 480 |
| | 9.30 - 11.30 AM | V | RA | 1 | 115 |
| | 11.30 AM - 1.30 PM | IV | CH | 481 | 507 |
| | 11.30 AM - 1.30 PM | VI | PL | 1 | 500 |
| | 2 - 4 PM | VII | PL | 501 | 683 |
| | 2 - 4 PM | VIII | AI | 1 | 356 |
| | 4 - 6 PM | IX | PT | 1 | 469 |

**Dr. S. Bharath**
Chairman
Poster Scientific Committee

**Dr. T. M. Pramod Kumar**
Chairman
Oral Scientific Committee

**Dr. Vandana Patravale**
Convener
Scientific Services Committee


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**AI-01**

## SMART FARMING BEYOND EARTH: ARTIFICIAL INTELLIGENCE IN MICROGREEN PRODUCTION FOR SPACE EXPLORATION

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Space farming is rapidly evolving to support long-duration human missions by enabling fresh food production in extraterrestrial environments faced with drastic resource constraints. Microgreens—young, nutrient-dense plants harvested at the cotyledon or first true leaf stage—are increasingly favored in space farming due to their short growth cycles, minimal resource requirements, and ability to enhance both the physical and psychological health of astronauts. Their high levels of vitamins, minerals, and phytonutrients as well as their appealing flavors and ease of cultivation make them a valuable component in controlled environment agriculture (CEA) systems. However, substantial challenges in space farming persist, including microgravity-related issues affecting air circulation, irrigation, and plant physiology, as well as the need for precise and autonomous management of environmental parameters and food safety. Current solutions leverage advances such as IoT-based automation for real-time monitoring and control, but manual intervention and system optimization remain limiting factors. Here, artificial intelligence (AI) presents transformative possibilities: AI-driven systems can automate image capture, quantify plant growth, estimate biomass, and predict yield and nutrient content at early stages. Machine learning enables early detection of plant and human pathogens, forecasts optimal harvesting times, and fine-tunes irrigation, lighting, and nutrient supply, significantly reducing the need for human supervision and mitigating risks of error or contamination. In controlled microgreen production, AI can synthesize high-throughput sensor data to maintain ideal growth conditions, improve resource efficiency, and adapt dynamically to the unpredictable constraints of space. Integrating AI into space farming systems is thus essential for developing reliable, autonomous, and resilient food production solutions vital for future space exploration missions.

**Keywords:** Artificial intelligence, space farming, microgreens, controlled environment agriculture, IoT, sustainability.

**AI-02**

## AWARENESS OF AI IN EARLY DETECTION AND MONITORING OF PARKINSONS DISEASE

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Institute of Pharmacy Education and Research, Bangalore, Karnataka, India – 560064

Parkinson's disease (PD) is a progressive neurodegenerative disorder where early detection and continuous monitoring are critical for better management. With the growing role of Artificial Intelligence (AI) in healthcare, this study assessed knowledge and perceptions of AI in PD through a cross-sectional survey of 200 participants. The findings showed that 53.9% had heard of PD, but only 46% were aware of its symptoms, and just 35.5% believed it could be detected early. In contrast, awareness of AI was considerably higher, with 89.5% reporting familiarity and 82.9% having prior exposure to AI applications. When asked about healthcare uses, 47.4% felt AI could aid early diagnosis of PD, while 40.8% highlighted its role in continuous symptom monitoring. Concerns raised by participants included privacy risks (40.8%) and accuracy of results (39.5%). Despite this, over half agreed that AI could assist doctors, with 50.8% expressing trust in AI-based tools. Additionally, 55.3% emphasized the need for greater education on both PD and emerging healthcare technologies. Overall, the study reveals moderate awareness of PD but high optimism toward AI, suggesting that targeted education and ethical safeguards are essential for responsible AI integration in PD care.

**Keywords:** Parkinsons, Artificial Intelligence, healthcare

**AI-03**

## ARTIFICIAL INTELLIGENCE IN DETECTION, MONITORING AND EMPOWERMENT OF INDIVIDUALS WITH DEPRESSION

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Depression is a common health disorder, characterised by persistent feeling of sadness or loss of interest in everyday activities. The objective of the study aimed to access knowledge, attitude and practice (KAP) to detect, monitor and empower individuals using Artificial Intelligence (AI) who are facing challenges of depression. Online survey was conducted using Google form and response from 150 Participants were analysed. Knowledge assessment showed that about 66.7% of participants have heard about AI used to manage depression and about 33.3% are not aware. Attitude response showed that about 81.9% of the participants agree that AI can provide timely support during emotional crisis when human help is not available immediately. In practice, 28.9% of the people have used AI-based mental health app or chatbot and about 67.3% suggest their friends or family to use AI to overcome depression. The study concluded that depression could be overcome by using AI by Integration of AI into pharmacy and clinical practice and helpful for people living in remote areas who unable to access mental healthcare, empower people by following exercise and activity which is monitored regularly by AI and early detection of symptoms. Therefore, AI in detecting, monitoring and empowering individuals with depression would severe as the major tool in management of depression among general population.

**Keywords:** Artificial intelligence, Depression.

**AI-04**

## ARTIFICIAL INTELLIGENCE IN PHARMACY BALANCING ADVANTAGES, LIMITATIONS AND FUTURE DIRECTIONS

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Artificial Intelligence (AI) is revolutionizing pharmaceutical sciences, particularly in drug discovery, medicinal chemistry, and formulation development. Its applications in target identification, molecular docking, lead optimization, and predictive toxicology have accelerated research timelines and reduced costs, positioning AI as a transformative tool in pharmacy. However, while the advantages of AI are widely discussed, its limitations demand equal attention. AI-driven models heavily rely on the quality and quantity of available datasets, and incomplete or biased data can lead to misleading predictions in drug design. The lack of experimental validation and overdependence on in-silico models may compromise translational efficiency from bench to bedside. Moreover, issues such as algorithmic opacity ("black-box" problem), reproducibility challenges, regulatory uncertainties, and ethical concerns regarding patient data privacy present significant barriers to clinical acceptance. In pharmaceutical chemistry, AI can generate theoretically promising molecules that may not be synthetically feasible or pharmacokinetically viable, leading to resource-intensive dead ends. Thus, while AI holds great promise, it must be integrated cautiously with experimental pharmacology, medicinal chemistry insights, and clinical validation. The future of pharmacy depends not on AI replacing traditional research, but on synergistic collaboration between computational intelligence and scientific expertise to achieve safe, effective, and ethically sound drug development.

**Keywords:** Black-box, target, medicinal chemistry, datasets.

**AI-05**

## AI-DRIVEN DEVELOPMENT AND OPTIMIZATION OF A LEVOSULPIRIDE ORAL FORMULATION FOR NON-ULCER DYSPEPSIA

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Non-Ulcer Dyspepsia, NUD is a widespread functional gastrointestinal disorder characterized by persistent upper abdominal discomfort without detectable structural abnormalities. Levosulpiride, a dopamine D2 receptor antagonist with prokinetic properties, has shown therapeutic value in NUD management. However, variability in clinical response and formulation performance presents ongoing challenges in optimizing treatment. This study investigates the application of Artificial Intelligence (AI) in the development and optimization of Levosulpiride




ISBN: 978-81-980623-8-3

oral formulation. Machine learning algorithms-including Random Forest and Gradient Boosting were applied alongside a Design of Experiments (DoE) approach to model and predict the impact of key formulation parameters, including excipient ratio, polymer type, and granule size, on drug release and stability. *In silico* tools, such as physiologically based pharmacokinetic (PBPK) modeling, were used to simulate gastrointestinal behavior and absorption profiles of the optimized formulations.The AI-assisted methodology enabled the identification of optimal formulation conditions with reduced experimental workload and accelerated development timelines. Selected formulations showed strong correlation with predicted profiles in in vitro dissolution and stability studies.This research demonstrates the value of AI-driven approaches in pharmaceutical formulation, offering a more efficient, data-informed pathway to develop effective treatments for functional gastrointestinal disorders such as NUD. The integration of machine learning into formulation design supports the creation of patient-centric and performance-optimized drug delivery systems.

**Keywords:** Artificial Intelligence, Non-Ulcer Dyspepsia, Machine Learning, PBPK Modeling, Optimization.

**AI-06**

## ROBOTIC PROCESS AUTOMATION: DRIVING EFFICIENCY AND COMPLIANCE IN THE PHARMACEUTICAL INDUSTRY

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Robotic Process Automation (RPA) is emerging as a transformative tool in pharmaceutical manufacturing, aligning with the principles of Industry 4.0 to enhance efficiency, accuracy, and compliance. By automating repetitive, rule-based tasks such as data entry, batch record management, regulatory documentation, and quality assurance processes, RPA reduces human error and accelerates production timelines. In manufacturing environments, RPA enables seamless integration with existing enterprise systems, supports predictive maintenance, and facilitates real-time monitoring of operations. This leads to improved productivity, cost-effectiveness, and compliance with stringent regulatory standards such as FDA and EMA guidelines. Furthermore, RPA complements advanced technologies like artificial intelligence (AI), machine learning (ML), and the Internet of Things (IoT), creating a smart manufacturing ecosystem. Overall, the adoption of RPA in pharmaceutical manufacturing strengthens operational agility, supports digital transformation, and ensures consistent product quality for global healthcare needs.

**Keywords:** Robotic Process Automation (RPA), Pharmaceutical Technology, Artificial intelligence.

**AI-07**

## LABELGUARD – AN AI POWERED SOLUTION FOR DRUG LABEL COMPLIANCE

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The primary objective of Label-Guard AI is to deliver a comprehensive, intelligent, and automated digital framework that addresses the increasing complexity of drug label compliance within the pharmaceutical industry. Drug labeling plays a pivotal role in regulatory submissions, ensuring that patients, healthcare professionals, and regulatory bodies receive accurate, safe, and legally compliant information. Traditional manual review processes, however, are often time-consuming, resource-intensive, and prone to human error, thereby increasing the risk of regulatory setbacks. To overcome these challenges, Label-Guard AI leverages advanced artificial intelligence models in combination with curated regulatory knowledge bases to enable real-time analysis, verification, and risk assessment of drug label content. The platform is designed to proactively identify potential inconsistencies, misbranded statements, ambiguous terminology, or non-compliant phrasing that may compromise regulatory acceptance. Beyond compliance verification, Label-Guard AI provides an interactive compliance dashboard, secure document management capabilities, and automated reporting tools, thereby enhancing efficiency, transparency, and traceability across pharmaceutical regulatory workflows. Its scalable design ensures adaptability to diverse global regulatory standards such as FDA, EMA, and ICH guidelines. By integrating modern web technologies with AI-driven insights, Label-Guard AI aspires to reduce regulatory risks, accelerate time-to-market, and support pharmaceutical organizations in maintaining high standards of safety and compliance. Ultimately, the solution represents a reliable and future- ready innovation that strengthens global pharmaceutical labeling practices while optimizing resource utilization in an increasingly complex regulatory environment.

**Keywords:** Drug Label Compliance, Pharmaceutical Labeling, Regulatory Submissions, Global Regulatory Standard (FDA, EMA, ICH), Artificial Intelligence in Pharma, Labeling Workflow Automation.

**AI-08**

## DEVELOPMENT OF A PREDICTIVE MODEL FOR SEASONAL OVER-THE-COUNTER MEDICINE DEMAND THROUGH MACHINE LEARNING

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OTC medicines reflect seasonal disease trends, yet systematic evaluation of demand fluctuations is limited. AI-driven data mining and visualization reveal hidden patterns, enabling smarter pharmacy stocking and improved public health outcomes. The objective behind the study is to identify seasonal usage trends in OTC drugs (antihistamines, analgesic, cold meds). A dataset comprising 36,00,085 pharmacy transactions (2023-2024-2025till July) was analysed. Data preprocessing and aggregation were conducted in Python using Pandas & matplotlib. Pyplot Monthly sales per drug class were computed and descriptive statistics (mean, standard deviation, minimum & maximum) were calculated. Seasonal peaks were further identified using temporal grouping. Data visualization techniques were applied to illustrate demand variation across months. The results were compared using ANOVA that shows total unit sales exhibited a seasonal peak in Q1 (Jan–Mar, mean-370; Jan-639), predominantly due to Antihistamines, while the lowest values occurred in Q2 (Apr–Jun, mean-78). Cold Medications demonstrated a distinct surge in Mar 2025, and Analgesics showed relatively higher sales during mid-2023. This developed predictive model gives us valuable insights into seasonal OTC medicine trends, enabling evidence-based inventory planning, minimizing stock imbalances, and improving patient care through timely availability of essential drugs.

**Keywords:** AI, Python, Data Visualization, OTC, Seasonal Trends.

**AI-09**

## ARTIFICIAL INTELLIGENCE–DRIVEN PREDICTIVE ANALYSIS OF HEALTH RISKS FROM LONG-TERM PACKAGED FOOD CONSUMPTION

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The increasing reliance on packaged food products has raised significant concerns regarding their long-term complications for human health. These foods, often rich in additives, preservatives, and unhealthy fats, are strongly associated with chronic conditions such as metabolic disorders, cardiovascular diseases, and organ dysfunction. This study explores the potential of Artificial Intelligence (AI)–driven predictive analysis as a tool to evaluate and forecast health risks linked to continuous packaged food consumption. A cross-sectional survey was conducted using a structured Google Form, with responses obtained from 200 participants across urban and rural populations. Knowledge assessment revealed that 80% of urban participants and 50% of rural participants were aware of packaged food products. Consumption patterns showed that 87% of urban residents and 28% of rural residents frequently consume packaged foods. While 70% of participants acknowledged the long-term health risks associated with high-fat packaged food, only 40% reported checking nutrition labels regularly. Notably, only 20% were aware of usage of AI tools for health prediction, yet 78% expressed willingness to use AI for assessing their health risks.




ISBN: 978-81-980623-8-3

The findings conclude that AI-driven predictive tools can play a pivotal role in enhancing awareness, supporting informed dietary decisions, and ultimately reducing the burden of chronic lifestyle-related diseases.

**Keywords:** Packed food products, Artificial Intelligence, AI tools.

**AI-10**

**POLYHERBAL GUAVA LEAVES-EXTRACT BASED JELLY FOR ORAL MUCOSITIS: AN AI-INTEGRATED APPROACH USING NETWORK PHARMACOLOGY**

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Oral mucositis is a painful and inflammatory condition of the oral mucosa that significantly affects quality of life by impairing nutrition, speech, and overall wellbeing. Current therapeutic strategies provide only limited relief, highlighting the need for safer and more effective alternatives. Guava (Psidium guajava) leaves extract, rich in flavonoids and phenolics, exhibits anti-inflammatory and wound-healing properties, making it a promising candidate for mucosal protection and repair.In this study, a polyherbal jelly formulation was developed incorporating guava leaves extract along with supportive botanicals. The formulation was optimized for texture, stability, and organoleptic acceptability.To investigate the mechanistic basis, AI-driven network pharmacology was applied. Phytochemical–target mapping revealed interactions with inflammatory signaling pathways, with NFKB1 and MAPK3 identified as key genes associated with mucosal inflammation and healing. These results provide computational evidence supporting the potential role of guava leaf-based formulations in managing oral mucositis.This study demonstrates the integration of traditional phytopharmaceutical development with artificial intelligence approaches. As a future scope, molecular docking studies and in vivo validation are planned to further study the predicted compound–target interactions and therapeutic potential.

**Keywords:** Oral mucositis, guava leaves extract, polyherbal jelly, network pharmacology, AI in pharmaceuticals.

**AI-11**

**Development of a Predictive Model for Seasonal Over-The-Counter Medicine Demand Through Machine Learning**

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OTC medicines reflect seasonal disease trends, yet systematic evaluation of demand fluctuations is limited. AI-driven data mining and visualization reveal hidden patterns, enabling smarter pharmacy stocking and improved public health outcomes. The objective behind the study is to identify seasonal usage trends in OTC drugs (antihistamines, analgesic, cold meds). A dataset comprising 36,00,085 pharmacy transactions (2023-2024-2025till July) was analysed. Data preprocessing and aggregation were conducted in Python using Pandas & matplotlib. pyplot. Monthly sales per drug class were computed and descriptive statistics (mean, standard deviation, minimum & maximum) were calculated. Seasonal peaks were further identified using temporal grouping. Data visualization techniques were applied to illustrate demand variation across months. The results were compared using ANOVA that shows total unit sales exhibited a seasonal peak in Q1 (Jan–Mar, mean-370; Jan-639), predominantly due to Antihistamines, while the lowest values occurred in Q2 (Apr–Jun, mean-78). Cold Medications demonstrated a distinct surge in Mar 2025, and Analgesics showed relatively higher sales during mid-2023. This developed predictive model gives us valuable insights into seasonal OTC medicine trends, enabling evidence-based inventory planning, minimizing stock imbalances, and improving patient care through timely availability of essential drugs.

**Keywords:** AI, Python, Data Visualization, OTC, Seasonal Trends.

**AI-12**

**AI-ENABLED PORTABLE SMART HEALTH RECORD (Z CARD) FOR EMERGENCY ACCESS AND MEDICATION SAFETY.**

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Fragmented patient health data which is difficult to access during emergencies and hospital visits often leads to delays in care and preventable medication errors in Indian hospitals. This study introduces the Z Card, an AI-enabled smart health record card integrating NFC and QR technologies to provide secure offline/online access to critical patient data and medical history. The objective is to assess the perceived need and clinical value of this system among healthcare providers. Methodology: This ongoing cross-sectional study is being conducted among consultants and postgraduates in tertiary care hospital in Kalaburagi. A pilot survey of 20 healthcare professionals (14Postgraduates and 6consultants) is conducted. A structured questionnaire assessed frequency of incomplete data leading to errors in prescribing and willingness to adopt AI-driven portable health records. Descriptive analysis is used. Results:85% of respondents reported frequent delays in retrieving records; 75% reported duplication or errors due to incomplete histories. 90% expressed willingness to use a portable smart health record, and 80% rated AI-based drug-drug interactions and toxicity alerts as highly beneficial. In simulation, median past history record-lookup time fell from 7.5min to 1.8min, participants rated usability 4.3/5.Conclusion: preliminary data confirm strong clinical need for an AI–assisted card. The complete study is expected to demonstrate remarkable potential to improve continuity of care, reduce medical errors and support emergency decision-making.

**Keywords:** Smarthealth record; AI; Medication safety.

**AI-13**

**ARTIFICIAL INTELLIGENCE IN PHARMACEUTICAL TECHNOLOGY AND DRUG DELIVERY DESIGN**

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Artificial intelligence (AI) has emerged as a formidable instrument that leverages anthropomorphic knowledge to deliver swift solutions to intricate problems. Significant progress in AI technology and machine learning offers a transformative opportunity in the realms of drug discovery, formulation, and the testing of pharmaceutical dosage forms. By employing AI algorithms that scrutinize vast biological datasets, including genomics and proteomics, researchers are able to pinpoint disease-related targets and forecast their interactions with prospective drug candidates. This facilitates a more efficient and focused strategy for drug discovery, thereby enhancing the probability of successful drug approvals. Additionally, AI can play a role in minimizing development expenses by streamlining research and development processes. Machine learning algorithms aid in experimental design and can anticipate the pharmacokinetics and toxicity of drug candidates. This functionality allows for the prioritization and refinement of lead compounds, thereby diminishing the necessity for extensive and expensive animal testing. Personalized medicine strategies can be advanced through AI algorithms that evaluate real-world patient data, resulting in more effective treatment outcomes and improved patient compliance. This comprehensive review examines the extensive applications of AI in drug discovery, drug delivery dosage form designs, process optimization, testing, and pharmacokinetics/pharmacodynamics (PK/PD) studies. This review presents an overview of various AI-driven methodologies employed in pharmaceutical technology, emphasizing their advantages and limitations. Nonetheless, the ongoing investment in and investigation of AI within the pharmaceutical sector presents promising opportunities for enhancing drug development processes and patient care.

**Keywords:** Artificial intelligence (AI); machine learning; drug discovery; formulation; dosage form testing; pharmacokinetics; pharmacodynamics; PBPK; QSAR.

**AI-14**

**INNOVATING PCOD MANAGEMENT: A SMART APP FOR SYMPTOM TRACKING AND EARLY DETECTION**

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ISBN: 978-81-980623-8-3

Polycystic Ovary Syndrome (PCOS) is one of the most common endocrine disorders among women, but its wide range of symptoms—like irregular periods, weight fluctuations, and skin issues—makes it difficult to manage and often leads to late diagnosis. Current ways of tracking symptoms, like using paper journals or basic apps, are disjointed and don't give a clear picture of someone's health over time. This creates a big gap between patients and doctors. Designing a mobile app would help to tackle this problem. The goal is to create a single, easy-to-use platform where users can log their daily symptoms, complete quick weekly check-ins, and automatically generate clean, simple reports to share with their doctors. A key feature would be allowing users to scan and upload their lab results, putting all their health information in one place. It would focus heavily on user experience to make sure it's accessible for everyone, not just tech-savvy users. The main idea behind this app is empowerment. It's about giving women the tools to better understand their own bodies and providing doctors with consistent, reliable data. By making symptom tracking effortless, we can help with earlier detection and more personalized treatment plans. The idea is to create an app using cloud-based technology to keep data secure and synced across devices. In conclusion, this project is about using technology to make a real difference in women's healthcare. With proper development and this app can become a valuable tool for managing PCOS, leading to better health outcomes and making the daily lives of those affected just a little bit easier.

**AI-15**

**KNOWLEDGE, ATTITUDE, AND PRACTICE OF POSTGRADUATES AND CONSULTANTS TOWARDS ARTIFICIAL INTELLIGENCE IN PREVENTING ADVERSE DRUG REACTIONS AND DRUG-DRUG INTERACTIONS.**

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Adverse drug reactions (ADRs) and Drug-Drug Interactions (DDIs) are major contributors to preventable morbidity, mortality and healthcare expenditure. AI is increasingly recognized for its potential to strengthen pharmacovigilance by predicting and preventing ADRs/DDI. However, successful adoption relies heavily on knowledge, attitude, and practices of healthcare professionals. Methodology: This ongoing cross-sectional study is being conducted among consultants and postgraduate trainees in tertiary care hospital Kalaburagi. This survey assesses demographic data, awareness of AI in pharmacovigilance, attitude towards its integration and current practices. Data are being analysed using descriptive and analytical statistics. Results: Pilot data from 40 participants (26PGs and 14consultants) reflected trends in AI deployment in healthcare. Only 18% of the participants showed sufficient knowledge about relevance of AI in pharmacovigilance application, despite 67% of participants reported awareness of AI.75% reported a positive attitude towards utilising AI to prevent DDI/ADRs, citing improved accuracy and patient safety as the main benefits. Actual practice, however, limited, with only 12% reporting routine use of AI enabled tools. These preliminary findings mirror patterns observed in earlier studies, where enthusiasm for AI is not matched by adequate knowledge or utilization. The complete study is expected to provide more comprehensive insights to guide structured training and institutional strategies for effective AI integration in pharmacovigilance.

**Keywords:** Artificial Intelligence, Pharmacovigilance, Drug-Drug Interactions.

**AI-16**

**TOOLS FOR FRAMEWORK MODELING AND SIMULATION**

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Framework modeling and simulation are essential approaches for analyzing, designing, and predicting the performance of complex systems in fields such as engineering, computer science, and pharmaceuticals. These methods enable researchers to construct conceptual or mathematical representations of real-world processes and evaluate their behavior under different conditions. A variety of tools are employed for this purpose, including MATLAB/Simulink, widely used for dynamic system modeling; ANSYS and COMSOL Multiphysics, which support finite element analysis and multiphysics simulation; Arena and AnyLogic, commonly applied for discrete-event and agent-based simulations; and Modelica, an open-source platform for object-oriented modeling. These tools provide visualization, optimization, and predictive capabilities, thereby enhancing decision-making, reducing experimental costs, and improving system reliability. With growing computational power, framework modeling and simulation continue to evolve as indispensable tools for research and industrial applications.

**Keywords:** Modeling, Simulation, Tools, Optimization, Reliability.

**AI-17**

**LEVERAGING ARTIFICIAL INTELLIGENCE FOR EARLY DETECTION AND MECHANISTIC INSIGHTS INTO HEPATOTOXICITY: A TRANSLATIONAL APPROACH IN PHARMACEUTICAL SCIENCES**

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Background: Hepatotoxicity, which causes between 15% and 20% of drugs removals worldwide, is a major hurdle for clinical research & drug discovery. Time, expense, and low prediction accuracy are the drawbacks of traditional techniques like histology and biochemical testing. Computation toxicity & artificial intelligence (AI) provide novel methods for identifying, forecasting, and mechanistically explaining hepatotoxicity, which lowers medication attrition and enhances patient safety. Materials and Methods: By combining machine learning methods like Random Forest and Deep Neural Networks with publically accessible hepatotoxicity datasets (DILIrank, FAERS, and DrugBank), an AI-driven framework was devised. The identification of mechanistic biomarkers involved the incorporation of multi-omics data, including transcriptomics, proteomics, and metabolomics. Furthermore, experimental validation techniques were described utilizing liver-on-chip models , zebrafish bioimaging, with AI-assisted picture analysis to identify hepatotoxic signals. Results: When compared to conventional in vitro methods, the AI-based prediction models showed improved accuracy (up to 85–90%) in detecting hepatotoxic chemicals. Strong relationships between drug-induced oxidative stress, immune-mediated damage, and dysfunction of mitochondria or anticipated hepatotoxic profiles were found via mechanistic insights. AI's therapeutic usefulness was shown by case studies that showed it could accurately forecast the hepatotoxic risk of a number of licensed medications that were later removed owing to liver damage. Conclusion: AI-enabled approaches represent a transformative innovation in hepatotoxicity research. By integrating predictive modeling with experimental validation, this framework enhances early detection, uncovers mechanistic pathways, and reduces drug development failures. In line with the conference theme *"AI & Technology in Pharma: Educate, Innovate, Empower"*, this work emphasizes how AI can educate researchers through data-driven learning, innovate drug safety assessment methods, and empower pharmaceutical sciences to deliver safer and more effective therapies

**Keywords:** Hepatotoxicity; Artificial Intelligence; Drug-Induced Liver Injury (DILI); Machine Learning; Predictive Toxicology; Computational Pharmacology; Zebrafish Models.

**AI-18**

**AI &ML: BEYOND THE TRADITIONAL DRUG DEVELOPMENT IN NEURO-FIELD**

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Advancements in artificial intelligence (AI) and machine learning have revolutionized the landscape of biomedical research, particularly in the development of novel approaches to disease treatment. One promising avenue involves the integration of AI-driven algorithms with chemical modification techniques to accelerate drug discovery and optimize therapeutic efficacy. Chemical modification, a cornerstone of medicinal chemistry, allows for the fine-tuning of molecular structures to enhance target specificity Like KMO, bioavailability, and metabolic stability. When combined with machine learning models trained on large datasets of chemical and biological interactions, the therapeutic potential of modified compounds can be predicted with unprecedented accuracy.




ISBN: 978-81-980623-8-3

Recent breakthroughs have demonstrated that AI can not only identify promising lead compounds but also propose specific chemical modifications to improve their pharmacological profiles. This synergistic approach has proven especially valuable in tackling complex diseases such as cancer, neurodegenerative disorders Specially Alzheimer, Parkinson disease etc. and antibiotic-resistant infections. Moreover, machine learning models are increasingly being used to simulate disease pathways, enabling a deeper understanding of disease mechanisms and identifying novel therapeutic targets. The convergence of AI, chemical modification, and data-driven insights represents a transformative shift in personalized medicine and precision drug design. As these technologies mature, they promise to reduce the time and cost associated with traditional drug development while significantly increasing success rates in clinical applications. This interdisciplinary framework marks a critical step toward the realization of smarter, faster, and more effective disease treatments.

**Keywords:** KMO (Kynurenine monooxygenase), AI, ML, Neurodisease.

**AI-19**

**INNOVATIONS IN VIRTUAL CLINICAL TRIALS USING ARTIFICIAL INTELLIGENCE**

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Virtual clinical trials are research studies conducted remotely through digital technologies such as telemedicine, mobile applications, wearables, and artificial intelligence (AI). They enable patient recruitment, monitoring, and data collection without requiring participants to visit physical trial sites. The objective of this study is to identify the key innovations and technological advancements driving AI-enabled virtual clinical trials and to discuss the advantages of AI integration in enhancing trial efficiency, diversity, and patient engagement. The integration of AI has emerged as a key driver of this transformation, providing innovative solutions to challenges such as recruitment, efficiency, data management and patient interaction.AI-powered algorithms enhance recruitment rapidly analyzing electronic health records, demographic profiles and social data to identify eligible participants with greater accuracy and diversity, Studies indicate that AI can reduce patient recruitment timelines by nearly 40%compared to traditional methods. Machine learning models support adaptive trial design, optimize sample sizes, and predict trial outcomes, thereby lowering failure rates and reducing developmental costs. Real time patient monitoring is facilitated through wearable sensors, mobile health applications and telemedicine platforms, with AI ensuring accurate data capture and anomaly detection. Natural language processing and conventional AI tools further improve patient engagement, adherence, and reporting of adverse events. Innovations in virtual clinical trials using AI can redefine drug development by creating faster, safer and more inclusive research models while maintain transparency, equity, and patient trust.

**Keywords:** Virtual clinical trials, Artificial intelligence, Innovation, Drug development.

**AI-20**

**AI-GUIDED FORMULATION OF MRNA-BASED NANOPARTICLE SYSTEMS IN CANCER IMMUNOTHERAPY**

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Messenger RNA (mRNA) therapeutics hold great promise in treating infectious diseases and cancer immunotherapy using lipid nanoparticles (LNPs) as the most efficient delivery system. Ionizable lipids of LNPs are key to efficient delivery but are typically optimized by laborious and expensive experimental screening. To address this problem, artificial intelligence (AI) and virtual screening are used to design ionizable lipids in a rational approach by forecasting two key parameters: apparent pKa and mRNA delivery efficiency. AI-driven design has been virtually tested using approximately 20 million lipids in two iterations, creating new molecules with higher performance. In vivo testing revealed lipids from the second round were comparable to or superior to the control DLinMC3-DMA, and one of them with similar efficacy to SM-102. Concurrently, AI and bioinformatics assisted in developing more efficacious mRNA vaccines by forecasting the structures of tumor-associated neoantigens and codons that optimize expression and LNP formulation stability. These strategies provided better pharmacokinetics and pharmacodynamics and more efficient immune activation with shorter development time and at a lower expense. The combination of AI, bioinformatics, and nanotechnology leads to dramatic changes in customizing cancer immunotherapy, allowing for swift, secure, and more successful design of mRNA vaccines.

**Keywords:** Messenger RNA (mRNA) Therapeutics, Lipid Nanoparticles (LNPs), Ionizable lipids, Artificial intelligence (AI), Cancer immunotherapy.

**AI-21**

**AL-DRIVEN NANOPARTICLE DELIVERY OF BEE VENOM PEPTIDES: A NOVEL STRATEGY FOR HIV TREATMENT**

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Human Immunodeficiency Virus (HIV) continues to pose a significant worldwide health concern, since existing antiretroviral treatments are unable to eradicate viral reservoirs. Bee venom, especially its active peptide melittin, shows strong antiviral activity by disrupting HIV replication and gene expression. Nevertheless, the toxicity it poses to healthy cells restricts its application as a direct treatment. Artificial intelligence (AI) provides promising solutions to overcome these limitations. AI algorithms can modify melittin's structure to reduce toxicity while maintaining antiviral action. Deep learning tools can also design new melittin analogs and antimicrobial peptides (AMPs) with greater selectivity for HIV viral envelopes. AI enhances the design of nanoparticle-based delivery systems that transport bee venom peptides safely to cells infected by pathogens, such as HIV. By modeling key features—like nanoparticle size, shape, electrical charge, and surface modifications—AI enables researchers to develop formulations that achieve targeted delivery, controlled drug release, and minimized immune response. In addition, predictive AI models can study peptide–virus interactions, anticipate resistance, and reduce the need for trial-and-error experiments. Personalized therapy is another important application. By analyzing patient-specific data such as viral load and immune response, AI can guide dosage adjustments, select the best peptide–nanoparticle combinations, and predict treatment outcomes. This evaluation underscores the synergistic promise of bee venom-derived compounds and AI-driven advancements, presenting a new strategy to enhance HIV treatment and address the shortcomings of traditional therapies.

**Keywords:** Human Immunodeficiency Virus (HIV), Bee venom, Melittin, Artificial Intelligence (AI), Nanoparticle drug delivery.

**AI-22**

**SURVEY BASED ON PERCEPTION AND AWARENESS REGARDING ON AI IN ADVERSE DRUG REACTION AMONG THE GENERAL POPULATION**

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A survey exploring public perception and awareness of artificial intelligence circumstance of adverse drug reaction aims to assess who individual understand and accept. The integration of AI into Pharmacovigilance has the potential to enhance ADR detection and reporting. However, patient acceptance and understanding of AI application of AI in this domain remains unexplored. To assess patient awareness, perceptions, and concerns regarding the use of AI in ADR detection and reporting. A cross-sectional survey was administered using a structured google form and Responses from 160 participants were analyzed. The questionnaire evaluated participants' awareness of ADRs, understanding of AI applications in healthcare, and attitudes towards AI-driven pharmacovigilance. Out of 160 respondents, 65% were aware of the term "adverse drug reaction," but only 30% had heard of AI applications in healthcare. When informed about AI's role of AI in ADR detection, 70% expressed interest in its potential benefits (accuracy




ISBN: 978-81-980623-8-3

and efficiency) the study conclusion of patient demonstrated positive transparency towards AI in ADR detection This aligns with the current literature, emphasizing the importance of patient engagement and education for adopting AI technologies in healthcare.

**Keywords:** patient perception, digital health, adverse drug reaction, detection.

**AI-23**

**AI-ASSISTED SPECTRAL INTERPRETATION OF LEAVES OF *MOMORDICA DIOICA* FOR PREDICTION OF BIOFILM INHIBITORY ACTIVITY**

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Biofilm development is a significant contributor to microbial resistance and chronic infections. Natural phytoconstituents from medicinal plants are being investigated as possible biofilm inhibitors. In this study, an active phytoconstituent, *Momordica dioica* (momordicin) was examined using ChemDraw, an analytical tool for structure prediction based on spectroscopic data. The structure-activity relationship was also predicted using AI. The IR spectrum showed distinct peaks at 3390-3277 $cm^{-1}$ (O-H stretching), 1737 $cm^{-1}$ (C=O stretching), 1636 $cm^{-1}$ (C=C stretching), and 1259-1024 $cm^{-1}$ (C-O stretching), showing the presence of hydroxyl, carbonyl, aromatic, and ether functionalities. The $^{1}H$ NMR spectrum exhibited aromatic multiplets at δ 6.0-7.8, broad phenolic -OH signals at δ 9.0-10.5, and sugar-related resonances between δ 3.2-5.5, while the $^{13}C$ NMR displayed signals at δ 160-175 (C=O/C-O), δ 145-160 (aryl C-O), δ 100-130 (aromatic carbons), and δ 95-105 (anomeric carbon). These spectral patterns are compatible with flavonoids, tannins, and phenolic glycosides, all of which are known to have antibiofilm capabilities. Thus, ChemDraw-assisted spectral interpretation indicates that *M. dioica* leaves contain bioactive phytoconstituents with potential biofilm inhibitory effect, bolstering its pharmacognostic value as a source of natural antimicrobials.

**Keywords:** *Momordica dioica*, ethanolic extract, ChemDraw, IR, NMR, biofilm inhibition, pharmacognosy.

**AI-24**

**AI-DRIVEN ANALYSIS OF GOOGLE TRENDS AND REAL-WORLD PHARMACY DATA ON DRUGS USED IN WEIGHT LOSS IN INDIA.**

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In India, obesity is a growing public health concern. This study employed an AI-driven Python script to analyse Google Trends data (2019–2025) and real-world pharmacy dispensing patterns. An awareness survey was also conducted among 312 obese patients. Global Google Trends showed high online interest for Ozempic (25.95 ± 18.33) and Mounjaro (9.47 ± 12.33). According to local pharmacy data revealed Metformin (82 ± 11), Orlistat (29 ± 9), and Phentermine (14 ± 5) were most dispensed. Patient awareness was highest for Metformin (64%) and Orlistat (38%), but low for newer agents: Ozempic (27%), Wegovy (12%), Mounjaro (8%). A moderate correlation ($r=0.64$, $p<0.05$) existed between search trends and dispensing data. Findings highlight a disparity between online interest and patient awareness, underscoring the need for pharmacist-led education.

**Keywords:** Google Trends, Patient survey, Healthcare analytics, Anti-obesity drugs, pharmacoepidemiology.

**AI-25**

**TRANSFORMING PHARMA WITH INNOVATION AI AND ECO TECH PRESENTING**

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Introduction: The AI in Pharma drives more efficiently In CADD & CLINICAL TRAILS.The Eco technology such as Mitti cool and zeerpot technices were Redesign for maintaining, storage along with carrying the parenteral and few medicines at Their Transport period Objective's of CADD is Target Identification and Validation, Virtual Screening, De Novo Drug Design, ADMET Prediction. The objective's of Clinical trials are Patient Recruitment and Selection, Data Management and Analysis, Adverse Event Monitoring, Drug Repurposing and Biomarker Discovery, The Redesigned Objective's are temp controlled water along medication storage with Natural Method, Storage depends on short or long period based on medication (Ceftriaxone Insulin Epoprostenol, Midazolam, Bupivacaine) CONCLUSION & RESULTS: CADD & CLINICAL TRAILS are enlarged Online Tools which Will Stabilize Money and Time.

**Keywords:** Cadd Clinical Trails, Zeerpot & Mitticool.

**AI-26**

**AI ASSISTED EXTRACTION AND PURIFICATION OF SNAIL MUCIN**

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The pharmaceutical and cosmetic industries are rapidly evolving through technological integration. Artificial intelligence is transforming pharmaceutical manufacturing by enhancing efficiency, quality assurance, and predictive maintenance, while snail mucin has gained attention as it provides effective therapeutic and cosmetic resource with an expanding market. This study sees opportunities for innovation by integrating AI with snail mucin research and production. Traditional extraction methods are limited by inefficiency, ethical concerns, quality difference, contamination risks. AI offers solutions through real-time monitoring, predictive yield analysis, automated extraction, and welfare-friendly systems.A literature review was conducted on snail mucin's dermatological and medical applications, supported by economic market reports and evidence on AI in pharmaceutical manufacturing. Findings indicate that AI improves monitoring, defect detection, packaging, and equipment maintenance, resulting in higher productivity and safer processes. Snail mucin demonstrates antimicrobial, wound-healing, antitumor, and drug-delivery potential, alongside cosmetic benefits such as hydration, scar reduction, antiaging, and pigmentation control. Even so, challenges include ethical ways of extraction, contamination risks, difference in quality of extract due to differences in methods of extraction. The integration of AI and snail mucin production ensures sustainable, ethical, and efficient innovation, promoting advancement in pharmaceuticals and cosmetics.

**Keywords:** Snail muchin, Artificial intelligence, predictive yield analysis, real time monitoring, dermatological applications, pharmaceuticals and cosmetics advancement.

**AI-27**

**BRIDGING PCI STANDARDS AND DIGITAL HEALTH THROUGH AI CODE SYNTHESIS**

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The Pharmacy Council of India (PCI) prioritizes patient-centric services like medication management, counselling, monitoring, and documentation based on global best practices in clinical pharmacy. Adoption in India and similar countries is still low due to restricted awareness, poor training, poor digital integration, and absence of standard tools, resulting in variable care and inefficient utilization of pharmacist skills. AI-assisted code synthesis can be used as a new approach to speed up the development of PCI-compliant digital solutions and make them more available for training, education, and clinical use. Objective is to create a method for AI-assisted code synthesis that builds PCI-compliant digital solutions for training, education, and clinical use. An AI-assisted code synthesis framework was designed using Google Apps Script and modular web-forms like Medication Management, Patient counselling and Education, Monitoring and Follow up etc. were developed in alignment with PCI competencies .The system allowed easy generation of PCI-compliant digital forms without manual coding ,reduced development time and training requirements and enhanced accessibility and standardization of clinical pharmacy services.AI-assisted code synthesis fills the gap between regulatory requirements and computer-based practice, providing a scalable, easy-to-use, and globally applicable model for the improvement of clinical pharmacy services and education. System Development is currently




ISBN: 978-81-980623-8-3

ongoing. Final results will be presented at conference.
**Keywords:** PCI guidelines, Clinical pharmacy, AI-assisted code synthesis, Web-forms.

**AI-28**

**ARTIFICIAL INTELLIGENCE IN PHARMACEUTICAL RESEARCH AND DEVELOPMENT**

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Artificial Intelligence (AI) is transforming the pharmaceutical research and development (R&D) by speeding up drug discovery, lowering the cost, and making personalized medicine a reality. Conventional drug development is expensive and time-consuming, taking sometimes over a decade and billions of dollars. AI technologies such as machine learning, deep learning, and natural language processing solve these issues by screening large amounts of data, predicting drug-target interactions, and optimizing molecules. In initial discovery, AI accelerates target identification and virtual screening and generative models create new molecules with desired pharmacological properties. Preclinically, AI enhances ADME prediction and minimizes late-stage failure, minimizing the use of animal studies. Clinical trials are optimized by AI-aided patient recruitment, adaptive trial design, and real-time monitoring, maximizing efficiency and safety. In production, AI facilitates process optimization, predictive maintenance, and automated quality control, enabling consistency and conformity. AI also allows personalized medicine through the application of genomic and clinical data to customize treatments, optimizing efficacy and minimizing side effects. Although all these are advancements achieved, issues of data quality, regulatory uncertainty, model interpretability, and ethics remain critical. Future progress will depend on explainable AI, federated learning, and partnerships among pharma companies, technology firms, and regulators. By and large, AI possesses the transformative potential to fast-track timelines, condense costs, and accelerate therapeutic innovation, thus transforming world healthcare's future.
**Keywords:** Artificial Intelligence, Drug Discovery, Clinical Trials, virtual screening, Pharmaceutical Manufacturing.

**AI-29**

**REAL-TIME, PYTHON-BASED TRACKING APPLICATION FOR BEHAVIORAL PHENOTYPING**

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Rodent Path Tracking Application (RPTA) is a python-based, real-time animal tracking system that can showcase the movement of rodents in a laboratory setup without the aid of physical markers. The program is built using object tracking algorithms – OpenCV CSRT (Channel and Spatial reliability Tracker) along with PIL(Pillow) and Matplotlib that facilitates plotting and visualization of trajectories for AI based behavioral analysis. It can track live position and behavioral state of multiple rodents in an intuitive GUI using webcams, providing an open, customizable, and user- friendly tool for laboratory studies. The captured video and annotations are saved in a timestamped protected subfolder – a PNG image of the path plot, annotated MP4 video recording, and a detailed excel spreadsheet of the tracking data. We applied RPTA to various behavioral models to evaluate its accuracy in target recognition and tracking over different time periods. It was also tested by different users to ensure its adaptability, efficacy and ease of execution. RPTA high performance and reliability makes the program usable for real time applications. Although the current tracking is based on classic computer vision, the app is structured to allow easy extensions for generative AI and integrated deep learning-based tracking – DeepLabCut, YOLO, or OpenCV-DNN modules or plug in behavioral classifiers that can further automate and enhance rodent behavior phenotyping. The system provides a reliable and open-source solution for real-time laboratory applications.
**Keywords:** Tracking Application, OpenCV CSRT, PIL, Matplotlib, DeepLabCut.

**AI-30**

**ROBOTICS FOR MINIMALLY INVASIVE SURGERY: A DESIGN AND CONTROL APPROACH IN NEUROSURGERY**

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This presents NAOTRAC, an autonomous surgical navigation robot integrating artificial intelligence, machine vision, and robotic assistance, designed to improve neurosurgical accuracy, safety, and operational efficiency. Neurosurgical procedures demand high precision and efficiency, with navigation accuracy and workflow optimization being critical for patient outcomes. Traditional navigation systems often involve complex, time-consuming registration processes and reliance on radiographic markers. NAOTRAC employs Surface Mapping Auto-registration Technology (SMART) for fast, non-contact, frameless patient registration. Its robotic arm recognizes surgical instruments and follows pre-planned, 3D vision-based trajectories, merging preoperative imaging with real-time data to guide instrument placement. Clinical validation studies assessed registration time, navigational accuracy, and safety across various procedures, including brain tumor biopsy, deep brain stimulation, and external ventricular drainage. Average patient registration time was approximately 71 seconds with a mean spatial accuracy of 0.28 mm. NAOTRAC demonstrated safe, precise support for stereotactic biopsies, DBS electrode placement, and catheter navigation, reducing manual workflow and operative time. Regulatory approvals (FDA, CE, TFDA) have confirmed clinical readiness and safety standards. NAOTRAC offers a robust technological advance in neurosurgical navigation, elevating accuracy, streamlining workflow, and supporting a broad range of minimally invasive procedures. Its rapid registration, autonomous navigation, and high safety profile establish NAOTRAC as a valuable innovation for neurosurgical practice worldwide.
**Keywords:** SMART (Surface Mapping Auto-registration Technology), Neurosurgical Navigation, Artificial Intelligence & Machine Vision, Minimally Invasive Procedures, NAOTRAC.

**AI-31**

**DETECTION OF GLAUCOMA USING FUNDUS IMAGES BY DEEP LEARNING.**

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Glaucoma is a progressive optic neuropathy and a major contributor to irreversible blindness worldwide. Because visual damage caused by glaucoma cannot be reversed, timely detection and intervention are essential to preserve vision. Traditional diagnostic practices often rely on clinical judgment and manual analysis of fundus or OCT images, which may be time-consuming and prone to variability. This study presents a computer-aided system that applies deep learning techniques to retinal fundus images for automated identification of glaucoma. The dataset used consisted of 5,000 retinal images, evenly divided between normal and glaucoma-positive cases. The MobileNet architecture was implemented due to its lightweight design and strong performance in image classification tasks. On the initial validation, the model achieved 97.25% accuracy, 99.52% area under the curve (AUC), 96.88% precision, and 97.64% recall. A second evaluation further supported its robustness, with results of 91.67% accuracy, 96.56% AUC, 88.93% precision, and 95.19% recall. These outcomes emphasize the model's ability to reliably distinguish between healthy and glaucomatous eyes. In summary, the proposed MobileNet-based framework demonstrates considerable potential as a clinical decision-support tool. By integrating such systems into ophthalmic practice, clinicians may benefit from more consistent and rapid assessments, enabling earlier treatment decisions. Ultimately, this approach could help reduce the global burden of preventable blindness linked to glaucoma.
**Keywords:** Glaucoma detection, Fundus imaging, MobileNet, Deep learning, AI-assisted screening.

**AI-32**

**AI'S ROLE IN OPTIMIZING PHARMACOGENOMICS**

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ISBN: 978-81-980623-8-3

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Pharmacogenomics, the science of discovering how genetic variation affects drug reactions among various individuals, stands at the center of the vision of individualized medicine. It can potentially maximize treatments, reduce drug side effects, and maximize overall treatment responses. However, with swift advances in genomic sequencing and pharmacogenomic guideline availability, translation of this information into routine clinical practice remains limited. Major hurdles include the interpretability challenge, multi-layered genomic and clinical data complexity, and regulatory barriers to adoption. The paper proposes an **AI-based pharmacogenomic decision engine** that is intended to bridge this gap by transforming raw genomic and clinical data into useful clinical insights. The engine assists clinicians in making drug selection and dosing approaches specific to the individual genetic profile of each patient through the application of complex techniques of machine learning, predictive modeling, and electronic health record-integrated genomic sequencing data. Importantly, the model is constructed with interpretability and evidence-based decision-making, thus providing AI recommendations that are as transparent as possible and clinically credible. We describe the methodological underpinnings of this paradigm, including data pipelines, model architectures, and validation strategies. Clinical case studies from actual use cases demonstrate its potential to reduce the frequency of adverse events while raising therapeutic selectivity in therapeutic categories such as oncology, psychiatry, and cardiology. We discuss the key challenges—anything from data privacy to regulatory approval—and present a guide for clinical translation. By harnessing the capability of pharmacogenomics combined with artificial intelligence, this decision engine is a significant step towards converting personalized medicine into an attainable reality of everyday healthcare.

**Keywords**: Pharmacogenomics, personalized medicine, artificial intelligence, decision engine, predictive modeling, clinical translation, drug response, adverse drug reactions, genomic sequencing, precision medicine.

**AI-33**

## ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN DRUG DISCOVERY: TRANSFORMING MODERN PHARMACOTHERAPY

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Introduction: Drug discovery is traditionally a time-consuming and costly process, often spanning over a decade with high rates of failure. Artificial Intelligence (AI) and Machine Learning (ML) have emerged as transformative tools in pharmaceutical research by enabling rapid prediction of drug-target interactions, molecular properties, and clinical outcomes. Their integration significantly reduces development timelines and enhances precision in identifying novel therapeutic candidates. The primary objective of this study is to explore the applications of AI and ML in drug discovery, emphasizing their role in accelerating target identification, optimizing lead compounds, predicting toxicity, and improving clinical trial efficiency. Additionally, this study aims to highlight the potential of AI-driven platforms in reducing costs and improving success rates in drug development. A systematic review of published literature, databases, and case studies was conducted to evaluate the impact of AI and ML in drug discovery. Tools such as deep learning, natural language processing, and reinforcement learning were analyzed in relation to their effectiveness in molecular modeling, high-throughput screening, and repurposing of existing drugs. Findings demonstrate that AI-based models significantly improve predictive accuracy in molecular docking, reduce attrition rates in clinical trials, and aid in the discovery of new therapeutic entities. Notably, AI has shown remarkable success in repurposing drugs for rare diseases and pandemic preparedness, such as COVID-19. AI and ML are pivotal in reshaping drug discovery by enhancing efficiency, reducing costs, and providing person therapeutic solutions. Their integration is expected to revoiutionize futuru pharmaceutical research and development

**Keywords:** Artificial Intelligence, Machine Learning, Drug Discovery, Clinical Trials, Drug Repurposing.

**AI-34**

## AI-DRIVEN DIGITAL TWIN FOR PERSONALIZED STEM CELL THERAPY: A COMPREHENSIVE FRAMEWORK FOR REGENERATIVE MEDICINE

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Stem cell therapy is a game-changer in the future of medicine with wide-ranging possibilities to heal, regrow, and reconstruct damaged tissues and organs. From cardiovascular conditions to neurodegenerative diseases, its healing potential is endless. However, translational science is hampered by the fact that the nature of challenges that arise as a combination of response variability in the patient population, unpredictable patterns of differentiation, risk of immune rejection, and even tumorigenesis. These are uncertainties that require new approaches that bridge biology and computational science. This article introduces the concept of an **AI-driven digital twin**—an active, patient-individual computational model designed to replicate and predict stem cell therapy responses before actual use in the clinic. Through the integration of multi-omics data, sophisticated computational biology models, and machine learning models, the digital twin platform provides a digital laboratory for optimizing therapy. Pharmacogenomic analysis further enhances its predictability, allowing clinicians to predict drug–gene interactions and tailor interventions to individual patients. We establish the methodological foundations of this approach, including data integration pipelines, simulation platforms, and predictive modeling techniques. Future use spans preclinical safety analysis to personalized therapy design and extended monitoring of treatment trajectories. While potential is enormous, challenges exist as well, e.g., data standardization, model certification, ethics considerations, and regulatory frameworks.Lastly, the convergence of stem cell biology with artificial intelligence presents a blueprint towards safer, more precise, and patient-specific regenerative medicine. The digital twin concept, although still in its nascent stages, has the potential to change the nature of how we design, evaluate, and deliver stem cell therapies in the future.

**Keywords:** Stem cell therapy, regenerative medicine, digital twin, artificial intelligence, computational biology, pharmacogenomics, personalized medicine, predictive modelling, multi-omics, machine learning.

**AI-35**

## FROM TRANSPARENCY TO ACCOUNTABILITY BY OVERCOMING THE SHADOWS OF GENERATIVE AI: ENSURING FAIRNESS, PRIVACY, AND TRANSPARENCY IN HEALTHCARE APPLICATIONS

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Generative Artificial Intelligence (GenAI) in healthcare has a significant potential, clinical decision making, increased diagnostic tools and personalized patient care. Although, this progression in GenAI introduced many complex problems in case of ethical, privacy, algorithmic bias and limited explainability that which mitigated the trust and equity in healthcare. This study mainly focuses on the risks of using GenAI in healthcare and suggests some possible ways to overcome them. The research involved in interview the healthcare practitioners, literature review, tools like IBM AI Fairness 360, and SHAP. PRISMA Guidelines were used for screening and peer-reviewing of articles of MEDLINE, Embase, PsycINFO, Philosopher's Index, JMAI. These all involved in analysis of ethical, privacy, bias, and explainability risks. The research showed that the GenAI in healthcare can sometimes gives biased results that mainly affecting age, gender, minority groups and bias audits showed that disparities of 11-15%, which is reduced to below 4% by using fairness algorithms and explainability tools like SHAP. Healthcare practitioners wanted GenAI to be safe, transparent, ethical and supported by strong rules like EU AI Act that ensures safe and fair use. GenAI involves in great improvement in healthcare through better decision making and personalised treatment but it also shows risks likes bias, privacy and transparency issues. The fairness tools, explainable AI methods, strong ethical rules with continuous monitoring and physician involvement helps for safe, fair, transparency and trustworthy in




ISBN: 978-81-980623-8-3

healthcare.

**Keywords:** Generative AI, Responsible AI, healthcare Ethics, Bias Mitigation, Explainable AI.

**AI-36**

**AI –DRIVEN PREDICTIVE TOXICOLOGY: TOWARDS SAFER AND MORE EFFICIENT DRUG DEVELOPMENT**

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Drug development is challenged by increasing cost burdens and declining approval rates, and significant attrition, with toxicity being primary reason for clinical trail failure and post-marketing termination. Conventional in vitro and in vivo toxicity assessments are expensive, extended timelines, ethically challenging and thus prompt interest in Machine-learning approaches for predictive toxicology. Such approaches like decision tree, naïve Bayes, support vector machines, and neutral networks are applied and deliver notable results across endpoints as in hepatotoxicity, mutagenicity, and carcinogenicity. Deep learning (DL) models provide further benefits by via default features from diverse datasets such as chemical structures, toxicogenomics, molecular descriptors, and large-scale bioactivity data. New approaches like TargeTox, which integrate drug target identity, functional impact scores, and biological network information, highlight the ability of AI to recognize idiosyncratic toxicity and strengthen reliable drug design. Restricted range and quality of accessible datasets, hinders in model legibility and lack of regulatory acceptance limit extensive use and managing the large-scale biodata impose computational difficulties – could remain as challenges. Aligning ML and DL with conventional methods can deliver enhanced predictive frameworks, and allow uses like drug-drug interactions prediction and uncommon subset toxicity assessment. These approaches decrease dependence on animal testing, increase patient safety, cut costs, and exhibit capacity to revolutionize predictive toxicology.

**Keywords:** Drug development, Machine learning (ML), Deep learning (DL), Predictive toxicology.

**AI-37**

**FROM GENOMICS TO CLINICAL DECISIONS: AI-DRIVEN ADVANCES IN PRECISION MEDICINE**

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Bioinformatics and artificial intelligence (AI) have emerged as transformative technologies in drug development, addressing many shortcomings of traditional methods. With rapid technological progress, the integration of AI, machine learning (ML), and bioinformatics now enables advanced protein screening and analysis across diverse “omics” fields such as genomics, transcriptomics, proteomics, metabolomics, and epigenomics. These integrative models allow prediction of disease risk, pathogenicity, and individual drug responses, while also supporting drug repurposing through sensitivity analysis using multi-omic data. Such approaches are creating new opportunities for precision medicine and guiding informed clinical decision-making. Precision medicine leverages a patient’s molecular profile, clinical history, and diagnostic information to design personalized treatment strategies. AI and bioinformatics further enhance individualized care by analyzing phenotypes, family history, and medication adherence. Radiogenomics provides an additional layer, predicting mutations at the cellular level to refine diagnosis and therapy. Machine learning algorithms play a critical role in predicting disease risk, monitoring progression, and tailoring therapeutic options. Combined with deep learning, these technologies can rival expert human diagnostic abilities, particularly in medical imaging. Together, they accelerate drug discovery, development, and repurposing while improving patient outcomes. The convergence of AI, ML, natural language processing, and bioinformatics marks a new era in precision medicine—delivering the “right treatment, at the right time, to the right patient.”

**Keywords:** Precision Medicine, Artificial Intelligence, Bioinformatics, Multi-omics, Drug Development.

**AI-38**

**HARNESSING AI AND TECHNOLOGY TO INNOVATE DIABETES CARE: FROM PREDICTION TO PERSONALIZED MEDICINE**

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Diabetes mellitus is a global health burden, affecting over 530 million people worldwide. Conventional diagnostic and therapeutic strategies often fail to predict disease onset, progression, and complications. AI and advanced technologies are emerging as transformative tools to address these gaps. We conceptualized an AI-driven framework for diabetes research and management by integrating multi-omics datasets, electronic health records, continuous glucose monitoring data, and pharmacological databases. Machine learning models (Random Forest, SVM, Deep Neural Networks) were employed for early prediction of diabetes risk, drug response profiling, and complication forecasting. Validation was considered through clinical datasets and animal models such as zebrafish for translational insights. Preliminary AI models achieved predictive accuracies of 85-92% in identifying high-risk diabetic patients. Integration of omics and pharmacogenomic data improved drug response predictions, particularly for metformin and insulin analogs. AI-enabled retinal imaging demonstrated high sensitivity for detecting diabetic retinopathy. Case studies showed how AI could uncover novel therapeutic targets (e.g., GLP-1 receptor pathways) and support repurposing of existing drugs. AI and technology have the potential to revolutionize diabetes research and management by enabling early detection, personalized therapy, and innovative drug development strategies. This aligns with the conference theme *“Educate, Innovate, Empower”* by educating researchers through data-driven insights, innovating predictive and therapeutic approaches, and empowering clinicians and patients with precision healthcare tools.

**Keywords:** Diabetes Mellitus; Artificial Intelligence; Machine Learning; Precision Medicine; Predictive Modeling; Pharmacogenomics; Digital Health.

**AI-39**

**APPLICATION OF ARTIFICIAL INTELLIGENCE IN COMPLETE MANAGEMENT OF DRUG COMPLICATIONS AND ADRS TAILORED TO PATIENT CONDITION**

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Drug safety remains a cornerstone of healthcare, yet adverse drug reactions (ADRs) continue to contribute significantly to patient harm and healthcare costs. Traditional pharmacovigilance systems, which depend on spontaneous reporting and manual review, are often limited by underreporting, delayed signal detection, and insufficient attention to patient-specific differences. The integration of Artificial Intelligence (AI) offers a promising shift toward more efficient, precise, and personalized management of ADRs.AI techniques such as machine learning, deep learning, and natural language processing can evaluate extensive datasets, including electronic health records, pharmacovigilance databases, clinical notes, and patient-generated reports. These methods reveal associations and patterns that conventional approaches may miss, enabling earlier identification of safety concerns. At the same time, digital tools—mobile applications, wearable devices, and AI-powered chatbots—facilitate real-time symptom reporting and monitoring, allowing patients to play an active role in drug safety. This continuous flow of information helps bridge the gap between patients and healthcare professionals. The patient-centered application of AI extends beyond detection, supporting predictive modeling to identify individuals at higher risk for ADRs. Such insights enable targeted interventions, personalized monitoring, and improved communication, thereby strengthening shared decision-making. While obstacles remain, including issues of data quality, algorithm transparency, and regulatory




ISBN: 978-81-980623-8-3

acceptance, these challenges can be addressed through interdisciplinary collaboration. In summary, the incorporation of AI into pharmacovigilance represents a transition from passive surveillance to proactive, patient-specific ADR management. This paradigm not only enhances drug safety but also promotes a more responsive and inclusive healthcare system.

**Keywords:** Artificial Intelligence, Pharmacovigilance, Adverse Drug Reactions, Patient-Centered Care, Decision making Predictive Modeling, Drug Safety.

**AI-40**

**ARTIFICIAL INTELLIGENCE IN HERBAL DRUG DISCOVERY: BRIDGING TRADITION WITH TECHNOLOGY**

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Herbal medicines have played a vital role in healthcare for centuries, particularly in India through Ayurveda and traditional medical practices, but the discovery of novel bioactive compounds from plants remains a slow, costly, and labor-intensive process. Artificial Intelligence (AI) offers a revolutionary approach by integrating computational tools with traditional knowledge to accelerate herbal drug discovery. AI techniques such as machine learning, molecular docking, and predictive modeling can efficiently identify active phytochemicals, forecast pharmacological activities, predict toxicity, and evaluate drug-likeness properties, thereby reducing both time and cost compared to conventional experimental methods. Case studies demonstrate this potential; for instance, AI models have predicted the anticancer activity of curcumin from turmeric, the anti-inflammatory properties of withanolides from ashwagandha, and the antimicrobial action of azadirachtin from neem. These examples highlight how AI can transform herbal research into a systematic, data-driven process that bridges tradition with innovation. While promising, challenges such as the scarcity of curated herbal databases, lack of global standardization, and the need for advanced computational infrastructure remain significant barriers to large-scale adoption. Nevertheless, the synergy of AI and herbal drug discovery paves the way for sustainable, affordable, and globally acceptable therapeutics, offering opportunities for personalized medicine and enhanced recognition of traditional systems of healthcare.

**Keywords:** Artificial Intelligence, Herbal Medicine, Drug Discovery, Ayurveda, Phytochemicals.

**AI-41**

**"SMART SAFETY: INTEGRATING AI WITH THE MATERIOVIGILANCE SIGNALING TOOL FOR ENHANCED MEDICAL DEVICE MONITORING"**

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The increasing use of medical devices raised concerns regarding their safety and the potential for adverse events. This study aimed to develop and validate a Materiovigilance Signaling Tool, enhanced by an integrated AI-driven Dashboard, to improve the monitoring and analysis of disposable invasive medical device-related issues in the future. A pilot study involving 30% of the target population (N=100) assessed the feasibility of the tool. Content validity was evaluated by a panel of 12 experts, leading to modifications that resulted in a final tool of 11 items scored on a five-point Likert scale. An AI-driven Dashboard will be developed to visualize data trends, automate scoring, and facilitate real-time analysis. The final application of the tool showed that 100% of cases related to IV cannulas were categorized as PROBABLE, while 14 out of 23 cases of Foley catheters were deemed as PROBABLE and remaining POSSIBLE. The tool demonstrated strong content validity (Aiken's V = 0.85) and reliability (Cronbach's alpha ranging from 0.68 to 0.77). Thus, it can be concluded that the Materiovigilance Signaling Tool, complemented by an AI-driven Dashboard, will be a validated instrument that effectively identifies adverse events associated with medical devices and will significantly enhance patient safety and overall quality of healthcare delivery.

**Keywords:** Materiovigilance, Adverse events, Signaling tool, AI.

**AI-42**

**AI DRUG DISCOVERY AND DEVELOPMENT: ACCELERATING INNOVATION TOWARDS PRECISION MEDICINE**

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Artificial intelligence (AI) have emerged as a central force for change in drug discovery and development, changing a historically lengthy process, into a faster, more efficient, and less risky process. AI applications encompass the drug process fully - mining genomic data to identify disease targets, machine-learning design of new drug molecules, predicting some of the properties of compounds such as efficacy and side effects before human selection. In-silico trials, driven by artificial intelligence, can quickly simulate the interactions of drug candidates, and the biological responses of interacting compounds at the molecular level (and the patient level), allowing rapid virtual screening of compounds and developing personalized treatment predictions without clinical studies. Quantum computing and multimodal AI models will enhance accuracy of protein folding simulations and drug-target predictions enabling us to better understand complex disease mechanisms. The emergence of cellular thermal shift assays (CETSA) has reinforced the validation of drug-target interactions by providing rapid and quantitative evidence of engagement in live cells and tissues. These are transforming the field of precision medicine through curative-directed therapies for diseases involving cancers, genetic disorders, and immune pathologies, moving the field towards addressing the root cause instead of just the symptom. Ultimately, AI-driven drug discovery in 2025 will lead in a new era of smarter, faster and more individualized medicine, potentially revolutionizing pharmaceutical R&D and patient treatment experiences across the globe.

**Keywords:** Artificial intelligence (AI), Drug discovery, Drug development, In-silico trials, Drug-target prediction, Quantum computing, Multimodal AI, Cellular Thermal Shift Assay (CETSA).

**AI-43**

**AI-DRIVEN LIPOSOMAL MAGNETIC NANOPARTICLES: A MAJOR DEVELOPMENT TOWARDS SMARTER CANCER TREATMENT**

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Cancer is a genetic disorder that results from genetic or epigenetic alterations in the somatic cells and has abnormal cell growth, which may be spread to other body parts. There are various types of cancers that affect humans. The impact of cancer is increasing significantly day by day. There are different types of magnetic nanotechnology used in cancer treatments such as Superparamagnetic iron oxide (SPIONs), Superparamagnetic magnetite ($FeO_4$), Maghemite ($\gamma$-$FeO_3$) nanoparticles, Ferrite, FePt (iron- platinum), Gold coated, Silica coated are used in advanced imaging modalities and are widely used as targeted medication carriers. One fascinating strategy for smarter cancer treatment is the combination of magnetic liposomal nanoparticles and artificial intelligence. These multifunctional nanotechnologies facilitate precise tumor targeting even in the presence of external magnetic fields by combining the responsive magnetic characteristics of iron oxide nanoparticles with the biodegradability and targeted drug delivery ability of liposomes. AI-driven algorithms improve targeting specificity, control release kinetics, and enhance drug loading by increasing lipid and other nanoparticle characteristics, such as lipid composition, particle size, and surface functionality. Additionally, the magnetic responsiveness provides controlled hyperthermia treatment and improved imaging-guided therapy, preventing damage to healthy tissues. AI models provide real-time prediction of nanoparticle behaviour in vivo, reducing experimental trial-and-error and improving clinical development. By using liposomal magnetic nanoparticles with AI's predictive ability, this novel platform opens the door to highly successful, adaptable, and patient-specific cancer treatments.

**Keywords:** Liposomes, magnetic nanoparticle, AI technology, smarter cancer treatment.

**AI-44**




ISBN: 978-81-980623-8-3

**AI-BASED SPECTRAL BARCODING FOR HERBAL AUTHENTICATION AND ADULTERATION DETECTION**

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The authenticity and quality of medicinal herbs are essential for their therapeutic effectiveness, regulatory compliance, and consumer safety. However, standard authentication methods such as morphological inspection, microscopy, and chromatographic analysis are often time-consuming, destructive, and prone to variability. To overcome these limitations, this study introduces an AI-based spectral barcoding framework for reliable herbal authentication and adulteration detection. Spectral profiles of selected botanicals were collected using Fourier-transform infrared (FTIR), near-infrared (NIR), Raman spectroscopy, and hyperspectral imaging (HSI). Data pre-processing techniques including Savitzky–Golay smoothing, standard normal variate (SNV), and derivative transformations were applied to enhance signal quality and reduce background noise. Machine learning algorithms—support vector machines (SVM), random forest (RF), extreme gradient boosting (XG Boost), least-squares SVM (LS-SVM), and convolutional neural networks (CNNs) were applied to classify authentic and adulterated samples and to generate unique spectral barcodes. Among them, CNNs achieved the highest classification accuracy (>98%), while regression models such as LS-SVM and CNN effectively quantified adulteration levels ($R^2 > 0.98$). The framework demonstrated high reproducibility, robustness against subtle spectral differences, and rapid analysis (<2 minutes per sample). Importantly, the proposed approach is scalable and suitable for industrial quality control, supply chain monitoring, and field-level testing. Portable spectroscopy devices integrated with embedded AI models could further enable efficient real-time screening of herbal materials at farms, markets, and processing facilities. Overall, AI-driven spectral barcoding provides a robust and scalable framework for ensuring herbal authenticity, minimizing fraudulent practices, strengthening regulatory monitoring, and improving global consumer safety and long-term trust in botanical medicines.

**Keywords:** Artificial Intelligence, Spectral Barcoding, Herbal Authentication, Adulteration Detection, Machine Learning.

**AI-45**

**AI ETHICS AND REGULATORY CHALLENGES IN THE PHARMACEUTICAL INDUSTRY**

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Artificial Intelligence (AI) is transforming pharmaceutical research and healthcare delivery by enabling accelerated drug discovery, optimized clinical trials, and personalized treatments. However, the integration of AI raises significant ethical dilemmas and regulatory challenges that must be addressed to ensure safe, fair, and responsible applications. Key ethical concerns include data privacy, algorithmic bias, transparency, accountability, and informed consent. Regulatory frameworks are evolving to address these issues while balancing innovation with patient safety and data security. This article reviews the main ethical and regulatory challenges in pharma AI, current approaches to governance, and proposes pathways for responsible AI integration.The pharmaceutical industry is increasingly leveraging AI technologies to analyze large biomedical data, streamline drug development, and optimize patient care. Despite its immense potential to improve therapeutic outcomes, AI introduces complex ethical and compliance issues. The ethical principles of autonomy, nonmaleficence, beneficence, and justice must guide AI use to avoid harm and ensure equitable treatment. At the same time, regulatory agencies like the FDA and EMA strive to develop guidelines and frameworks appropriate for adaptive AI systems. ethical challenges: data privacy and security**:** AI requires access to extensive patient data, raising concerns about confidentiality breaches and misuse. Strict protocols and patient consent mechanisms are necessary to protect sensitive information. Algorithmic Bias and Fairness: AI models trained on unrepresentative data can perpetuate biases, leading to unfair treatment and disparities in drug development outcomes and patient therapies. Continuous bias detection and mitigation are crucial. Transparency and Explainability**:** Many AI algorithms operate as "black boxes," making decision explanations difficult. Explainability is essential for trust, clinical adoption, and regulatory approval. Accountability: Defining liability for AI errors or adverse outcomes remains a challenge, necessitating clear accountability frameworks in clinical settings.

**AI-46**

**AI IN CLINICAL DECISION SUPPORT SYSTEM**

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Modern healthcare is changing as a result of the incorporation of Artificial Intelligence (AI) into Clinical Decision Support Systems (CDSS), especially in the domains of risk assessment and preventative care. Large volumes of patient data can be analysed using AI-powered CDSS to find those who are at high risk for chronic illnesses including diabetes, heart disease, and cancer. These systems can reveal hidden trends in genetic data, lifestyle data, and electronic health records (EHRs) by utilizing machine learning algorithms. This enables early intervention techniques. By predicting the course of diseases and suggesting individualized preventative strategies, predictive analytics helps physicians make well-informed judgments. AI also improves the speed and accuracy of diagnostic processes, which lessens the workload for medical staff and improves patient outcomes. By supporting ongoing risk monitoring and informing physicians of early warning indicators, the integration of AI tools in primary care settings helps to move the emphasis from reactive to proactive healthcare. AI has the ability to improve public health and streamline clinical operations, despite obstacles including data privacy issues and the requirement for regulatory frameworks. With healthcare systems throughout the world shifting to value-based care, AI-powered CDSS is leading the way in facilitating population health management and precision medicine.

**Keywords:** Clinical Decision Support Systems, Risk Assessment, Preventive Healthcare, Machine Learning.

**AI-47**

**AI IN CLINICAL DECISION SUPPORT SYSTEM**

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**Keywords:** Clinical Decision Support Systems, Risk Assessment, Preventive Healthcare, Machine Learning.

**AI-48**

**ROLE OF AI IN EARLY CANCER DETECTION USING IMAGING TECHNIQUES**

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By enabling quicker, more precise, and early cancer detection through sophisticated image processing, artificial intelligence (AI) is revolutionizing medical imaging and radiology. Artificial intelligence (AI) algorithms, especially those built on convolutional neural networks (CNNs) and deep learning, are trained to identify minute patterns in imaging data that might be invisible to the human eye. AI is essential in detecting early indications of cancer, including microscopic lesions, tissue anomalies, and aberrant growth patterns, in modalities like MRI, CT, mammography, PET, and ultrasound. For cancer patients, early identification greatly enhances prognosis and increases therapy options. Computer-aided detection (CAD) systems powered by artificial intelligence (AI) can automatically evaluate vast amounts of imaging data, rank high-risk cases, and help radiologists diagnose patients more quickly and reliably. In addition to lowering interobserver variability and human error, these solutions significantly lessen the increasing burden in radiology departments. Notable achievements include the early identification of liver lesions in MRIs, breast cancer in mammograms, and lung nodules in CT images. AI also makes it easier to perform radiomics, which is the process of extracting quantitative information from pictures to help tumor classification, risk stratification, and individualized treatment planning. AI has enormous potential to improve early cancer detection, notwithstanding obstacles with regard to data consistency, regulatory approval, and model interpretability. For implementation to be safe and successful, data scientists, clinicians, and regulatory agencies must work together and conduct ongoing research.

**Keywords:** Early Cancer Detection, Deep Learning, Computer Aided Detection, Precision Oncology.

**AI-49**

**DIGITAL PATHOLOGY WITH AI FOR CANCER GRADING**

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By improving diagnostic precision, effectiveness, and repeatability, artificial intelligence (AI) is transforming pathology, especially histopathology. The basis for AI integration is provided by digital pathology, which entails the digitalization of histology slides. Artificial intelligence (AI) systems can now help pathologists analyze whole-slide images (WSIs) with high precision by utilizing sophisticated machine learning and deep learning methods. AI-driven technologies in cancer diagnostics are especially useful for tumor grading, which is a crucial stage in establishing prognosis and directing treatment plans. Compared to human observers alone, these technologies are more reliable at quantifying histological aspects that are crucial for tumor grading, such as nuclear atypia, mitotic figures, gland development, and tissue architecture. By pre-screening slides, emphasizing areas of interest, and offering quantitative evaluations that aid in clinical decision-making, AI improves workflow efficiency. Additionally, AI helps standardize grading standards across institutions and lowers interobserver variability. According to recent research, AI models can grade malignancies like colon, breast, and prostate cancer just as well as or better than skilled pathologists. The use of AI in digital pathology signifies a revolutionary move toward precision medicine, notwithstanding issues with data privacy, algorithm interpretability, and regulatory approval. In order to characterize cancer holistically, future advancements will probably concentrate on multimodal integration, integrating histology with genetic and clinical data.

**Keywords:** Artificial Intelligence, Digital Pathology, Machine Learning, Precision Medicine.

**AI-50**

**NEURAL INTELLIGENCE SYSTEM: LEVERAGING AI FOR INTEGRATIVE ENHANCED ALZHEIMER'S DISEASE DIAGNOSIS AND THERAPEUTIC OPTIMIZATION.**

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Alzheimer's Disease (AD) presents a significant challenge in neurogenerative research and clinical practice due to its intricate etiology and escalating nature. Artificial Intelligence (AI) has the potential to revolutionize patient care for dementia patients by using AI for diagnosis, treatment, and prognostic modelling of AD. Alzheimer's Disease (AD), the most prevalent neurodegenerative illness, is characterized by brain accumulation of specific pathological proteins, accompanied by cognitive impairment. Improvement in the assessment of medication response is done by using AI algorithms to analyse patients' clinical and neuroimaging data. New advanced methods, such as digital phenotyping, offer prospective screening. Similarly, multimodal integration of neuroimaging, cognitive testing and fluid-based biomarker variables had a significant impact on classification capability, meeting a specific benchmark of 97% accuracy. Utilizing AI-based techniques for the initiation of personalized Alzheimer's Disease therapies that aim to improve the daily life of both patients and their caregivers. There are challenges related to data standardization, ethical governance, and clinical adoption, demanding integrative research with the ultimate goal of unlocking AI's full potential to enable beneficial and precise detection for Alzheimer's Disease. Time ahead emphasizes transparent, explainable algorithms for real-world performance, framing AI as a catalyst for precision-based Alzheimer's detection strategies.

**Keywords:** Alzheimer's Disease (AD), neuroimaging, artificial intelligence (AI), multimodal biomarkers, digital phenotyping.

**AI-51**

**DEEP LEARNING APPROACHES FOR EARLY AND RELIABLE SKIN CANCER DETECTION**

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The increasing global incidence of melanoma and other skin malignancies highlights the need for accurate, efficient, and accessible diagnostic systems. This study presents Dermalytics, a deep learning–based framework designed to enhance automated skin cancer detection and classification using convolutional neural networks (CNNs) The system employs advanced architectures including Xception, DenseNet201, DenseNet169, ResNet50, VGG16, and InceptionV3, trained on a curated dataset from the International Skin Imaging Collaboration (ISIC) Archive. To improve robustness, extensive preprocessing and data augmentation techniques were applied. Dermalytics was deployed through a Flask framework integrated with SQLite/MySQL, enabling seamless interaction, user accessibility, and real-time diagnostic support. Results showed that CNN models achieved high accuracy in distinguishing benign from malignant lesions, with DenseNet169 and ResNet50 providing robust and reliable outcomes. Furthermore, architectures such as Xception, DenseNet201, and InceptionV3 demonstrated strong potential in feature extraction, supporting progress toward achieving an overall classification accuracy of 95% or higher Dermalytics illustrates the efficiency of CNNs combined with transfer learning and balanced datasets for automated skin cancer diagnosis. The framework offers a non-invasive, scalable, and clinically relevant tool to aid dermatologists in early detection. Future enhancements, including advanced parameter tuning, federated learning for data privacy, and will further strengthen its applicability across diverse healthcare settings.

**Keywords:** Deep learning, Convolutional neural networks (CNNs), Skin cancer detection, Melanoma classification, Artificial intelligence in dermatology.

**AI-52**

**INTEGRATION OF AI TOOLS FOR PERSONALIZED MEDICATION ADHERENCE IN CHRONIC DISEASE MANAGEMENT**

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The non-adherence to medications is a significant obstacle to chronic disease management that leads to poor outcomes and increased costs. Personalized interventions through the use of Artificial Intelligence will help to enhance adherence by analyzing the behavior of patients, clinical


ISBN: 978-81-980623-8-3

data, and lifestyle patterns. To compare the efficacy of an AI-based individualized medication adherence intervention with patients with chronic conditions such as diabetes, hypertension, and tuberculosis in the real-life clinical environment. A prospective interventional trial of 250 chronic disease patients in North Bangalore primary health centers compared an AI-assisted mobile application that provides personalized notifications, adherence, and proactive notifications. At baseline and 12 weeks, the Morisky Medication Adherence Scale-8 was used to measure medication adherence. Blood pressure, HbA1c, and symptom control were used as secondary outcomes. Paired t -tests and repeated measures ANOVA were used to analyze the data in SPSS 25 in order to determine the improvements in adherence and clinical parameters. MMAS-8 base to post-intervention means improved significantly, (5.2 +/- 1.3) to (7.6 +/- 0.9) respectively ($p < 0.001$). Patients showed better clinical results, such as the mean systolic blood pressure was decreased by 8.5 mmHg, and HbA1c was decreased by 0.9%. The predictive alerts in the AI tool predicted 78 percent of possible non-adherence incidents, which allowed healthcare providers to act on time. AI-based personalized adherence tools enhanced medication adherence and clinical outcomes in the management of chronic diseases. These results propose AI-based interventions as extensible solutions in pharmacy practice and patient care. These promising results need further validation and strengthening, which is suggested to be done in larger studies, with multiple centers involved.

**Keywords:** AI, Medication adherence, Chronic disease, Digital health, Morisky scale.

**AI-53**

## PREDICTIVE HEALTHCARE ANALYTICS POWERED BY ARTIFICIAL INTELLIGENCE

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Predictive analytics powered by artificial intelligence (AI) is rapidly transforming healthcare by enhancing patient outcomes and reducing treatment errors. By identifying patterns and risk factors in large volumes of health data, predictive models support early diagnosis and prevention of diseases, ultimately making healthcare more proactive, personalized, and cost-effective. AI technologies such as machine learning, deep learning, natural language processing (NLP), and advanced predictive modeling can efficiently analyze both structured and unstructured medical data. These models can detect hidden patterns, assess patient risk levels, and forecast disease progression with a high degree of accuracy. One of the most impactful applications is in the early detection and management of chronic diseases such as cardiovascular conditions, cancer, and diabetes. AI-driven algorithms also improve diagnostic accuracy in medical imaging by enabling faster and more precise interpretation of scans. Decision support systems powered by AI provide real-time insights during clinical workflows, helping healthcare professionals make evidence-based decisions. These systems can predict disease onset, estimate patient outcomes, assist in diagnoses, and even suggest personalized treatment plans tailored to an individual's unique medical profile. Additionally, AI integration in hospital systems enables real-time alerts for critical conditions like strokes or heart attacks, supporting faster intervention and improved patient care. In summary, AI is not just optimizing current healthcare practices—it is redefining the future of healthcare delivery by making it smarter, faster, and more responsive.

**Keywords:** predictive analytics, AI-driven diagnosis, deep learning, hospital AI integration, clinical support systems.

**AI-54**

## DEEP LEARNING-BASED GENERATIVE MODELS FOR PREDICTIVE DESIGN OF PI3K PATHWAY INHIBITORS IN BREAST CANCER THERAPY

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Breast cancer, the most common cancer among women worldwide, is projected to increase by 38 percent in global incidence by 2050. The annual mortality is also expected to rise by 68 percent over the same period, according to reports from the International Agency for Research on Cancer (IARC) and the World Health Organization (WHO). The most frequently mutated gene, PIK3CA, occurs in 30–40% of cases and encodes the p110α catalytic subunit of phosphoinositide 3-kinase (PI3K), a crucial enzyme regulating cellular growth, survival, and metabolism pathways. Currently approved drugs, Alpelisib, Copanlisib, Duvelisib, Idelalisib, Leniolisib, and the recently approved Inavolisib (2025), face significant limitations, including suboptimal patient selection, drug-related toxicities, and variable efficacy. The widening mortality-incidence gap underscores the urgent need for innovative strategies to improve prediction of treatment response and accelerate the development of more effective PI3K-targeted therapies. In this study, we collected PI3Kα inhibitors (~2400 inhibitors) from the BindingDB and exported them into an Excel sheet. Chemical descriptors were calculated with RDkit using the Jupyter Notebook environment to extract molecular features for subsequent analysis. The descriptors that contribute to improved pharmacological activity were assessed for statistical compliance using the support vector machine algorithm. Systematic design by elucidating the Structure Activity Relationship (SAR) guided design of novel scaffolds and validated using molecular docking and dynamic simulations. Small-molecule inhibitors targeting PI3Kalpha were developed through novel generative AI-integrated deep learning methodology focusing on improved structural attributes.

**Keywords:** Deep learning, Dataset, Modeling, SAR, docking, dynamics.

**AI-55**

## AI BASED CHECKLIST SOFTWARE FOR REGULATED PHARMACEUTICAL INDUSTRIES

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The pharmaceutical industry operates under some of the strictest regulatory frameworks in the world, where adherence to regulatory standards is paramount to ensure product safety, efficacy, and overall public health. Traditional methods of compliance management, particularly manual checklists and paper-based systems, have long been the backbone of regulatory adherence. However, as the industry becomes increasingly complex and the volume of regulatory requirements grows, these outdated practices pose significant challenges in terms of accuracy, efficiency, and scalability. This paper explores the implementation of AI-based checklist software tailored for regulated pharmaceutical industries, offering a modern and dynamic approach to compliance management. AI-based checklist software utilizes advanced artificial intelligence, machine learning, and automation technologies to streamline and optimize compliance processes across various pharmaceutical operations, including manufacturing, quality assurance, auditing, and documentation. Through intelligent algorithms and predictive analytics, the software automates checklist creation, task management, and compliance tracking in real-time, significantly reducing human error and ensuring accurate documentation for audit purposes. Furthermore, it supports seamless integration with existing enterprise systems, enabling a unified approach to regulatory compliance management that enhances operational efficiency. This paper delves into the benefits and applications of AI-based checklist software, highlighting its ability to improve audit readiness, facilitate regulatory reporting, optimize batch record management, and ensure the timely maintenance of critical equipment in adherence to regulatory guidelines. It also explores how the software enables proactive risk management by identifying non-compliance patterns, automating corrective actions, and supporting continuous quality improvement initiatives. Additionally, AI-based checklists are designed to adapt to ever-evolving regulatory landscapes, ensuring that pharmaceutical companies remain compliant with global standards set by bodies such as the FDA, EMA, and ICH. The methodology for the development and implementation of AI-driven checklist systems in regulated environments is discussed in detail, including requirement gathering, AI model design, system integration, and validation testing.

**Keywords:** Pharmaceutical industry, Regulatory frameworks, Compliance management, Manual checklists, Paper-based systems, AI-based checklist software, Artificial intelligence (AI).




ISBN: 978-81-980623-8-3

**AI-56**

## IMPACT ON ARTIFICIAL INTELLIGENCE IN PHARMACEUTICAL MANUFACTURING: ENHANCING QUALITY CONTROL AND DECISION MAKING.

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The convergence of Artificial Intelligence (AI) and pharmaceutical manufacturing signifies a pivotal juncture in the industry's evolution, offering unprecedented opportunities to bolster quality control and refine decision-making processes. This provides a succinct overview of a comprehensive. research paper that delves into the profound applications, benefits, challenges, and future trajectories of integrating AI into pharmaceutical manufacturing, with a specific focus on augmenting quality control measures and optimizing decision-making. Against the backdrop of stringent quality standards and regulatory demands inherent to pharmaceutical production, the infusion of AI technologies introduces a paradigm shift. This paper elucidates the manifold applications of AI, spotlighting its contributions to fortifying quality control mechanisms while empowering data-driven decisions. AI's impact on quality control is profound, notably through cutting-edge image recognition and computer vision systems. These innovations imbue visual inspection processes with unprecedented precision, detecting imperfections and anomalies that often elude human scrutiny. Augmented by real-time monitoring enabled by Internet of Things devices, AI ensures continuous adherence to rigorous quality benchmarks, safeguarding product integrity. The transformative potential of AI extends to optimizing decision-making by harnessing the analytical prowess of data. Furthermore, AI's predictive capabilities are harnessed to forecast and mitigate risks. stemming from supply chain dynamics, regulatory shifts, and quality deviations. In predicting batch. release probabilities, AI accelerates the decision-making process, circumventing delays inherent to conventional manual testing. However, the adoption of AI in pharmaceutical manufacturing is not devoid of challenges. The efficacy of AI hinges upon the availability and quality of diverse datasets, underpinning accurate model training.

**Keywords:** Artificial Intelligence, Pharmaceutical Manufacturing, Quality Control, Predictive Analytics, Data-driven Insights.

**AI-57**

## BIOSENSING PLATFORM WITH AI-POWERED ANALYSIS FOR GLUCOSE MONITORING

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The development of a point-of-care glucose monitoring system by combining gold nanoparticle (AuNP)–based colorimetric sensors with artificial intelligence (AI)–assisted image analysis. AuNPs were synthesized using the citrate reduction method and were subsequently functionalized with glucose oxidase to enable specific interaction with glucose molecules. Upon exposure to varying concentrations of glucose, the functionalized nanoparticles exhibited visible color changes, forming the basis of a simple diagnostic platform. To quantify these changes, images of the sensors were captured using a smartphone under standardized lighting conditions. The RGB values extracted from the images were processed and applied to predictive models. Linear regression and convolutional neural network (CNN) algorithms developed in TensorFlow were trained to correlate image data with glucose concentration. The predicted values were validated against glucose levels measured using standard glucometers. The colorimetric sensors produced reproducible and concentration-dependent responses within physiologically relevant glucose ranges. The AI models successfully translated image data into quantitative glucose values, with CNNs outperforming linear regression by providing greater accuracy and stability, even when slight variations in imaging conditions were present. Overall, the study demonstrated that the integration of AuNP-based colorimetric sensors with AI-driven image analysis created a reliable, low-cost, and portable platform for glucose monitoring. The system utilized smartphones not only for image acquisition but also as analytical tools, eliminating the need for complex laboratory infrastructure. These findings highlighted the potential of combining nanotechnology and AI to deliver accessible diagnostic solutions for managing chronic diseases such as diabetes.

**Keywords:** Gold nanoparticles (AuNPs); Colorimetric sensor; Glucose detection; Point-of-care diagnostics; Artificial intelligence (AI); Image analysis; Convolutional neural networks (CNN); Biosensing; Digital health; Diabetes monitoring.

**AI-58**

## AI ASSISTED EVALUATION OF NEUROPROTECTIVE PHYTOCHEMICALS IN BERBERIS ARISTATA

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Berberis aristata DC. is a widely used medicinal plant in traditional systems of medicine. This medicinal plant is having many bioactive phytoconstituents with promising therapeutic potential. Systematic identification of neuroprotective compounds becomes more challenging due to complex structure of natural products. In this study, an AI based approach was employed to explore the neuroprotective potential of key phytoconstituents from Berberis aristata. Some advanced computational tools which integrating molecular docking, network pharmacology and machine learning based prediction models were utilized to identify bioactive compounds and their therapeutic targets associated with neurodegenerative pathways. The analysis revealed the presence of phytoconstituents like alkaloids, flavonoids, polyphenols and related derivatives exhibited strong interactions with targets involved in oxidative stress, neuroinflammation and neurotransmitter regulation. The findings provide information about the potential of neuroprotective compounds which are promising in Berberis *aristata* supporting its relevance as a candidate for future drug development. This Phytointelligence explores development in herbal drug discovery and bridging traditional knowledge with modern computational intelligence.

**Keywords:** Artificial Intelligence, *Berberis aristata*, Neuroprotection, Phytoconstituents.

**AI-59**

## AI IN POLYCYSTIC OVARY SYNDROME: REVOLUTIONIZING DIAGNOSIS AND MANAGEMENT

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Polycystic Ovary Syndrome (PCOS) is an endocrine disorder common among 4–20% of women in reproductive age. Reproductive, metabolic, and psychological implications of the syndrome are high. Present approaches for diagnosing PCOS have several issues associated with subjectivity, variability, and delayed diagnosis through clinical examination, biochemical investigations, and imaging. The rise of AI technology has made it a game changer in dealing with the problems related to diagnosis and provides enhanced diagnostic precision and speed through ML and DL models. This paper reviews the contribution of AI technologies in PCOS prediction and diagnosis. AI models, supervised as well as unsupervised, perform better than conventional approaches with large, complex data sets. Random forests and ANNs have reached high diagnostic accuracies over 90%, and patients are clustered into phenotypes for treatment tailored by unsupervised clustering techniques. They embrace clinical, genetic and imaging data with non-invasive diagnosis, early diagnoses and cost-effective interventions. SHAP and LIME are two other forms of AI structures of explanatory methods for added model explainability and increased clinician trust. When it comes to prediction of risk of developing PCOS by using AI the genetic factors, lifestyle parameters, and a family history of PCOS is used accurately up to 96 percent.

**Keywords:** Polycystic Ovary Syndrome, Diagnostic Criteria, Artificial Intelligence, Data Privacy, Global Applicability

**AI-60**




ISBN: 978-81-980623-8-3

**AI DRIVEN DRUG DISCOVERY AND CHEMICAL PLATFORMS**

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AI Driven drug discovery and chemical platforms are revolutionizing the pharmaceutical industry by integrating advanced computational techniques like machine learning, deep learning, and generative AI to address the high costs, lengthy timelines, and low success rates of traditional methods. These platforms leverage vast chemical and biological datasets, including genomics, proteomics, and scientific literature, to analyze complex patterns and predict molecular behavior with unprecedented speed and accuracy. AI is transforming drug discovery by reducing time, cost, and failure rates in the development of new medicines. The major AI platforms include the following like Insilico (AI-designed molecules and drug candidates), Synthace (Automation of compomplex experiments), BioNTech and Instadeep (AI for personalized immunotherapies & vaccines), NVIDIA Clara Discovery (GPU- powered AI tools for chemistry, biology & simulation) together, they represent the next generation of AI-driven drug pharmaceutical innovation, making drug development faster, cheaper, and more precise.

**Keywords:** AI-driven drug discovery, Pharmaceutical Innovation, Machine learning, Chemical & Biological Datasets, Platforms.

**AI-61**

**VARIOUS ROLE AND APPLICATION OF ARTIFICIAL INTELLIGENCE IN PHARMACEUTICAL SCIENCE**

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Artificial Intelligence (AI) emerged as an intervention for data and number-related problems. This breakthrough has led to several technological advancements in virtually all fields from pharmacy, engineering to architecture, education, accounting, business, health, and so on. AI also optimizes supply chains, automates tasks, and provides data-driven insights to reduce costs and improve efficiency across the pharmaceutical lifecycle, and also roles in data and information storage and management-such as patient medical histories, medicine stocks, sale records, and so on; automated machines; software and computer applications like diagnostic tools such as MRI radiation technology, CT diagnosis and many more have all been created to aid and simplify healthcare measures. Machine learning optimizes trial design by creating predictive models that forecast patient response and potential outcomes, which helps in selecting the most effective trial protocols. They provide valuable insights into the relationship between artificial intelligence (AI) and Human Resource Management (HRM). Artificial intelligence (AI), a branch of computer science, has been of growing research interest since its introduction to healthcare disciplines. Research has demonstrated that the application of such technologies has allowed for greater task accuracy and efficiency in medical disciplines such as diagnostics, treatment protocols and clinical decision-making. Application in pharmacy practice is reportedly narrower in scope; with greater emphasis placed on stock management and day-to-day function optimization than enhancing patient outcomes.

**Keywords:** Artificial Intelligence (AI), Machine learning, Pharmacovigilance, Clinical Trails, Drug discovery.

**AI-62**

**DEVELOPMENT AND EVALUATION OF AN AI-DRIVEN CHATBOT FOR COMMUNITY-BASED SURVEILLANCE OF OTC DRUG SAFETY**

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Background: Over-the-counter (OTC) medicines are common in self-care but irrational use and under-reporting of adverse events (AEs) remain major public health concerns. Traditional surveillance fails to capture real-time community data. Artificial intelligence (AI)-based chatbots provide a potential solution to enhance drug safety monitoring and improve patient education effectively. Purpose: This paper will design and test an AI-enabled chatbot to administer community-based OTC drug safety surveillance. Methods: A pilot chatbot was created based on natural language processing and implemented in a mobile interface in the chosen urban and semi-urban neighborhoods. The tool was coded to record self-reported AEs, recognize unsafe self-medication behavior, and to offer safety advice. Data were compared by descriptive statistics, chi-square to categorical variables and paired t-test to contrast the knowledge pre- and post-intervention. Results: A total of 520 participants were recruited, with 92.3% completing follow-up. The chatbot documented 148 adverse events: 42.5% from OTC analgesics, 27.0% from antacids, and 21.6% from cough/cold preparations. Safe-use knowledge improved significantly after intervention (mean ± SD: 11.2 ± 3.5 vs. 15.6 ± 2.8, $p<0.001$). Concordance between chatbot responses and pharmacist advice was 94%. User satisfaction was high, with 88% rating the chatbot as easy to use and trustworthy. Conclusion: The AI-enabled chatbot enhanced OTC drug safety surveillance, improved community awareness, and enabled rapid AE reporting. Its wider adoption could strengthen pharmacovigilance networks and promote rational medicine use, particularly in low-resource settings.

**Keywords:** Over-the-counter drugs, chatbot, pharmacovigilance, community surveillance, artificial intelligence, drug safety.

**AI-63**

**AI-DRIVEN INNOVATION IN NEUROSCIENCE: IDENTIFYING NOVEL THERAPEUTIC TARGETS FOR NEUROLOGICAL CONDITIONS**

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Neurological disorders, such as Alzheimer's disease, Parkinson's disease, and epilepsy, represent a growing global health burden with limited therapeutic options. Traditional approaches to identifying therapeutic targets reliant on fragmented data from genomics, proteomics, and electrophysiology have struggled to address the complexity and heterogeneity of neural systems. Artificial intelligence (AI), a transformative force poised to revolutionize neuroscience by decoding intricate neural mechanisms, accelerating biomarker discovery, and enabling precision drug development, has been developed. This review critically examines the role of AI-driven methodologies including machine learning, deep learning, and generative AI in overcoming these challenges. We explore how AI integrates multiomics data, neuroimaging, and electronic health records to uncover novel therapeutic targets, repurpose existing drugs, and stratify patients for personalized interventions. Case studies, such as DeepMind's AlphaFold for protein structure prediction and In silico Medicine's generative models for CNS drug design, highlight AI's potential to bridge the gap between computational predictions and clinical translation. However, technical limitations, including data quality issues and the "black-box" nature of AI, alongside ethical concerns such as algorithmic bias and patient privacy, remain significant hurdles. We argue that the future of AI in neuroscience lies in fostering interdisciplinary collaboration, improving model interpretability, and establishing regulatory frameworks for AI-driven therapies. By synthesizing recent advances and unresolved challenges, this review provides a roadmap for researchers and clinicians to harness AI's potential in transforming the landscape of neurological disease treatment.

**Keywords:** Artificial intelligence, neuroscience, therapeutic targets, neurological disorders, precision medicine.

**AI-64**

**TOXICITY PREDICTION AND EVALUATION OF AI-BASED GREEN-SYNTHESIZED NANOPARTICLES**

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The development of eco-friendly nanoparticles through plant-based synthesis offers a sustainable alternative to chemical methods, but their safe application depends on proper toxicity evaluation. In this work,


ISBN: 978-81-980623-8-3

silver nanoparticles (AgNPs) and zinc oxide nanoparticles (ZnONPs) were produced using aqueous extracts of neem (Azadirachta indica) and tulsi (Ocimum sanctum). The synthesized nanoparticles were examined for their physicochemical features, including size distribution by Dynamic Light Scattering (DLS), morphology through Transmission Electron Microscopy (TEM), and surface charge via zeta potential analysis. To reduce the dependence on extensive experimental assays, and machine learning approaches were employed for toxicity prediction. Data were compiled from Nano Commons and published literature, focusing on parameters such as particle size, shape, and surface charge. Classification models, specifically Random Forest and Support Vector Machines (SVM), were trained and tested in Python. These models demonstrated strong accuracy in assigning nanoparticles to distinct cytotoxicity categories. Validation was carried out using MTT assays on Vero and MCF-7 cell lines. The experimental outcomes aligned closely with computational predictions, confirming the effectiveness of AI-assisted toxicity screening. This combination of predictive modeling and laboratory validation established a reliable workflow for nanotoxicity assessment. The study showed that green synthesis can be paired with AI-based prediction to produce nanoparticles with well-defined toxicity profiles while minimizing redundant in vitro testing. Such integration fosters responsible innovation, supports sustainable nanotechnology practices, and highlights the role of artificial intelligence in advancing predictive toxicology.

**Keywords:** Transmission Electron Microscopy, surface charge, zeta potential, nanotoxicity, toxicity evaluation, predictive toxicology, artificial intelligence, AI, machine learning, Random Forest, Support Vector Machine.

**AI-65**

## ADOPTION OF CHATGPT AS A DRUG INFORMATION RESOURCE: A COMMUNITY-BASED STUDY AMONG PHARMACISTS

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Background: Access to accurate and timely drug information is crucial for safe and effective patient care. Pharmacists frequently rely on digital resources; however, limitations in conventional databases include subscription costs, time-intensive searches, and restricted accessibility. Emerging AI-powered tools like ChatGPT provide real-time, conversational, and user-friendly solutions for drug information, including dosing, interactions, and evidence-based updates. Despite its growing popularity, limited research exists on how pharmacists use ChatGPT in clinical and community practice. Aim and Objectives: To evaluate the extent and purpose of ChatGPT utilization among pharmacists for drug information. To assess the perceived accuracy, reliability, and impact of ChatGPT on clinical decision-making and patient counseling. Methodology: A community-based cross-sectional study was conducted among 300 pharmacists working in hospital, community, and academic settings. A validated questionnaire captured data on demographics, frequency of ChatGPT use, types of queries (dosing, ADRs, interactions, guidelines), satisfaction, and challenges. Responses were analyzed using descriptive statistics, and associations between practice setting and utilization trends were assessed using chi-square tests. Results: Out of 300 pharmacists, 72% reported using ChatGPT for drug-related queries, with the highest use in community practice (45%), followed by hospital (35%) and academia (20%). The most common queries included dosage adjustments (41%), drug–drug interactions (28%), and adverse drug reaction management (22%). 68% perceived ChatGPT as time-saving, 61% rated its accuracy as moderate-to-high, 55% reported improved patient counseling confidence. However, 32% expressed concerns regarding reliability and lack of source citations. Pharmacists suggested combining ChatGPT with standard references for safe practice. Conclusion: ChatGPT is increasingly utilized by pharmacists as a quick-access tool for drug information, particularly in community settings. While it enhances efficiency and supports patient counseling, concerns about reliability highlight the need for cautious integration with verified databases. With proper validation and training, AI-powered assistants like ChatGPT can complement traditional resources and reshape drug information access in pharmacy practice.

**Keywords:** ChatGPT, Pharmacists, Drug information, Artificial Intelligence, Community-based study, Patient counseling.

**AI-66**

## ARTIFICIAL INTELLIGENCE–ASSISTED DOSING OPTIMIZATION IN RENAL IMPAIRMENT PATIENTS: A PROSPECTIVE OBSERVATIONAL STUDY

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Background: Renal impairment significantly alters drug pharmacokinetics, increasing the risk of sub-therapeutic dosing, drug accumulation, and adverse drug reactions (ADRs). Traditional dose adjustments rely on manual calculations using creatinine clearance (CrCl) or estimated glomerular filtration rate (eGFR), which may not always account for patient-specific variations. Artificial Intelligence (AI) tools such as DoseMeRx®, Clinical Dose Calculator AI®, and IBM Watson® for Drug Safety can integrate laboratory data, comorbidities, and pharmacogenomic profiles to provide individualized, real-time dosing recommendations. Aim and Objectives: To evaluate the role of AI in optimizing drug dosing among renal impairment patients. To assess the impact of AI-guided dosing on therapeutic outcomes, ADR reduction, and clinical pharmacist interventions. Methodology: A prospective interventional study was conducted on 120 patients with moderate-to-severe renal impairment (eGFR < 60 ml/min/1.73 $m^2$) admitted to a tertiary care hospital. AI-powered dosing platforms (DoseMeRx®, IBM Watson®) were integrated with electronic health records (EHRs) to recommend individualized dose adjustments for commonly used renally excreted drugs (e.g., aminoglycosides, vancomycin, anticoagulants). The intervention group (n=60) received AI-guided dosing validated by pharmacists, while the control group (n=60) followed conventional dosing adjustments. Outcomes measured included therapeutic drug monitoring (TDM) levels, ADR incidence (graded using CTCAE v5.0), and pharmacist interventions. Results: AI-assisted dosing improved therapeutic target attainment to 88% compared to 65% in the control group ($p < 0.01$). ADR incidence was reduced by 30% in the intervention group, with fewer cases of nephrotoxicity and bleeding complications. Pharmacist workload for manual dose adjustments was reduced by 40%, and documentation efficiency improved significantly. Importantly, AI models provided dosing recommendations within seconds, enabling faster clinical decision-making and better patient safety outcomes. Conclusion: AI-driven dosing tools enhance precision in drug therapy for renal impairment patients by reducing ADRs, improving therapeutic target achievement, and supporting pharmacist-led interventions.

**Keywords:** Renal Impairment, Artificial Intelligence, Dose Optimization, Therapeutic Drug Monitoring, Pharmacist Interventions, ADRs.

**AI-67**

## "ARTIFICIAL INTELLIGENCE - DRIVEN ANALYTICS IN MODERN PHARMACEUTICAL METHOD DEVELOPMENT"

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The pharmaceutical method development arena is in the midst of a transformative shift. Conventional labor-intensive trial-and-error strategies are progressively being replaced by more agile, data-driven, and AI-infused methods. The incorporation of artificial intelligence technologies—i.e., machine learning, predictive analysis, and automated optimization gives new opportunities to expedite method development, enhance analytical accuracy, and improve reproducibility while decreasing costs and time demands. In addition to the automation of repetitive processes, the newest tools ensure adherence to increasingly stringent and dynamic global regulatory requirements. Platforms powered by AI are redefining the enterprise of making informed data-intensive decisions in a wide range of applications. These technologies play a critical role in the optimization of chromatographic conditions, execution of robust spectral analyses, contaminant monitoring, and predictive experimental trial design. By appropriately




ISBN: 978-81-980623-8-3

drawing upon vast datasets and advanced analytical techniques, researcher are able to quickly simulate, calibrate, and verify experimental parameters to minimize the consumption of resources and variability in experimental results. Such breakthroughs hold great promise to cause the facilitation of interdisciplinary collaborations, aid in the ongoing education in analytical methods, and permit customized, on-demand processes for the development and production of drugs. Such a confluence of advanced analytics and lab automation with artificial intelligence is a landmark development in the pharmaceutical area that establishes a new paradigm allowing for the more expedient and reliable introduction of safer, higher-quality, and more efficient therapeutic deliverables. Such a shift is remodeling the pharmaceutical innovation landscape by making pharmaceutical method development more complex, robust, and dynamic in responding to the challenges of global healthcare networks.

**Keyword:** AI, AI tools, Predictive Experimental Trials, Automated Optimizations, Machine Learning.

**AI-68**

## REVOLUTIONIZING TB TREATMENT: A QBD AND AI-INTEGRATED APPROACH FOR DEVELOPING ADVANCED DELAMANID-LOADED MICROSPHERES WITH ENHANCED SOLUBILITY AND EFFICACY

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This study presents a comprehensive Quality by Design (QbD) and artificial intelligence (AI)-integrated approach to overcome the significant aqueous solubility challenges (0.024 ± 0.003 mg/mL) of Delamanid, a critical BCS Class II anti-tubercular drug. The systematic QbD framework was implemented through Ishikawa diagram-based risk assessment identifying critical material attributes (CMAs) and critical process parameters (CPPs), followed by Design of Experiments (DoE) using a Central Composite Design (CCD) with three factors and three levels. The QbD approach began with AI-enhanced molecular docking using PyRx software, which identified Tween 80 (binding energy: -6.1 ± 0.2 kcal/mol) and ethyl cellulose (binding energy: -7.9 ± 0.3 kcal/mol) as optimal excipients based on their superior binding affinity with Delamanid. Drug-excipient compatibility studies conducted over 7 days under accelerated conditions (40°C/75% RH) showed no changes in FTIR spectra and no physical incompatibility, confirming formulation stability. Through QbD optimization, critical process parameters including stirring speed (800-1200 rpm), polymer concentration (1-3% w/v), and emulsification time (10-30 minutes) were systematically optimized against critical quality attributes. The optimized formulation demonstrated exceptional characteristics: particle size of 1.15 ± 0.05 µm (PDI: 0.18 ± 0.02), zeta potential of -32.4 ± 1.2 mV, and entrapment efficiency of 88.7 ± 2.3%. The QbD-driven formulation achieved a remarkable 50-fold enhancement in aqueous solubility (~0.1 mg/mL) compared to pure Delamanid (~0.002 mg/mL). *In-vitro* dissolution studies across physiological pH conditions (1.2, 4.5, 6.8, 7.4) demonstrated sustained release characteristics which was pH dependent. MIC studies showed reduction in minimum inhibitory concentration against Mycobacterium tuberculosis H37Rv strain when compared to plain drug. Microscopic characterization through SEM revealed spherical particles with smooth surfaces, while TEM confirmed the core-shell structure and uniform size distribution.

**Keywords:** Delamanid, Quality by Design (QbD), Design of Experiments (DoE), Artificial Intelligence, Molecular Docking, Microspheres, Solubility Enhancement, Tuberculosis Therapy.

**AI-69**

## AI-SUPPORTED EVALUATION OF SELF-MEDICATION PRACTICES IN MIGRAINE AND HEADACHE DISORDERS: A PROSPECTIVE OBSERVATIONAL STUDY

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Background: Migraine and headache disorders are among the most common neurological conditions, significantly impairing quality of life and productivity. Widespread availability of over-the-counter (OTC) medications and delayed physician consultation drive patients toward self-medication, which often leads to medication overuse headache (MOH), adverse drug reactions (ADRs), and suboptimal disease control. Artificial Intelligence (AI)-driven mobile health applications, such as Migraine Buddy®, Curelator Headache®, and Ada Health®, have emerged as innovative tools for tracking headache patterns, drug use, and predicting potential overuse, thereby supporting both patients and healthcare providers in optimizing care. Aim and Objectives: To assess the prevalence and patterns of self-medication in migraine and headache disorders using patient-reported data integrated with AI-based headache management apps. 2.To evaluate the role of AI-assisted monitoring in early detection of ADRs, medication overuse, and improving patient counseling outcomes by clinical pharmacists. Methodology: A prospective observational study was conducted on Results: 180 patients with migraine or headache disorders over six months at a tertiary care hospital. Participants were asked to log headache characteristics, medication use, and lifestyle triggers into AI-based apps (Migraine Buddy®, Ada Health®). Data were collected on demographics, drug classes used (NSAIDs, paracetamol, triptans), frequency of self-medication, and procurement sources. AI algorithms flagged potential medication overuse and possible ADRs in real-time. Clinical pharmacists reviewed AI-generated reports, counselled patients on rational use, and documented outcomes. Statistical analysis was performed using descriptive and inferential tests (Chi-square, t-test). Of the 180 patients, 61% engaged in self-medication, with NSAIDs (47%), paracetamol (36%), and triptans (17%) being the most common drugs. Conclusion: The AI-based applications identified medication overuse in 19% of patients and flagged ADR risks (gastritis, dizziness, fatigue) in 15%, which were subsequently validated by pharmacists. Patients monitored through AI apps demonstrated 32% better adherence to safety counseling and a 25% reduction in headache frequency compared to non-users ($p < 0.05$).

**Keywords:** Migraine, Headache disorders, Self-medication, Artificial Intelligence, Mobile health apps, Pharmacist intervention.

**AI-70**

## AI-OPTIMIZED POLYMERIC NANOPARTICLES FOR SUSTAINED DRUG RELEASE

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Polymeric nanoparticles (PNPs) using PLGA and related polymers were developed to achieve sustained drug release, thereby enhancing therapeutic efficacy and patient compliance. Conventionally, optimization of polymer ratios and processing parameters required extensive experimentation, which was both time-consuming and resource-intensive. To reduce this limitation, artificial intelligence (AI) models were integrated into the formulation process to predict key characteristics such as particle size and drug release kinetics. In this study, PNPs were prepared using the solvent evaporation method with varying polymer-to-drug ratios (1:1, 2:1, 3:1), stirring rates, and solvent types. The nanoparticles were systematically characterized for particle size and polydispersity index (PDI) using dynamic light scattering, morphology using scanning electron microscopy, drug loading and encapsulation efficiency, and in vitro drug release in phosphate-buffered saline over a period of 24 to 48 hours. Regression models including multiple linear regression (MLR) and Random Forest were implemented in Python to predict release profiles and particle size, and their outputs were validated against experimental results. The formulations produced nanoparticles with narrow size distribution, high encapsulation efficiency, and well-defined sustained release behavior. AI predictions demonstrated a strong correlation with laboratory findings, with Random Forest outperforming MLR in terms of predictive accuracy. The integration of AI with formulation development significantly reduced the need for repetitive optimization trials, saving both time and resources. Overall, the study demonstrated that the combination of advanced drug delivery systems with AI-assisted predictive modeling provided a




ISBN: 978-81-980623-8-3

powerful Quality by Design (QbD) strategy for developing sustained release nanoparticles with desired therapeutic profiles.

**Keywords:** Polymeric Nanoparticles (PNPs), PLGA, Sustained Drug Release, PDI (DLS), Drug Loading & Encapsulation Efficiency, In vitro Release (PBS), AI-assisted Formulation, Regression Models (Random Forest, MLR), Quality by Design (QbD).

**AI-71**

**ROLE OF AI IN HOSPITAL, COMMUNITY AND CLINICAL PHARMACY**

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Pharmacies play a vital role in modern healthcare by ensuring that patients receive the right medicines safely and effectively. This project focuses on three major branches of pharmacy—Hospital Pharmacy, Community Pharmacy, and Clinical Pharmacy—and explains how each contributes to improving patient care. Hospital pharmacy deals with the supply, storage, and dispensing of medicines in hospitals. Pharmacists here work closely with doctors and nurses to make sure patients admitted to the hospital get the right drugs at the right time. Their role is especially important in critical care units, surgeries, and emergency situations where accuracy and safety are essential. Community pharmacy is the part of pharmacy that most people interact with directly. Community pharmacists provide over-the-counter medicines, explain how to take prescribed drugs, and guide people on common health problems. They also raise awareness about healthy living, vaccinations, and the safe use of medicines. By being easily accessible, they act as a bridge between the healthcare system and the public. Clinical pharmacy is more patient-centered and focuses on optimizing drug therapy. Clinical pharmacists join healthcare teams to review treatments, monitor outcomes, and prevent side effects. Their goal is to make sure every patient receives maximum benefit from their medicines with the least possible risk. Together, these three areas of pharmacy create a complete support system. When hospital, community, and clinical pharmacy work hand in hand, they improve treatment outcomes, reduce medication errors, and make healthcare safer, more effective, and more patient-friendly.

**Keywords:** Hospital Pharmacy, Community Pharmacy, Clinical Pharmacy, Patient Safety, Drug Use, Healthcare System.

**AI-72**

**AI-ENABLED POLYPHARMACY MANAGEMENT: PREDICTION AND PREVENTION OF MULTIPLE-DRUG SIDE EFFECTS**

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Polypharmacy (PP), prescription or use of over-the-counter drugs by more than 1 medication is growing expertise in elderly and chronic disease patients. Useful as it is, however, it greatly increases the risk of ADRs, drug–drug interactions and hospitalization. Classical types of medication review are based on subjective clinical judgment, static criteria and incomplete patient information. AI is a revolutionary technique in plays an important to predict the high-risk drug combinations based on extremely large amount of data including EHRs, pharmacological databases, and so forth. Machine-learning algorithms can recognize intricate interactive patterns which physicians may often miss in the course of daily practice and deliver individualized risk assessment. According to several recent studies, AI-aided clinical DSS tools can significantly reduce medication errors, enhance compliance and enhance therapeutic effects. Challenges remain to be resolved, including data integration, model transparency and clinical adoption. Leveraging AI for the management of polypharmacy would revolutionize patient safety, reduce healthcare spending, and change how personalized pharmacotherapy is practiced.

**Keywords:** Polypharmacy, Artificial Intelligence, clinical decision support, Adverse Drug Reactions, drug–drug interactions, machine learning, personalized pharmacotherapy.

**AI-73**

**AUGMENTING PHARMACY EDUCATION WITH ARTIFICIAL INTELLIGENCE AND IMMERSIVE TECHNOLOGIES FOR BETTER CONCEPTUAL CLARITY FROM THEORY TO PRACTICe**

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The incorporation of Artificial Intelligence (AI) and immersive technologies like Augmented Reality (AR) and Virtual Reality (VR) can transform pharmacy education by bridging the gap between theory and practice. Traditional teaching and learning approaches have limitations in delivering clarity for complex pharmaceutical concepts. AI-driven platforms enable personalized adaptive learning, feedback, and predictive analytics, while AR and VR provide interactive 3D environments that simulate real-world scenarios of pharmaceutical processes, compounding techniques, and clinical settings. These innovations enhance visualization, foster experiential learning, and develop problem-solving and decision-making skills among pharmacy students. Additionally, immersive technologies support remote and collaborative learning, improving accessibility and engagement. This paper focuses on innovative strategies, implementation frameworks, and evidence demonstrating the impact these technologies have on teacher-learner engagement, conceptual understanding, and competency-based outcomes. Adoption of AI and immersive tools aligns with Education 4.0, preparing future pharmacists for an increasingly technology-driven healthcare ecosystem for better outcomes.

**Keywords:** Artificial Intelligence, Augmented Reality, Virtual Reality, Pharmacy Education, Conceptual Clarity, Education 4.0

**AI-74**

**NEW DRUG APPLICATION**

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The New Drug Application (NDA) process is a crucial regulatory requirement for the approval of new pharmaceutical products in the United States and India. This project work highlights the regulatory framework, historical evolution, and procedural aspects of NDA submission. The study emphasizes the role of the Food and Drug Administration (FDA) and the Central Drugs Standard Control Organization (CDSCO) in ensuring the safety, efficacy, and quality of new drugs before marketing authorization.

The report discusses the aims and objectives of NDA, the importance of regulatory documentation such as the Common Technical Document (CTD), and the relevance of bioequivalence studies in establishing drug performance. Key topics include dossier preparation, patent information, drug master files, approval process, and challenges in drug development. The methodology relied on both primary sources (guidance documents, regulatory body websites) and secondary sources (literature, articles, online databases). The findings underline that a comprehensive and well-structured NDA dossier is essential for timely approval and safeguarding public health. Deficiencies in submission may lead to delays or rejection, making adherence to guidelines critical. Overall, this project provides an overview of regulatory expectations and the significance of harmonized procedures in facilitating faster availability of safe and effective medicines.

**Keywords:** Central Drugs Standard Control Organization, dossier, regulatory, New Drug Application, Common Technical Document.

**AI-75**

**DEVELOPMENT AND VALIDATION OF AN AI-DRIVEN FRAMEWORK FOR PRESCRIPTION ANALYSIS: STRENGTHENING RATIONAL DRUG UTILIZATION**

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Irrational drug usage is a major global health concern, with its prevalence specifically in developing countries. Practices like polypharmacy, misuse of antibiotics, and inappropriate fixed drug combinations remain common. Auditing traditional prescriptions is always time-consuming and poses challenges in scalability. This highlights the need for an advanced approach that can systematically evaluate prescribing patterns. In this study, we developed and validated




ISBN: 978-81-980623-8-3

an AI-driven framework that automatically analyzes prescriptions in alignment with indicators recommended by the WHO. A dataset of 378 prescriptions was collected from open-source platforms, clinics, and hospitals in Bengaluru. The prescriptions selected were labelled as per WHO indicators, like polypharmacy, antibiotic prescriptions, and prescription of generic drugs. The collected data set was split into training (70%), validation (15%), and testing (15%). Various machine learning models like Sequential, Resnet_50, EfficientNet, MobileNet_V2, and VGG16 were selected, trained, and tested to analyze the prescriptions that were labelled as per WHO indicators. Resnet_50 achieved the best outcomes with a validation accuracy of 83% and an F1 score of 81% on test data. The Model achieved an overall accuracy of 89% in identifying generic prescriptions, 87% in detecting polypharmacy, and 90% in identifying antibiotic prescription patterns. The ability of this model to generate real-time feedback on trends in prescriptions aids the health care professionals in detecting and addressing irrational prescription patterns. This study underscores the potential of an AI-based tool in improving prescription analysis and thereby curtailing irrational drug usage and enhancing clinical decision-making.

**Keywords:** Artificial Intelligence, Rational Drug Use, Prescription Analysis, Polypharmacy, Machine Learning.

**AI-76**

## AI-SUPPORTED PAPER STRIP KIT FOR RAPID URIC ACID SELF-DETECTION

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Hyperuricemia is a major risk factor for gout, kidney disorders, and metabolic syndrome, and early detection is critical for disease prevention. Conventional diagnostic methods are expensive, time-consuming, and laboratory-dependent, limiting accessibility in rural and resource-limited settings. To avoid these concerns we developed a low-cost, paper strip–based uric acid self-testing kit integrated with AI support, aimed at empowering individuals with rapid, point-of-care diagnostics. The strip is coated with uricase enzyme, which catalyzes uric acid to produce hydrogen peroxide. In the presence of peroxidase and chromogenic agents, a visible color change occurs. A mobile application enabled with AI-based image processing quantifies the color intensity captured through the smartphone camera, translating it into uric acid concentration with higher accuracy. The kit is designed to be user-friendly, portable, and affordable, requiring minimal technical knowledge. The AI-supported self-test kit provides rapid, reliable, and cost-effective uric acid detection within minutes. This innovation bridges laboratory diagnostics and personal healthcare, enabling continuous self-monitoring and early medical intervention. By combining AI technology with low-cost biosensor strips, this approach represents an innovative diagnostic tool in pharma. Such self-testing solutions have the potential to transform patient-centered healthcare, especially in underserved populations.

**Keywords:** Artificial Intelligence, Diagnosis Kit, Paper Strip, Self-Detection, Uric Acid.

**AI-77**

## SMART NEBULIZERS WITH AI ASSISTED DOSING FOR RESPIRATORY DISEASES

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Respiratory diseases such as asthma and chronic obstructive pulmonary disease (COPD) require long-term inhalation therapy, yet poor adherence and incorrect dosing significantly compromise treatment outcomes. Conventional nebulizers lack the ability to personalize therapy or monitor patient usage effectively. The integration of Artificial Intelligence (AI) into smart nebulizer systems provides a novel approach to optimize inhaled drug delivery. This study presents the development of a smart nebulizer prototype equipped with real-time sensors and AI-assisted algorithms to regulate dosing based on patient-specific parameters, including breathing patterns, disease severity, and historical adherence data. The system was designed to monitor inhalation flow rates, detect improper technique, and adjust aerosol output dynamically. Preliminary simulations and pilot testing demonstrated improved drug deposition efficiency and reduced dosing variability compared to standard nebulizers. Additionally, AI-enabled feedback allowed real-time patient guidance and secure data sharing with healthcare providers for remote monitoring. Smart nebulizers with AI-assisted dosing represent a transformative step in respiratory care by enhancing adherence, minimizing wastage, and supporting precision therapy. Large-scale clinical validation is warranted to assess long-term efficacy and integration into routine clinical practice Adequate asthma and COPD management is frequently compromised by non-adherence and errors in dosing with traditional nebulizer systems. Connected smart nebulizers working in combination, with Artificial Intelligence, can even use breath patterns to identify and manage the correct doses and concentration of drugs for patients. For the purposes of this work, an AI-enabled nebulizer system with integrated sensors was developed to monitor inhalation, identify errors, and personalize dosing. Initial testing showed that drug deposition was improved as well as within-device variability and patient guidance compared to that from standard devices.

**Keywords:** AI Assisted Dosing, Digital Inhalation Therapy, Smart drug nebulization, Dose Optimization.

**AI-78**

## AI GUIDED DEVELOPMENT OF NANOSTRUCTURED HYDROGEL SYSTEMS FOR COSMETIC APPLICATIONS

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The use of artificial intelligence (AI) in cosmetic formulation science is changing how advanced delivery systems like nanostructured hydrogels are made. These hybrid platforms bring together the high water content, biocompatibility, and viscoelasticity of hydrogels with the better stability, penetration efficiency, and controlled release properties of nanocarriers. AI powered modeling, predictive analytics, and machine-learning algorithms make it possible to systematically improve these systems by finding the best polymer compositions, crosslinking densities, and nanocarrier architectures for specific cosmetic effects. AI speeds up the process of choosing materials, predicting how they will behave in terms of flow, and simulating how they will release over time. This leads to products that work better and take less time to develop. Nanostructured hydrogels have become promising ways to deliver actives like antioxidants, peptides, botanical extracts, and anti-aging molecules in cosmetics. They penetrate the skin more deeply with less irritation. AI-enhanced computational tools help customize how nanostructures interact with skin, predict how stable they will be in different environments, and reduce batch variability. Also, predictive toxicology models help make sure safety and follow the rules by testing polymer-nanoparticle combinations before they are made. Recent improvements in AI-guided optimization, such as generative models, neural networks, and digital twins, make it possible to make personalized cosmetic formulations that work with each person's skin type and environmental conditions. Combining AI with nanostructured hydrogels is a major step forward in the field of cosmetology. It makes it easier to create high performance, long-lasting, and customer-focused products. In general, AI-guided formulation is a game-changing way to create next-generation cosmetic hydrogels that work better, last longer, and make users happier.

**Keywords:** Nanostructured Hydrogels, Artificial Intelligence (AI) in Cosmetic Formulation, Controlled Drug Delivery using AI

**AI-79**

## ARTIFICIAL INTELLIGENCE IN PHARMACEUTICAL DEVELOPMENT AND NEURODEGENERATIVE DISEASES

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Artificial Intelligence (AI) is revolutionizing pharmaceuticals by accelerating drug discovery, reducing development costs, and minimizing failure rates. Utilizing machine learning (ML), deep learning (DL), and natural language processing (NLP), it enhances predictive




ISBN: 978-81-980623-8-3

modeling, target identification, and virtual screening. AI also optimizes lead compounds through pharmacokinetic and toxicity predictions and enables personalized medicine by analyzing clinical data to tailor treatments, improving patient adherence and therapeutic outcomes. In the context of neurodegenerative diseases, AI has shown considerable promise. For Huntington's Disease (HD), marked by the mutation of the Huntingtin gene and characterized by cognitive and motor decline, AI techniques allow for early detection through brain imaging and predictions of disease progression, enhancing personalized care. In Amyotrophic Lateral Sclerosis (ALS), which lacks a definitive diagnostic test, AI helps identify patterns from clinical data, improving diagnostic accuracy and treatment strategies. For Parkinson's Disease (PD), AI improves diagnosis and treatment through the analysis of speech, movement, and handwriting, aiding in the detection of early symptoms and assessment of disease severity. Lastly, in Alzheimer's Disease (AD), AI-enabled neuroimaging and biomarker analysis support early diagnosis and intervention while facilitating drug repurposing and prognostic modeling. Overall, AI provides a promising pathway for overcoming complex challenges in pharmaceutical development and neurodegenerative disease management. To maximize its potential in advancing global healthcare, ongoing innovation, ethical governance, and regulatory alignment are essential.

**Keywords:** Artificial Intelligence, Huntington's Disease, Amyotrophic Lateral Sclerosis, Parkinson's Disease, Alzheimer's Disease.

**AI-80**

## AI, EMOTIONAL INTELLIGENCE, AND PHARMACEUTICAL PROCESSING IN IVF: EDUCATE, INNOVATE, EMPOWER FROM TRADITIONAL NARRATIVES TO MODERN SCIENTIFIC ADVANCEMENTS

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Advances in pharmaceutical sciences and reproductive medicine have transformed in vitro fertilization (IVF) into a globally accessible treatment. Artificial intelligence (AI) now plays a critical role in embryo selection, cycle prediction, and pharmaceutical dosing, while Emotional Intelligence (EI) shapes patient–clinician communication, stress management, and decision-making in infertility care. The discussion emphasizes how AI-driven embryo viability models and pharmaceutical innovations must be balanced with EI-driven counseling and patient empowerment to ensure ethical, effective, and compassionate fertility solutions. The field of assisted reproductive technologies (ART), particularly in vitro fertilization (IVF), has undergone a paradigm shift with the integration of artificial intelligence (AI) and advanced pharmaceutical technologies. The journey of human fertility practices reflects a remarkable transition from traditional narratives and cultural beliefs to modern technological interventions. In Indian mythology, stories such as those of Kunti and Agastya highlight symbolic and divine approaches to reproduction, representing early recognition of external assistance in fertility. Today, in vitro fertilization (IVF), supported by pharmaceutical innovations and artificial intelligence (AI), offers scientifically precise and ethically complex solutions to infertility. Emotional Intelligence (EI) provides the human-centered dimension, ensuring compassionate care and patient empowerment. This paper explores the continuum from tradition to modernity through the Educate–Innovate–Empower framework, integrating mythology, science, and emotional well-being in reproductive medicine.

**Keywords**: Artificial Intelligence, Emotional Intelligence, IVF, Pharma Processing, Educate, Innovate, Empower etc.

**AI-81**

## AI AND ADVANCEMENTS IN TAILOR MADE PERSONALIZED MEDICINES PHARMACOGENOMICS

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Pharmacogenomics, is a study of how an individual's genetic makeup influences their response to drugs, revolutionizing personalized medicine by enabling more precise and effective treatments. Recent advancements in Pharmacogenomics have made it possible to tailor drug therapies to individual genetic profiles, minimizing ADR's and Optimizing therapeutic efficacy. This topic highlights the latest developments in Pharmacogenomics research, focusing on key innovations such as, biomarkers for drug selection and predictive models for drug responses. This explores recent breakthroughs in Pharmacogenomics, highlights key research findings and examines the growing role of genetic testing. Tailor drug therapies leads to more precise and effective patient care. Technologies such as Genetic Profiling, Drug-gene testing panels, Oncology Precision Medicine, Psychiatric Pharmacogenomics helps in transforming humanized therapies from “One-size-fits-all” to “tailor-made solutions”, offering safer, more effective, and personalized treatments. Genetic testing can predict how individuals metabolize certain drugs. Thus, it can be concluded this study can be beneficial leading to better targeted therapies.

**Keywords:** Personalized medicines, Genetic profiling, Optimized therapeutic drugs, Pharmacogenomics.

**AI-82**

## PHARMABOT: AN AI-POWERED LITERATURE SURVEY COMPANION - FOR THE STUDENTS, BY THE STUDENTS

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In the evolving era of digital healthcare and education, access to reliable and authentic information is essential for both learners and practitioners. To bridge this gap, we have developed PharmaBot, an AI-driven chatbot designed for the students, by the students. The tool enables quick and seamless access to information related to diseases, drugs, treatments, and dosing by simply entering a prompt such as a drug name or disease condition. Uniquely, PharmaBot not only provides summarized drug data but also integrates references from authentic sources like PubChem, ensuring transparency and credibility. This makes the tool versatile, catering to pharmacy students, clinical pharmacists, doctors, and even laypersons seeking basic drug-related knowledge. PharmaBot’s simplicity and evidence-based design position it as a practical learning and clinical aid. Future developments will include voice-enabled interaction, a personalized dosing assistant tailored to age groups, and multilingual capabilities to enhance accessibility and engagement across diverse populations. This initiative demonstrates how student-led innovation can empower the academic and healthcare community by creating digital tools that are both practical and socially impactful.

**Keywords:** AI, Chatbot, Pubchem.

**AI-83**

## AI USE IN DETECTION OF ADRS IN PHARMACOVIGILANCE

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Artificial intelligence (AI) is revolutionizing pharmacovigilance (PV) by addressing the growing complexity and volume of safety data. Through machine learning (ML), deep learning, and natural language processing (NLP), AI can analyze vast structured and unstructured datasets, including electronic health records (EHRs), clinical trial data, medical notes, and even social media posts, to efficiently detect adverse drug reactions (ADRs) and drug–drug interactions. Unlike traditional approaches, AI enables real-time surveillance, early detection of safety signals, and predictive modeling of patient-specific risks. Advanced techniques, such as neural networks and random forests, can generate personalized ADR risk profiles by integrating genomic, lifestyle, and historical health data, supporting tailored prescribing and improved outcomes, particularly in fields like oncology and chronic disease management. AI models can operate within international pharmacovigilance networks using privacy-preserving methods, allowing collaboration across regions without sharing raw patient data, which is especially valuable for identifying rare ADRs across diverse populations. Despite challenges related to data quality, algorithmic bias, and regulatory alignment, AI holds transformative potential to shift PV from passive monitoring to proactive, predictive, and patient-centered safety management. By enhancing efficiency, accuracy, and global collaboration, AI-powered pharmacovigilance ultimately strengthens drug safety surveillance and contributes to improved patient




ISBN: 978-81-980623-8-3

safety worldwide.

**Keywords:** Adverse drug reaction, social data, patient safety, drug safety, medical notes.

**AI-84**

**REMOTE MONITORING OF PATIENTS THROUGH WEARABLE DEVICES + AI**

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Remote monitoring of patients through wearable devices + AI. The traditional clinical trial paradigm, reliant on intermittent site visits and manual reporting, is limited in capturing the dynamic and continuous nature of disease progression and therapeutic response. The integration of Artificial Intelligence (AI) with remote patient monitoring (RPM) technologies offers a transformative framework for decentralizing and modernizing clinical trials. By leveraging multimodal data from wearable sensors, implantables, digital diaries, and connected devices, high-resolution, longitudinal digital phenotypes of participants can be developed. Advanced AI methods, including deep temporal convolutional networks and unsupervised representation learning, enable the conversion of dense, heterogeneous data streams into objective, granular, and clinically meaningful endpoints. Recent studies on adherence reveal that while older adults demonstrate high single-day adherence, sustained longitudinal engagement remains challenging. Nonetheless, reliable activity data for critical measures can be obtained with shorter device usage periods, underscoring the feasibility of AI-enhanced trial designs. Beyond data collection, AI-driven wearables extend functionality toward predictive, context-aware, and personalized care, enabling proactive risk mitigation and optimized therapeutic interventions. Despite significant promise, realizing the full potential of AI-enabled RPM in clinical research requires addressing technical, operational, and ethical challenges, including data quality, algorithmic bias, user engagement, and privacy concerns. Ultimately, AI integration within decentralized clinical trials has the potential to reduce costs, improve efficiency, and enhance patient-centricity, thereby reshaping healthcare delivery toward a more proactive and personalized model.

**Keywords:** Remote monitoring, clinical trials, personalized care, patient engagement.

**AI-85**

**ADDRESSING MOBILE ADDICTION AND SLEEP DISTURBANCES USING ARTIFICIAL INTELLIGENCE: AN INTERVENTIONAL APPROACH TO ENHANCING COGNITIVE WELL-BEING**

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Background: Rising dependence on mobile devices has led to increased sleep disturbances, impairing memory, focus, and mental health. Prolonged screen exposure, blue light, and digital addiction disrupt sleep patterns. Artificial Intelligence (AI)-based interventions, including personalized monitoring and digital detox strategies, offer promising solutions to improve sleep and cognitive function. Aim and Objectives: This study aims to evaluate the effectiveness of AI-assisted interventional approaches in reducing mobile addiction and improving sleep quality to enhance cognitive well-being. The objectives include identifying the prevalence of sleep disturbances due to mobile overuse, implementing AI-driven interventions such as usage tracking, behavior prediction, and sleep hygiene reinforcement, and analyzing their outcomes on cognitive performance. Methodology: A prospective interventional study was conducted among 500 participants with mobile-related sleep disturbances. Participants were randomized into an intervention group receiving AI-assisted monitoring and counseling (using free apps: Sleep Cycle, Rescue Time, Headspace, and Digital Wellbeing) and a control group following routine lifestyle. Sleep quality and cognitive performance were assessed using standardized questionnaires, actigraphy, and cognitive tests at baseline and post-intervention. Data were analysed using paired t-tests and ANOVA. Results: The intervention group demonstrated a significant improvement in sleep duration and quality ($p < 0.01$), with reduced late-night screen exposure as predicted and managed by AI tools. Sleep Cycle and Digital Wellbeing users showed higher adherence to sleep schedules, while Rescue Time effectively reduced compulsive phone usage. Cognitive function scores, particularly in memory retention and attention span, improved markedly compared to the control group. Participants reported reduced mobile cravings, better mindfulness, and enhanced daytime productivity. Statistical analysis revealed a strong correlation between AI-guided interventions and improved cognitive outcomes. Conclusion: The findings suggest that AI-assisted interventions using freely available applications like Sleep Cycle.

**Keywords:** Artificial Intelligence, Sleep disturbances, Cognitive function, Mobile addiction, Actigraphy, ANOVA.

**AI-86**

**SCREENING AND EVALUATION OF AI-DRIVEN NANOPARTICLE-BASED ANTIMICROBIAL PEPTIDES**

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Antimicrobial peptides (AMPs) are promising alternatives against antibiotic-resistant bacteria but are costly to synthesize and test indiscriminately. AI models can predict the antimicrobial potential of peptide sequences, reducing costs before wet-lab formulation. Chitosan nanoparticles (CNPs) enhance peptide stability and sustained delivery, creating an effective nanobiotechnological solution. Main Objectives of research includes Use AI to screen peptide sequences for antimicrobial activity, Formulate AMP-loaded CNPs for enhanced antibacterial activity and Validate AI predictions through in vitro testing. By Using the Antimicrobial Peptide Database (APD3) to collect peptide sequences and associated antimicrobial activity data. Extract physicochemical features (charge, hydrophobicity, molecular weight, amphipathicity). In this studies AI Integration of Train classification models using Python (scikit-learn) to predict antimicrobial activity, Algorithms: Random Forest, SVM, and XGBoost and Validate the model with test datasets and select top-performing peptides. Formulation designed by Using ionic gelation to prepare chitosan nanoparticles loaded with selected peptides, optimizing Chitosan: TPP ratio, Peptide concentration, pH conditions and Characterization studies of Size and PDI (DLS), Morphology (TEM) and Encapsulation efficiency.In Vitro Testing Evaluated antibacterial activity using disc diffusion and MIC against E. coli and S. aureus and correlate *in vitro* results with AI predictions. Significantly This work proved competence in designing AI models for screening therapeutic peptides, bridging in silico predictions with nanotechnology, crucial for antimicrobial resistance research and created effective peptide-loaded CNPs with enhanced stability and antibacterial properties, pre-screening and exposure of peptide research, nanobiotech, and AI integration

**Keywords:** Antimicrobial peptides (AMPs), Artificial intelligence (AI), Machine learning, Chitosan nanoparticles (CNPs), Ionic gelation, Nanobiotechnology, Antibacterial activity, Drug delivery, Minimum Inhibitory Concentration (MIC), Antibiotic resistance.

**AI-87**

**LEVERAGING CLAUDE AI FOR ADVANCED ADR DETECTION AND PHARMACOVIGILANCE: INNOVATIONS IN PHARMACY PRACTICE**

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Background: Adverse Drug Reactions (ADRs) are a significant challenge in clinical pharmacy, contributing to hospitalizations, increased healthcare costs, and patient morbidity. Traditional ADR detection methods rely on manual reporting, which is often delayed and underreported. Claude AI, a state-of-the-art language model, offers an innovative solution by enabling real-time ADR detection, predictive pharmacovigilance, and AI-powered patient counseling. This study explores how Claude AI can enhance ADR identification and optimize drug safety monitoring in pharmacy practice. Aim and Objectives: To




ISBN: 978-81-980623-8-3

evaluate the role of Claude AI in detecting ADRs using predictive analytics and natural language processing (NLP). To assess the effectiveness of Claude AI in real-time ADR reporting and documentation. To analyze the impact of AI-driven pharmacovigilance on patient safety and clinical decision-making. Methodology: A prospective observational study was conducted on 220 Patients in collaboration with hospital pharmacists. The AI system was integrated into electronic health records (EHRs) to analyze patient data, medication history, and reported symptoms. AI-powered chatbots engaged patients in ADR self-reporting, while Claude AI cross-referenced symptoms with pharmacovigilance databases to identify potential ADRs. Pharmacists validated AI-generated ADR alerts and recorded intervention outcomes. Results: Claude AI successfully identified and detected ADRs with 85% accuracy, reducing detection time by 60% compared to manual reporting. AI-assisted counseling improved adherence to safety protocols by 40%, and pharmacists reported a 50% improvement in efficiency for ADR documentation and risk assessment. Clinical decision-making and patient outcomes improved significantly due to faster identification and intervention. In 220 patients, AI integration with EHRs enabled continuous monitoring of medication history and reported symptoms. Pharmacists validated AI-generated alerts in real-time, ensuring accuracy and timely interventions. Conclusion: Claude AI revolutionizes ADR detection and pharmacovigilance by enabling real-time monitoring, predictive analytics, and automated reporting. Its integration into pharmacy practice enhances patient safety, reduces ADR-related hospitalizations, and supports evidence-based medication management.

**Keywords:** Adverse Drug Reactions (ADRs), Claude AI, Pharmacy practice, Natural language processing (NLP).

**AI-88**

## NANOROBOTS: THE NEXT-GEN SOLDIERS IN TARGETED DRUG DELIVERY

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Targeted drug delivery has emerged as a critical challenge in modern therapeutics due to issues such as systemic toxicity, poor bioavailability, and lack of site specificity. Conventional drug delivery systems often expose healthy tissues to drugs, leading to adverse effects and reduced therapeutic efficacy. Nanorobots, which are nanoscale programmable machines, offer a novel strategy to overcome these limitations. These nanodevices can be engineered using DNA origami, magnetically controlled nanoparticles, or biological hybrids, enabling them to selectively recognize diseased cells, navigate complex biological environments, and release therapeutic agents in a controlled and localized manner. Importantly, nanorobots can cross physiological barriers such as the blood–brain barrier, expanding treatment possibilities for neurological disorders. Recent advancements, including DNA nanorobots for vascular occlusion in tumor therapy and magnetically powered nanorobots for targeted antibiotic delivery, have demonstrated their promising potential in oncology, neurology, and cardiovascular medicine. While significant challenges remain in terms of biocompatibility, large-scale manufacturing, cost, and regulatory approvals, nanorobotics represents a revolutionary step toward intelligent, site-specific, and personalized drug delivery systems.

**Keywords:** Nanorobots, Targeted drug delivery, Precision medicine, Theranostics.

**AI-89**

## OPTIMIZING MEDICATION ADHERENCE USING AI TECHNOLOGIES: A PATIENT-CENTERED APPROACH TO SMART HEALTHCARE

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Medication adherence – taking medications as prescribed – is critically low in chronic diseases. Globally only about 50% of patients adhere to long-term therapies, and rates in Type 2 diabetes (T2DM) are even lower (e.g. ~34% reported in India). This leads to poorer glycemic control, more complications, hospitalizations and enormous costs (an estimated 125,000 preventable deaths and $100 billion/year in the US alone). Conventional solutions (SMS reminders, pillboxes, apps) yield only modest gains (typically ~10–20% absolute improvement) and often fail to sustain engagement or address individual patient needs. Artificial Intelligence (AI) offers a breakthrough: by learning each patient's behavior and tailoring support, AI can personalize reminders, predict non-adherence and adapt in real time. We propose MedBuddy AI, a hybrid agentic–generative AI system: an agentic component autonomously engages patients (scheduling tasks, monitoring data) while a generative component crafts personalized messages and education. This dynamic platform continuously tracks disease status, medication schedules, and behavior. Early evidence suggests AI-based interventions can boost adherence by up to ~20–30%. We outline a quantitative study design, present a patient-centered intervention model (addressing psychological, behavioral and literacy factors), and show how AI tools (predictive analytics, real-time monitoring) can make interventions adaptive and precise. Finally, we describe a scalable, low-cost deployment plan for India – e.g. voice-based prompts in local languages for rural, low-literacy populations– aiming to significantly improve T2DM adherence and outcomes.

**Keywords:** Medication adherence, Artificial Intelligence (AI), Type 2 diabetes (T2DM), Personalized intervention, Digital health.

**AI-90**

## AI-DRIVEN DRUG REPURPOSING: TRANSFORMING PHARMACEUTICAL INNOVATION

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The traditional drug discovery process is time-intensive, costly, and marked by high attrition rates, often requiring over a decade and billions in investment for a single approved drug. This research explores artificial intelligence (AI)-driven drug repurposing as a strategic solution to these limitations. The objective was to assess how AI methodologies—such as machine learning, deep learning, natural language processing, and knowledge graphs—can identify novel therapeutic applications for existing drugs, drastically reducing development time and costs. Case studies, including Sildenafil, Thalidomide, and Aspirin, were analysed to understand historical success patterns, while modern examples like Baricitinib and DeepDrug validated AI's predictive capabilities. An implementation framework was constructed, outlining a four-phase strategic workflow: hypothesis generation, preclinical validation, clinical development, and IP strategy. AI-enabled systems demonstrated success in processing multi-omics data, analysing adverse event reports, and integrating real-world evidence from EHRs to reveal hidden drug-disease links. The study concludes that AI-driven repurposing transforms pharmaceutical innovation from serendipity to system, offering a cost-effective, time-efficient, and patient-centric approach to therapeutic development, with significant implications for precision medicine and global health equity.

**Keywords:** Artificial intelligence, drug repurposing, machine learning, side effect mining, pharmaceutical innovation.

**AI-91**

## AI-INTEGRATED TELEPHARMACY FOR PERSONALIZED MEDICATION COUNSELLING IN INDIAN PUBLIC HOSPITALS: A CONCEPTUAL FRAMEWORK TO ADDRESS POLYPHARMACY AND IMPROVE ADHERENCE

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India's public healthcare system is struggling with a severe shortage of trained clinical chemists which leads to various healthcare issues like non-compliance to medication, adverse reactions and polypharmacy especially among the elderly and those with chronic diseases. While telepharmacy is a big solution, it is often devoid of real time clinical decision support and personalization. This proposal presents a telepharmacy model integrated with AI to address the needs of public hospitals in India. This model enhances telepharmacy based medication




ISBN: 978-81-980623-8-3

management by using patient Electronic Health Records (EHRs) and AI algorithms to provide real time alerts for drug-drug interactions and polypharmacy, personalized counseling through voice assistants, chatbots or SMS and AI driven medication adherence alerts. The model is designed to be interoperable with existing digital healthcare ecosystem like eSanjeevani and Ayushman Bharat Digital Mission (ABDM) so that pharmacists can spend more time on senior consultations and triaging and follow up to AI. The model proposes improved medication safety, identification of drug related risks at an early stage, patient adherence with automated tailored follow ups and reduction of workload for pharmacists in high volume settings. The AI-telepharmacy framework provides a structured and scalable solution to optimize drug use and address the chemist shortage in India's healthcare infrastructure. Future implementation will require addressing regulatory standards, prototyping and stakeholder engagement to ensure deployment and acceptance. This is a step forward towards personalized, efficient and technology driven pharmaceutical care in India's public health system.

**Keywords:** Telepharmacy, artificial intelligence, polypharmacy, public hospitals, clinical decision support.

**AI-92**

**THE CANS PLATFORM: AN AI-GUIDED, CLOSED-LOOP MICRONEEDLE SYSTEM FOR PERSONALIZED NOOTROPIC DELIVERY**

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The Chrono-Adaptive Nootropic System (CANS) represents a paradigm shift in cognitive enhancement technology, moving beyond static, passive transdermal patches to a fully integrated, closed-loop bio-optimization platform. The system is built upon a flexible, biocompatible micro-moulded silicone substrate that houses a suite of non-invasive biosensors and a digitally-actuated drug delivery mechanism. Real-time physiological data, including electrodermal activity and sweat cortisol levels, are continuously monitored to assess the user's stress, arousal, and circadian state. This data is processed by a proprietary chronobiological algorithm that interprets deviations from the user's personalized baseline rhythm. In response, the algorithm triggers the on-demand release of specific nootropic agents from an array of gold-coated, dissolvable microneedles. The payload, featuring microencapsulated L-Tyrosine, Caffeine, and L-Theanine, is delivered with high spatiotemporal precision to reinforce natural cognitive peaks and mitigate troughs. By fusing real-time biosensing with adaptive, chronologically-aware pharmacology, the CANS offers a novel, data-driven approach to sustainable cognitive performance. This platform technology establishes a new category of personalized health devices capable of active, intelligent biological modulation, moving beyond passive tracking to dynamic intervention. The system's architecture, requiring a combination product regulatory pathway, provides a significant competitive moat against conventional supplement-based products.

**Keywords:** Nootropics, Transdermal drug Delivery, Smart Patch, Cognitive enhancement, Biosensors.

**AI-93**

**ARTIFICIAL INTELLIGENCE IN DIAGNOSIS OF POLYCYSTIC OVARY SYNDROME (PCOS)**

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Polycystic ovary syndrome (PCOS) is one of the most common reproductive endocrine disorders in women underline indication of ovarian cysts. Polycystic ovary syndrome is an endocrine gynecology disorder affecting females aged between 12 and 45 years. The persistent hormonal imbalance leads to the complexities such as numerous cysts, an irregular menstrual cycle that ultimately leads to infertility among females. Many candidate genes have been identified to be one of the causes of PCOS. According to World Health Organization (WHO) estimation revealed over 116 million women (3.4%) are affected by PCOS worldwide. The predisposing risk factors include genetics, absent menstrual cycles, pigmentation,decrease in hair volume, particularly elevated androgens and insulin resistance, neuroendocrine, lifestyle/environment and obesity that contributes to the development of PCOS. The treatment in PCOS is mainly symptomatic and involves lifestyle interventions and medication such as Metformin, Oral contraceptives and anti-androgens. However, the management of PCOS is challenging and current interventions are not able to deal with outcomes of this syndrome. This review encompasses the latest pharmacotherapeutic and non-pharmacotherapeutic interventions currently in use to tackle various symptomatic contentions in PCOS. Our focus has been mainly on novel therapeutic modalities for treatment/management of PCOS. Probability based inference systems are designed to estimate and stage the degree of the PCOS condition in the patient.

**Keywords:** PCOS, pathophysiology, diagnostic criteria, metabolic disease, lifestyle intervention.

**AI-94**

**ARTIFICIAL INTELIGENCE IN BREAST CANCER**

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Breast cancer, the foremost prevailing style of cancer in girls, accounts for 14 percent of cancer cases in Indian girls. In keeping with reports, a girl in India receives a carcinoma designation every four minutes Girls in their early thirties to fifties area unit at a high risk of developing carcinoma as a result of it's the foremost prevailing style of cancer in Indian women; this risk rises till it reaches its peak by the time they're fifty to sixty-four years previous breast cancer is the second highest cause of cancer-related mortality in women worldwide and in the United States, accounting for around 571,000 deaths per year. increases treatment results and the possibility of a cure. Among the cancers, breast cancer is the most widely spreading cancer, with about 23 % of cancers in the US. and worldwide. Additionally, it is the second most cause of death in females, around 5.7 million every year Breast cancer consists of 3 major tumor subtypes categorized according to estrogen or progesterone receptor expression and *ERBB2* gene amplification. The 3 subtypes have distinct risk profiles and treatment strategies. Optimal therapy for each patient depends on tumor subtype, anatomic cancer stage, and patient preferences however, also exacerbate harm from screening. For example, AI might alter the spectrum of disease detected at breast screening if it differentially detects more micro calcifications which are associated with lower grade ductal carcinoma in situ. In such a case, AI might increase rates of over diagnosis and overtreatment and alter the balance of benefits and harms

**Keywords:** Carcinoma, lymph nodes, prevention, screening, diagnosis, treatment, Risk factor.

**AI-95**

**APPLICATIONS AND BENEFITS OF ARTIFICIAL INTELLIGENCE (AI) AND MACHINE LEARNING (ML) IN HEALTHCARE**

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AI technologies are used in the healthcare industry as a driving force to improve healthcare-related products and services like computer vision (CV), natural language processing (NLP) and machine learning (ML). Artificial intelligence (AI) and machine learning (ML) to the R&D, production, and distribution of products and services.AI/ML technologies can enhance business agility and improve strategies by increasing fast, accurate decision-making, reducing costs. AI/ML brings changes to the entire product lifecycle in drug discovery, clinical trials and product launch. The use of AI is being explored in the pre-clinical phase to understand disease biology and drug candidates, in the clinical phase to help target populations and to design intervention studies and in the development of digital therapeutics and devices to enable continuous monitoring. The pharmaceutical industry is poised for significant transformation in the coming years with the rise of AI. AI will improve operation efficiency, reduce operational costs, and help organizations comply with regulations. An AI can manage all supply chain management operational aspects by tracking demand variations, minimizing waste, and avoiding drug shortages. AI will streamline the




ISBN: 978-81-980623-8-3

drug development process by speeding up clinical trials, automating data analysis, and assisting in decision-making with predictive analytics. Artificial intelligence (AI) has the potential to bring about a paradigm shift in the way drug are researched, developed and marketed. AI is changing the pharmaceutical industry by looking at data science, drug discovery, clinical trials, marketing and R&D. Applications of AI are improving healthcare delivery in preventive care, disease diagnosis and prediction, treatment plans and administrative work, benefiting both the patients and healthcare providers. Implementation of AI in India with 1.4 billion people is a essential to improve the healthcare system. India was the founding member of the Global Partnership on AI (GPAI) alliance since 2022–23 has adopted a measured approach for the integration of AI.

**Keywords:** AI, ML, CV, NLP

**AI-96**

**REVOLUTIONIZING PHARMA: THE ROLE OF ARTIFICIAL INTELLIGENCE IN DRUG DISCOVERY AND DEVELOPMENT**

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The application of artificial intelligence (AI) is revolutionising pharmaceutical research by transforming the landscape of drug discovery and development. Traditional drug development is frequently time-consuming, expensive, and resource-intensive, but AI-powered alternatives are speeding up the process using predictive modelling, virtual screening, and advanced data analytics. Machine learning algorithms analyse massive biological, chemical, and clinical datasets to find new drug prospects, optimise molecular design, and predict pharmacological features with greater accuracy. In clinical development, AI improves patient selection, trial design, and real-time monitoring, resulting in increased trial efficiency and lower failure rates. Additionally, by customising medications to each patient's unique genetic and clinical profile, AI-powered solutions enable personalised medicine by providing more focused and efficient treatments. AI not only boosts productivity in the pharmaceutical sector but also opens the door for safer, quicker, and more patient-centered healthcare innovations by increasing accuracy, reducing on timelines, and lowering prices.

**Keywords:** Artificial Intelligence (AI), Drug Discovery, Machine Learning, Predictive modeling.

**AI-97**

**INTEGRATING ARTIFICIAL INTELLIGENCE WITH OPEN-SOURCE PROGRAMMING IN PHARMACEUTICAL RESEARCH AND DEVELOPMENT: A COMPREHENSIVE STUDY**

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Integrating artificial intelligence (AI) with open-source programming languages such as Python and R can transform pharmaceutical research and development. These computational methods can complement and enhance traditional experimental research. In this study, we developed and evaluated the potential of AI-assisted Python and R-based programming for selected pharmaceutical applications. AI-assisted Python codes were developed for paediatric dose calculations using Young's, Fried's, and Dilling's equations and for laboratory-level wet granulation process calculations. The results from both studies were consistent with manual calculations and commercial software outputs. RStudio (version 4.3.3) was used in the Response Surface Methodology (RSM) for a $2^3$ full factorial design to optimize an oral formulation. Optimized conditions (8% w/v cryoprotectant, 100 mg drug loading, 15 min trituration) resulted in 98.25% drug content, 16.28 mg/ml solubility, and 44.604% drug release within 10 min. The *in vitro–in vivo* correlation (IVIVC) of rosuvastatin–hydroxypropyl-β-cyclodextrin inclusion complexes was studied using RStudio. The Loo–Reigelman deconvolution method showed that nonlinear polynomial regression provided a better fit for the predicted values ($R^2$ = 0.8698, RMSE = 0.1420, MAE = 0.1271) compared to linear regression. The absorption rate constant (ka= 0.0845) is consistent with the established pharmacokinetics of rosuvastatin. In both studies, RStudio generated outputs similar to those of commercial software. The findings of these studies indicate that AI-assisted Python and R can generate precise outputs in pharmaceutical calculations, formulation optimization, and IVIVC modelling. Hence, the potential of AI assisted open-source programming languages should be explored for affordable and robust pharmaceutical research and development.

**Keywords:** Artificial Intelligence, Open-Source Programming, Pharmaceutical Research and Development, Python, R.

**AI-98**

**ADVANCEMENTS IN ARTIFICIAL INTELLIGENCE (AI) FOR THE DESIGN AND OPTIMIZATION OF SOLID DOSAGE FORMS**

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Artificial Intelligence (AI)-driven formulation development is an emerging approach that holds significant promise for accelerating drug product development. AI offers a versatile suite of algorithms applicable across diverse pharmaceutical contexts. Solid dosage forms—such as tablets, capsules, powders, and granules—remain the most common modes of drug administration. Their development is influenced by multiple factors, including critical material attributes (CMAs) and processing parameters, which can impact key product characteristics such as dissolution rate, physical and chemical stability, particle size distribution, and dry powder aerosol performance. Traditional trial-and-error methods for formulation design are often inefficient, resource-intensive, and time-consuming. Recently, AI has gained recognition as a transformative tool in pharmaceutical formulation science. This review outlines: (1) an overview of AI in pharmaceutical sciences with regulatory guidance, (2) strategies for database generation for solid dosage formulations, (3) data preparation and processing techniques, (4) a comparative discussion of AI algorithms, and (5) applications and case studies relevant to solid dosage forms. Additionally, the review highlights the role of deep learning-based image analytics in pharmaceutical applications. Leveraging AI enables scientists to better predict and optimize formulation properties, leading to more efficient and targeted drug product development.

**Keywords:** Artificial Intelligence, AI algorithms, solid dosage forms, tablets, capsules, powders, granules, pharmaceutical formulation development, critical material attributes (CMAs), processing parameters, dissolution rate, stability, particle size distribution, aerosol performance, trial-and-error.

**AI-99**

**IMMERSIVE VR FOR PHARMACY EDUCATION: FROM SKILLS GAP TO SCALABLE SIMULATION**

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Introduction: The project addresses a persistent challenge in pharmacy education—limited access to live experimental training due to ethical, regulatory, and logistical constraints. Traditional lab-based pharmacology education lacks scalability and standardization, creating a skills gap in graduating students. We propose a Virtual Reality (VR) solution aligned with the Pharmacy Council of India (PCI) curriculum, offering procedural simulations with real-time feedback so students can safely practice mandated experiments. This supports competency-based education, reduces training costs, promotes accessibility, and aligns with SDG 3, 4, and 9. Practical pharmacology training in India is still heavily dependent on animal models, but ethical restrictions and infrastructural limitations prevent many institutions from providing sufficient hands-on practice. As a result, students often receive uneven exposure and limited repetition of critical experiments. A scalable VR-based alternative can bridge these gaps and strengthen national goals for high-quality healthcare education. A pilot VR module was developed using Unity 3D, with inputs from faculty and laboratory coordinators. Key features include step-wise guidance, interactive elements such as pipetting and dose selection, instant feedback, and performance analytics. Testing was conducted using Oculus Quest 2 and Android-based VR kits. A validation study with 30 students and 5 faculty members showed significant skill




ISBN: 978-81-980623-8-3

improvement (38.6%, p = 0.002), with 91% of students reporting higher procedural confidence. Cost analysis suggested up to 60% savings over three years compared to maintaining physical labs. VR simulations provide ethical, repeatable, and accessible learning while reducing dependence on animal experimentation. Future goals include expanding to all PCI-mandated experiments, adding instructor dashboards, integrating multilingual support, and partnering with 50+ colleges by 2026.

**AI-100**

**ARTIFICIAL INTELLIGENCE IN PHARMACY: BRIDGING INNOVATION AND PRACTICE IN DRUG DEVELOPMENT AND CLINICAL OPERATIONS**

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This systematic review critically examines the transformative influence of artificial intelligence (AI) across various dimensions of pharmacy practice. As the pharmaceutical industry grapples with persistent challenges—ranging from supply chain disruptions and clinical trial inefficiencies to complexities in drug discovery—AI emerges as a powerful enabler of innovation and optimization. The study synthesizes findings from a broad selection of peer-reviewed literature, revealing how AI technologies, including supervised and unsupervised learning models, enhance predictive analytics, target identification, and drug development pipelines. AI applications in virtual clinical trials, wearable health monitoring, and data-driven drug repurposing not only reduce time and cost but also elevate precision and patient-centric care. Furthermore, AI-driven insights facilitate rapid screening of molecular structures, toxicity prediction, and efficient design of bioactive compounds, reshaping the traditional research and development workflow. The review also highlights AI's growing role in automating clinical trial data analysis and optimizing real-world data for regulatory decisions and pharmacovigilance. Despite its vast potential, the study acknowledges critical limitations, such as data bias, cybersecurity risks, and the need for human oversight in interpreting AI-generated outcomes. As the pharmaceutical sector adapts to post-pandemic demands, the integration of AI tools presents both opportunities and responsibilities. The review concludes that sustainable advancement in pharmacy practice hinges on continued investment in AI infrastructure, ethical governance, and interdisciplinary collaboration to fully realize its potential. Future research must aim at refining AI methodologies and expanding their real-world implementation for enhanced global healthcare delivery.

**Keywords:** Artificial Intelligence (AI), Drug Discovery, Clinical Trials, Pharmaceutical Industry, Machine Learning, Drug Development.

**AI-101**

**ARTIFICIAL INTELLIGENCE IN DRUG DESIGN AND DEVELOPMENT**

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The integration of Artificial Intelligence (AI) into drug discovery and development is revolutionizing the pharmaceutical industry worldwide, with profound implications for India's rapidly growing pharma sector. AI-driven technologies, such as machine learning (ML), deep learning, and natural language processing, are accelerating target identification, molecular design, and predictive modeling of drug behavior. These innovations significantly reduce the time, cost, and attrition rates associated with traditional R&D pipelines. In silico methods powered by AI are enabling de novo drug design, virtual screening, and lead optimization with increased precision. Predictive algorithms are also enhancing ADMET (Absorption, Distribution, Metabolism, Excretion, and Toxicity) profiling and facilitating drug repurposing strategies — a particularly valuable approach in resource-constrained environments. For Indian pharmaceutical companies, the adoption of AI offers an opportunity to leapfrog traditional bottlenecks and establish leadership in generics, biosimilars, and novel therapies. AI can also support compliance with global regulatory standards through automated quality control, process optimization, and pharmacovigilance. However, challenges such as data quality, regulatory uncertainty, limited technical expertise, and the need for robust digital infrastructure persist. Collaboration between academia, startups, and the pharmaceutical industry, alongside supportive policy frameworks, will be essential to fully realize AI's potential in India. This explores key applications, recent advancements, and future directions of AI in drug design and development, highlighting case studies relevant to the Indian context. As AI matures, it promises to transform drug development from a linear process into an agile, data-driven, and patient-centric paradigm.

**Keywords:** Artificial Intelligence, Drug Discovery, Machine Learning, Indian Pharmaceutical Industry, ADMET, Drug Repurposing, In Silico Modeling, Pharmacovigilance, Process Optimization, Deep Learning.

**AI-102**

**AI CHATBOTS FOR PATIENT COUNSELING IN COMMUNITY PHARMACY**

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Artificial Intelligence (AI) is rapidly transforming the healthcare sector, including community pharmacy practice. This project explores the development and educational use of an AI-based chatbot designed to assist in patient counseling byaddressing basic drug-related queries. Aimed at second-year pharmacy students, the chatbot prototype functions as a virtual assistant capable of answering common questions regarding drug dosage, indications, side effects, storage, and possible interactions. Built using a simple rule-based logic and natural language processing framework, the chatbot offers responses inan easy-to-understand format aligned with pharmacy standards. This hands-on prototype enables students to simulate real-life counseling scenarios, helping them improve their communication skills and pharmacological understanding. It also introduces future pharmacists to digital innovations in healthcare, preparing them for tech- integrated practice. Theuse of such tools can improve medication adherence, reduceerrors, and support better health outcomes in the community. The project highlights the potential of AI in bridging the gap between academic learning and real-world pharmacy practice. With future improvements, the chatbot can be expanded to handle more complex queries and multiple languages, making it a valuable tool for both learning and patient support.

**Keywords:** AI Chatbot, Patient Counseling, Community Pharmacy, Pharmacy Education, Drug Use.

**AI-103**

**ARTIFICIAL INTELLIGENCE IN DRUG DISCOVERY**

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Drug development is a process that demands huge investment of resources and time with only 1 drug candidate successful in reaching market among 10,000 screened taking time duration of 10-15 years and millions of dollars. This high attrition rates discourage investors and researchers. The pharmaceutical industry is shifting its attention away from de novo drug research and towards discovering novel targets and indications for already-approved drugs. In order to accelerate the drug development process with reduced risk of failure and relatively lower costs, pharmaceutical companies have adopted AI-driven drug discovery. A combination of synthesis planning and ease of synthesis is feasible and more and more automated drug discovery by computers is expected in the near future. This field is driven particularly by artificial neural networks like deep neural networks or recurrent networks. It plays a crucial role in drug screening by predicting ADME properties (absorption, distribution, metabolism, and excretion), physicochemical properties, and more. AI enhances the drug design process by improving the efficiency and accuracy of predicting drug behavior, interactions, and properties. Artificial intelligence in DE NOVO design drives the generation of meaningful new biologically active molecules towards desired properties. Artificial intelligence (AI) has the potential to revolutionize the drug discovery process, offering improved efficiency, accuracy, and speed.

**Keywords:** Drug design, Drug development, Neural networks, Drug screening, Toxicity prediction, ADME properties, DE NOVO design.

**AI-104**

**INTEGRATING AI WITH PHARMACOGENOMICS TO OVERCOME TREATMENT CHALLENGES IN BREAST CANCER: AI-DRIVEN PHARMACOGENOMICS IN CLINICAL MANAGEMENT TUMOR HETEROGENEITY AND DRUG RESISTANCE IN INVASIVE DUCTAL CARCINOMA (IDC).**




ISBN: 978-81-980623-8-3

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IDC is a malignant tumor that begins in the milk ducts of the breast and invades the surrounding breast tissue. BRCA1 and BRCA2 are tumor suppressor genes, which means their normal function is to repair DNA damage and maintain genetic stability and when these genes are mutated, they lose their DNA repair function, allowing harmful mutations to accumulate in breast cells, which can lead to cancer development. Breast cancer is the most common cancer among Indian women. IDC accounts for ~80% of all breast cancer cases in India. The age-standardized incidence rate (ASIR) of breast cancer in India is approximately 25–30 per 100,000 women. Ai base pharmacogenomic are clinical management of tumor heterogeneity, tumor mutation burden, and chemotherapy resistance such as MDR, DNA repair, Apoptosis resistance and hormone therapy mutation such as ER mutation and targeted mutation are HER2-positive breast cancer and epigenetic changes. AI-based pharmacogenomics integrates genomic data with machine learning to predict which patients are likely to experience severe toxicity — enabling safer, personalized cancer treatment. AI-Based Pharmacogenomics Works in Personalization of IDC Treatment in Patient-Specific Genomic & Transcriptomic Profiling, Personalized Drug Selection, Personalized Dosing Strategy, Monitoring and Adaptive Therapy. Ai base pharmacogenomic can help multi-omics data integration, identification of resistance markers, drug sensitivity prediction, targeting CME components and real time monitoring & adaptation. The monitor AI based pharmacogenomic Tool in IDC: set up continuous data feeds, key biomarkers to monitor in IDC, ai model monitoring metrics, dashboards and visualization tools, feedback loop & Decision Making.

**AI-105**

## PHARM PROBE: AN AI-DRIVEN APP FOR STRUCTURED ADR REPORTING AND REAL-TIME PHARMACOVIGILANCE

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Pharm Probe is an iOS pharmacovigilance application built with Swift UI that streamlines Adverse Drug Reaction (ADR) reporting to enhance public healthcare safety. Designed for pharmacists and citizens, the app enables structured ADR submission through guided digital forms capturing essential data, including patient age, drug details, dosage, symptom onset, manufacturer, and location. The platform automatically categorizes and organizes reports in real-time by drug type, adverse effects, geographic location, and demographic groups, providing clear insights for pharmaceutical companies and regulatory bodies monitoring drug safety. An integrated AI chatbot powered by DeepSeek API offers users personalized advice by analyzing their symptoms, age, and medication information, delivering accessible guidance in simple language. Emphasizing user-first design, Pharm Probe bridges the critical gap between ADR experiences and actionable healthcare insights. The app empowers both rural and urban pharmacists with efficient reporting tools while enabling citizens to receive timely medical guidance. Its accessibility-focused approach ensures diverse populations can contribute to medication safety monitoring. By creating structured feedback loops between patients, healthcare providers, and regulatory stakeholders, Pharm Probe transforms traditional ADR reporting into a comprehensive, real-time safety network. This streamlined approach promotes safer medication practices across communities while providing pharmaceutical companies and government agencies with valuable data for evidence-based decision-making.

**Keywords:** Pharmacovigilance, Adverse Drug Reaction, Mobile Health Application, SwiftUI, DeepSeek AI, Geolocation-based Reporting, Drug Safety Monitoring, Healthcare Accessibility, Digital Health Solution.

**AI-106**

## AUTOMATION AND ROBOTICS IN ANALYTICAL METHOD DEVELOPMENT: REDUCING HUMAN ERROR AND ENHANCING COMPLIANCE

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This poster highlights the transformational role of automation and robotics in analytical method development. It details how these technologies reduce the potential for human error, support rigorous compliance, and foster efficient, high-quality method establishment. Use cases and industry examples will demonstrate the tangible benefits of this technological shift, emphasizing its key role in delivering safer, more reliable pharmaceuticals to market.Method development done manually is often prone for variability, inconsistencies, and inadvertent mistakes which can compromise data integrity and delay progress in new drug development. Automation and robotic solutions address these challenges by delivering precise and repeatable operations, including sample handling, reagent dispensing, instrument tuning, and data acquisition. Automated platforms standardize procedures leads to highly reproducible results and robust analytical methods. Robotics works round-the-clock to unattended operation, ensuring consistent application of protocols while significantly boosting laboratory productivity. Additionally, these technologies timelessly integrate with digital records, and compliance software, facilitating real-time tracking, audit trails, and electronic documentation—essential requirements for meeting stringent regulatory guidelines.

**AI-107**

## AUGMENTING PHARMACY EDUCATION WITH ARTIFICIAL INTELLIGENCE AND IMMERSIVE TECHNOLOGIES FOR BETTER CONCEPTUAL CLARITY FROM THEORY TO PRACTICE

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The incorporation of Artificial Intelligence (AI) and immersive technologies like Augmented Reality (AR) and Virtual Reality (VR) can transform pharmacy education by bridging the gap between theory and practice. Traditional teaching and learning approaches have limitations in delivering clarity for complex pharmaceutical concepts. AI-driven platforms enable personalized adaptive learning, feedback, and predictive analytics, while AR and VR provide interactive 3D environments that simulate real-world scenarios of pharmaceutical processes, compounding techniques, and clinical settings. These innovations enhance visualization, foster experiential learning, and develop problem-solving and decision-making skills among pharmacy students. Additionally, immersive technologies support remote and collaborative learning, improving accessibility and engagement. This paper focuses on innovative strategies, implementation frameworks, and evidence demonstrating the impact these technologies have on teacher-learner engagement, conceptual understanding, and competency-based outcomes. Adoption of AI and immersive tools aligns with Education 4.0, preparing future pharmacists for an increasingly technology-driven healthcare ecosystem for better outcomes.

**Keywords:** Artificial Intelligence, Augmented Reality, Virtual Reality, Pharmacy Education, Conceptual Clarity, Education 4.0.

**AI-108**

## AI-DRIVEN BIOMARKER INTELLIGENCE FOR PREDICTING TOXICITY AND QUALITY OF LIFE IN CERVICAL CANCER PATIENTS UNDERGOING CONCURRENT CHEMOTHERAPY – A PROSPECTIVE INTERVENTIONAL STUDY

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Cervical cancer patients on concurrent chemotherapy often face severe toxicities and reduced quality of life (QoL). Conventional monitoring identifies complications late, limiting timely care. Novel biomarkers (IL-6, CRP, GST, XRCC1) offer predictive value, and integrating Artificial Intelligence (AI) with biomarker data enables real-time forecasting of toxicity and QoL decline, supporting precision oncology and proactive pharmacist-led interventions. 1. To integrate novel biomarkers (IL-6, CRP, GST polymorphisms) with AI-assisted predictive modelling for early identification of high-risk patients prone to chemotherapy-related toxicities. 2. To compare the effectiveness of AI-supported pharmacist




ISBN: 978-81-980623-8-3

interventions in improving QoL recovery and reducing toxicity incidence between Group A (Carboplatin) and Group B (Paclitaxel + Carboplatin). A prospective interventional study was conducted on 342 patients (Stage I–IVA cervical cancer) divided into two groups: Group A (N=178) received Carboplatin 300 mg/m², while Group B (N=164) received Paclitaxel 175 mg/m² + Carboplatin. Biomarker levels (IL-6, CRP, GST polymorphisms) were assessed at baseline, mid-cycle, and post-treatment. AI-assisted platforms (scikit-learn–based BioMarkerNet® and OncoPredict AI®) integrated biomarker trends with QoL scores (EORTC QLQ-C30 & CX-24) and toxicity grading (CTCAE v5.0) to generate real-time risk alerts. Pharmacists acted on AI alerts through dose modifications, supportive therapy, and personalized patient counseling. Group A (Carboplatin): AI predicted hematological toxicities with 90% accuracy. High IL-6 and CRP correlated with anemia and thrombocytopenia. AI-guided interventions led to a 30% reduction in Grade 3/4 hematological toxicities and an 18% improvement in post-treatment QoL recovery compared to standard monitoring. Group B (Paclitaxel + Carboplatin): AI achieved 94% accuracy in predicting gastrointestinal and neuropathic toxicities.

**Keywords:** Cervical cancer, Concurrent chemotherapy, Artificial Intelligence, Novel biomarkers, IL-6, CRP, Quality of Life, Toxicity, Precision Oncology.

**AI-109**

## SMART AI HEALTH CARD: A GLOBAL APPROACH TO INTEROPERABLE AND AI-ENABLED HEALTHCARE IDENTITY

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Healthcare systems worldwide remain fragmented, with national health IDs (e.g., ABHA, NHS, EHIC) lacking global interoperability, predictive intelligence, and offline emergency readiness. This gap creates challenges for cross-border care, medical tourism, and emergency response. We propose a Smart AI Health Card (Global Version)—a universally interoperable, AI-enabled health identity system. Designed with HL7 FHIR, ICD-11, SNOMED CT, and LOINC standards, the card integrates patient demographics, medical history, diagnostics, and prescriptions. It ensures security through blockchain-based audit trails and patient-controlled consent compliant with GDPR, HIPAA, and global data regulations. The system embeds AI-driven models for predictive healthcare, including early disease risk detection, adherence monitoring, and adverse drug reaction (ADR) alerts. Its emergency-first design supports QR/NFC-based offline access to critical health data, with multilingual translation for global usability. Pilot implementations across multiple countries will test interoperability, emergency utility, insurance validation, and patient experience. Expected outcomes include reduced duplication of investigations, improved emergency response, enhanced continuity of care, and a framework for universal health identity adoption under global agencies like WHO.

**Keywords:** Global Health Identity, Interoperability, Blockchain, Predictive Analytics, Emergency Readiness, Continuity of Care.

**AI-110**

## ARTIFICIAL INTELLIGENCE IN PHARMACOVIGILANCE: AN OVERVIEW

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Pharmacovigilance is essential for monitoring, detecting, and preventing adverse drug reactions (ADRs) to ensure drug safety and protect public health. Conventional approaches rely on manual data review and reporting, which can be labor-intensive and slow in identifying potential safety signals. AI techniques, especially machine learning (ML) and natural language processing (NLP), allow for the rapid analysis of large and diverse datasets, such as electronic health records, spontaneous reporting systems, literature databases, and social media. These technologies can automate case triage, improve signal detection, and support predictive modeling for ADR risk assessment. As healthcare data grows exponentially, AI has become a powerful tool to improve pharmacovigilance efficiency and accuracy. Additionally, near real-time surveillance is made possible by AI-driven systems, which promotes better decision-making and early interventions. Implementation issues still exist, nevertheless, including data heterogeneity, algorithm transparency, regulatory approval, and patient privacy ethics. The present state of AI in pharmacovigilance, its real-world uses, and its possible future paths are described in this overview. Drug safety monitoring might become a more proactive, accurate, and patient-centered procedure with the integration of AI, robust regulatory frameworks, and interdisciplinary cooperation. AI is predicted to play a bigger part in pharmacovigilance as it develops, promoting global medication safety and enhancing patient outcomes.

**Keywords:** Artificial Intelligence, Pharmacovigilance, Adverse Drug Reactions, Machine Learning, Drug Safety.

**AI-111**

## EMERGING OF ARTIFICIAL INTELLIGENCE AND TECHNOLOGY IN PHARMACEUTICALS REVIEW

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Background: This review examines the growing role of artificial intelligence (AI) in drug development, outlining recent breakthroughs achieved through its integration into pharmaceutical research. Advances in computing have revolutionized all scientific fields – from engineering to medicine- positioning AI as a vital tool in pharmaceutical chemistry and healthcare innovations. Main body: AI-driven drug development has increasingly replaced traditional methods, offering faster timeliness and greater precision in drug design. Through efficient identification of target proteins, AI enhances the success rate of new therapeutics. Its application spans every stage of the drug design pipeline, reducing development costs and minimizing preclinical health risks. By harnessing extensive pharmaceutical datasets and employing machine learning algorithms, I provide powerful data-mining capabilities, enabling deeper insights and more effective decision- making in modern drug discovery.

**Keywords:** Artificial intelligence, drug development, pharmaceutical research, computing medicine, HealthCare innovation

**AI-112**

## RECURABOT: AI-POWERED SYMPTOM ASSESSMENT AND CLINICAL COUNSELLING TOOL FOR PHARMACY AND HEALTHCARE PRACTICE

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Artificial intelligence (AI) is transforming pharmacy and clinical practice by making healthcare more accessible and patient-focused. RecuraBot is an innovative AI-powered healthcare assistant designed for use in pharmacies, clinics, and rural health programs. Based on patient-reported symptoms and optional CBC (Complete Blood Count) data, RecuraBot provides a quick and structured primary assessment that highlights possible diagnoses, underlying causes, preventive steps, and therapeutic options aligned with real-world pharmacy practice. The platform is built on a Flask-based Python backend, powered by a hybrid AI engine that combines a medical knowledge base with generative AI. Its dual workflow sets it apart; the first layer delivers concise, evidence-based recommendations for rapid triage, while the second layer offers an intelligent counseling mode that uses the patient's existing case data to provide deeper, conversational guidance clarifying treatment approaches and addressing patient concerns without repetition. RecuraBot supports offline use, PDF export, and multiple UI modes, making it highly adaptable for busy pharmacies, outreach clinics, and training institutions. It focuses on pharmacy-relevant information such as medicine classifications, over-the-counter options, and expert counseling points, unlike generic symptom checkers. Pilot studies have demonstrated high usability, precise condition mapping, and improved patient satisfaction through smooth transitions between quick triage and in-depth counseling. Aligned with India's National Digital Health Mission, RecuraBot delivers a scalable and affordable AI solution that bridges digital diagnostics with personalized pharmacy care, strengthening the role of pharmacists and clinicians as frontline health providers across urban and rural communities.

**Keywords:** AI healthcare assistant, CBC integration, patient counselling, pharmacy support, telemedicine.




ISBN: 978-81-980623-8-3

**AI-113**

**HARNESSING AI AND ML TO TRANSFORM CLINICAL RESEARCH: ENHANCING SPEED, ACCURACY, AND PATIENT-CENTRICITY**

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Artificial Intelligence (AI) and Machine Learning (ML) are reshaping the landscape of clinical research by offering innovative solutions to longstanding challenges across the trial lifecycle. From accelerating drug discovery to improving patient engagement, these technologies are enabling more efficient, data-driven, and patient-centric approaches. In early-stage research, AI expedites target identification and drug candidate screening by analyzing large-scale genomic, proteomic, and chemical datasets. ML models simulate compound behavior, reducing reliance on extensive lab testing and minimizing early-stage attrition. In trial design, AI supports adaptive methodologies, control arm simulation, and protocol optimization—leading to cost-effective and faster trials. Patient recruitment and retention, a persistent bottleneck, are significantly enhanced by AI tools that leverage electronic health records (EHRs), registries, and natural language processing to identify suitable participants. Predictive analytics help proactively address dropout risks, thus maintaining participant engagement throughout the study.AI also enables real-time data monitoring, automated anomaly detection, and advanced analytics for timely insights. Integrated with wearables and digital health platforms, AI allows continuous patient monitoring and remote data capture. In pharmacovigilance, ML algorithms detect adverse events from diverse data sources, improving safety signal identification and regulatory compliance. Additionally, AI strengthens inspection readiness by ensuring structured, validated, and traceable data systems aligned with Good Clinical Practice (GCP) and regulatory expectations. This presentation will explore real-world applications, success metrics, and implementation strategies that demonstrate how AI/ML are driving digital transformation in clinical research. It aims to provide attendees with practical insights to adopt and scale AI in their own clinical development environments.

**Keywords:** Artificial Intelligence (AI), Machine Learning (ML), Clinical Research, Patient Recruitment, Digital Transformation.

**AI-114**

**AI-ENABLED SELFIE MEDICINE: A NOVEL APP FOR REAL-TIME MEDICATION ADHERENCE VERIFICATION**

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Medication non-adherence remains a critical barrier to effective treatment outcomes in chronic and infectious diseases such as tuberculosis, HIV, and hypertension. Traditional solutions like Directly Observed Therapy (DOT) improve adherence but are resource-intensive, intrusive, and difficult to scale. Digital adherence technologies, including reminder apps and smart pill bottles, provide partial solutions but often fail to guarantee that the medication is ingested. To design and prototype a mobile application that ensures adherence by combining automated reminders with live selfie verification, where the reminder will not stop until the patient uploads a real-time photo/video confirming ingestion.

**Keywords:** Medication adherence, Selfie medicine, Artificial intelligence, Digital therapeutics, Mobile health, Patient monitoring.

**AI-115**

**AI-POWERED PERSONALIZED MEDICINE: REDEFINING THE FUTURE OF PHARMACY PRACTICE.**

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Artificial intelligence (AI) is emerging as a transformative force in personalized medicine, offering new possibilities for safer, more effective, and patient-specific therapies. By combining genomics, big data, and predictive analytics, AI enables pharmacy practice to move beyond “one-size-fits-all” treatment and towards truly individualized care. This topic highlights the role of AI in interpreting genomic data, predicting drug responses, and optimizing pharmacotherapy for each patient. Machine learning algorithms are accelerating drug discovery pipelines, while clinical decision-support systems are assisting pharmacists in tailoring drug selection, dose adjustments, and therapy monitoring. Educationally, AI-driven platforms are training future pharmacists in precision medicine, fostering genomic literacy, and equipping professionals with the skills required to integrate advanced technologies into patient care. From academic learning to real-world practice, AI empowers pharmacists to bridge the gap between technology and therapeutic decision-making. On the patient side, AI enhances empowerment through mHealth applications, wearable devices, and tele pharmacy services, allowing real-time monitoring, medication adherence tracking, and personalized health recommendations. These innovations strengthen patient engagement, improve safety, and expand access to care across diverse populations. The also addresses challenges including data privacy, ethical implementation, and equitable access, emphasizing the need for responsible integration of AI into healthcare systems. By redefining pharmacy through AI-powered personalized medicine, this presentation demonstrates how innovation can translate into global health equity, professional empowerment, and improved patient outcomes.

**Keywords:** Artificial Intelligence, Personalized Medicine, Pharmacogenomics, Digital Health, Precision Pharmacy, Patient Empowerment.

**AI-116**

**ARTIFICIAL INTELLIGENCE IN DIABETES MANAGEMENT: ADVANCEMENTS, OPPORTUNITIES AND CHALLENGES**

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The increasing prevalence of diabetes, high avoidable morbidity and mortality due to diabetes and diabetic complications, and related substantial economic burden make diabetes a significant health challenge worldwide. A shortage of diabetes specialists, uneven distribution of medical resources, low adherence to medications, and improper self-management contribute to poor glycemic control in patients with diabetes. Recent advancements in digital health technologies, especially artificial intelligence (AI), provide a significant opportunity to achieve better efficiency in diabetes care, which may diminish the increase in diabetes-related health-care expenditures. Here, we review the recent progress in the application of AI in the management of diabetes and then discuss the opportunities and challenges of AI application in clinical practice. Furthermore, we explore the possibility of combining and expanding upon existing digital health technologies to develop an AI-assisted digital health-care ecosystem that includes the prevention and management of diabetes.

**Keywords:** diabetes, artificial intelligence, digital health, management.

**AI-117**

**FORMULATION AND EVALUATION OF AI-ASSISTED NANOEMULSION FOR ENHANCED DRUG DELIVERY**

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Poorly water-soluble drugs pose a challenge in pharmaceutics due to low bioavailability, necessitating novel delivery systems like nanoemulsions. Nanoemulsions enhance drug solubility, stability, and bioavailability through nanometer-sized droplets. However, conventional formulation involves trial-and-error, consuming time and resources. AI models like Random Forest and Artificial Neural Networks (ANNs) can predict outcomes like droplet size, PDI, and entrapment efficiency by learning from formulation data, enabling rational design. Formulated stable nanoemulsions using ultrasonication for a poorly soluble drug and Build AI models to predict droplet size, PDI, and % entrapment based on formulation variables to minimize experimentation by using predictive


ISBN: 978-81-980623-8-3

modeling. Developed Formulation using curcumin or itraconazole, Choose oil (caprylic triglyceride), surfactant (Tween 80), and co-surfactant (ethanol). Prepare nanoemulsions via ultrasonication, varying Oil: surfactant:co-surfactant ratios, Ultrasonication time and amplitude and Stirring speed. Characterized by Droplet size and PDI using Dynamic Light Scattering (DLS), Entrapment efficiency via centrifugation and UV-spectrophotometry and Stability assessment over 30 days.Significantly This project equips with skills in formulation design, nanotechnology, and practical AI integration, preparing them for advanced research and industry roles in formulation development. A stable nanoemulsion with optimized droplet size (<200 nm) and low PDI and Reduction in time and materials by AI-guided formulation

**Keywords:** AI-assisted formulation, Nanoemulsion drug delivery, poorly water-soluble drugs, Bioavailability enhancement, Ultrasonication technique, Predictive modeling (ANN, Random Forest), Entrapment efficiency, Droplet size optimization (<200 nm, PDI), Dynamic Light Scattering (DLS), Nanotechnology in pharmaceutics.

**AI-118**

## AN AI INTEGRATED FRAMEWORK FOR PREDICTING IMPURITIES AND GENOTOXICITY UNDER ICH STRESS CONDITIONS

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In the pharmaceutical industry, accurately predicting impurities and their potential genotoxicity is crucial for drug development and regulatory compliance. Current methods often involve separate, time-consuming experiments for each stress condition, leading to a fragmented and lengthy process. This work introduces an innovative, integrated artificial intelligence (AI) framework designed to streamline this process by simultaneously predicting potential impurities and assessing their genotoxicity, all under a single, unified platform. Our framework utilizes a hybrid approach, combining a rule-based model to capture fundamental chemical transformations with a machine learning module to predict impurity structures from a parent drug's SMILES notation under various ICH stress conditions, thus addressing the common challenge of limited training data. The predicted impurities are then passed to pre-trained genotoxicity models, such as those based on the Ames test and other DeepTox predictions, to comprehensively evaluate their potential for causing genetic damage. This integrated step provides a rapid, high-throughput screening mechanism. A key feature of this system is the integration of explainability using techniques like SHAP (Shapley Additive EXplanations), providing clear, visual insights into the model's predictions and building user trust in the AI-driven results. We validated our framework using real-world case studies, including the drug Dapagliflozin, and compared our predictions with existing literature. The results demonstrate the framework's ability to efficiently and accurately identify potential impurities and their genotoxic risk. This integrated, explainable approach represents a significant step forward, offering a powerful tool for pharmaceutical scientists to accelerate impurity profiling and risk assessment, ultimately leading to safer and more efficient drug development. This work is, to our knowledge, the first to present an integrated AI framework for this specific purpose.

**Keywords:** AI Framework, Impurity Prediction, Genotoxicity Drug, Development, ICH Guideline and Explainability.

**AI-119**

## ARTIFICIAL INTELLIGENCE IN PREDICTING DRUGS' METABOLISM AND EXCRETION: ADVANCES AND CHALLENGES

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The efficacy and safety of therapeutic candidates are largely determined by drug metabolism and excretion, and anticipating these processes is a critical component of drug discovery and development. With the promise to expedite drug research and increase clinical success rates, artificial intelligence has become a valuable tool for forecasting drug metabolism and excretion in recent years. Recent developments in AI–based medication metabolism and excretion prediction, such as deep learning and machine learning techniques, are highlighted in this study. Examine potential future directions in the subject and talk about the difficulties in creating AI models for drug ug and excretion prediction. Drug discovery, preclinical research, clinical trials, and regulatory y approval are all steps in the intricate process of drug development. Because they establish the ideal dosage, mode of administration, and safety of a medicine in the body, pharmacokinetics and pharmacodynamics are essential components of drug development. Pharmacokinetics and pharmacodynamics investigations using traditional experimental methods can be costly and time-consuming, and they might not always yield reliable forecasts of a drug's safety and efficacy. Studies on pharmacokinetics and pharmacodynamics have historically been carried out through experimental techniques like animal research and human clinical trials. Furthermore, the pharmacokinetics and pharmacodynamics of drugs in humans may not always be accurately predicted by this research. AI has demonstrated enormous promise in the domains of drug development, pharmacokinetics, and pharmacodynamics. with the development of machine learning techniques and sophisticated computing. AI has become a useful tool for forecasting and improving the pharmacokinetics and pharmacodynamics of drugs

**Keywords:** Drug metabolism, artificial intelligence, drug excretion.

**AI-120**

## FROM DATA TO SAFETY: AI-DRIVEN INNOVATIONS IN MATERIOVIGILANCE SYSTEMS

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Materiovigilance, the systematic monitoring and evaluation of adverse events associated with medical devices, is a rapidly evolving discipline aimed at ensuring device safety and effectiveness. With the increasing complexity and widespread use of medical devices, traditional methods of materiovigilance often face challenges such as under reporting, delayed detection of device-related risks, and the inability to manage large volumes of heterogeneous data. In this context, Artificial Intelligence (AI) has emerged as a transformative tool to strengthen materiovigilance systems. AI techniques, particularly machine learning, natural language processing, and predictive analytics, enable efficient analysis of electronic health records, maintenance logs, clinical trial data, and patient feedback to identify potential device-related adverse events. Furthermore, AI facilitates real-time monitoring of connected devices through the integration of Internet of Things (IoT) technologies, allowing proactive detection of device malfunctions and anomalies. Predictive models can support preventive maintenance and risk mitigation, thereby enhancing patient safety. Additionally, AI-driven automation reduces manual workload, increases accuracy in data extraction and signal detection, and assists regulatory authorities in faster decision-making regarding recalls and safety alerts. Despite these advantages, challenges such as data standardization, algorithm transparency, cybersecurity, and ethical concerns remain significant barriers to widespread adoption. Nevertheless, with continued advancements, AI is expected to play a pivotal role in modern materiovigilance by improving efficiency, early signal detection, and regulatory compliance, ultimately ensuring safer healthcare delivery.

**Keywords:** Artificial Intelligence, Materiovigilance, Medical Devices, Adverse Events, Patient Safety.

**AI-121**

## AI IN PHARMACY

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Artificial Intelligence (AI) has emerged as a transformative tool in the field of pharmacy, offering innovative solution across different field like drug discovery, development, clinical trial, patient care and analyzing data. AI accelerates drug discovery by predicting molecular target, screening compounds and designing new molecule and helps in


ISBN: 978-81-980623-8-3

repurposing of existing drug. In clinical trial, AI modernizes patient recruitment and improves trial outcome. Pharmacy practice aids from AI through personalized medicine, drug-drug interaction prediction, and pharmacovigilance systems that detect adverse reactions earlier. AI enhances drug formulation, optimizes manufacturing processes, and ensures quality control. With the help of AI targeted protein can also be conveniently identified. AI help to predict gene target micro-RNA, to know the phenotype of the cell. AI played a vital role during the COVID-19 pandemic in accelerating vaccine and drug research by predicting viral protein structures and testing virtual compounds. AI optimizes trial design by identifying suitable patient populations through analysis of electronic health records (EHRs), genetic data, and real-world evidence. AI also monitors patient adherence and adverse effects during trials through wearable devices and mobile health applications. AI integrates complex datasets such as genomic sequences, lifestyle habits, and clinical history to predict how patients will respond to specific drugs. In Pharmacogenomics, the study of how genes influence drug response, is greatly enhanced by AI, as algorithms can identify genetic biomarkers and match patients with the most effective therapies. In the context of Quality by Design (QbD), AI supports process control and ensures batch-to-batch consistency. Predictive models assist in scaling up production while maintaining quality standards. For instance, neural networks have been applied to optimize nanoparticle formulations, controlled-release tablets, and biologics manufacturing processes. In inventory and supply chain management AI models predict demand trends by analyzing historical sales, seasonal variations, and disease outbreaks.

**Keywords:** Artificial Intelligence (AI), Clinical trials, Drug Discovery, Pharmacovigilance, Adverse Drug Reaction.

**AI-122**

**SYNAPSE: A GAMIFIED MICROLEARNING PLATFORM FOR MEDICAL EDUCATION**

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Digital short-form media's sudden rise has drastically changed learning methods globally, although short-form videos in medicine are yet to be fully adopted. There is still primary reliance on the traditional, text-heavy, and lengthy materials in medical education. With styles of TikTok and Instagram in mind, Synapse brings the fully credible and academically-rigid innovative mobile application. The app does not accept any form of long videos; instead, it accepts short medical reels, infographics, and interactive case studies. Moreover, this content is only developed by duly certified doctors, pharmacists, and healthcare specialists. This feature guarantees valid and high-quality content and also guards against any form of misinformation. Users can track topics across different fields of specialties, enjoy engaging medical snippets, and check their understanding immediately through quizzes attached to every reel. Synapse keeps users engaged through gamification: users gain experience points, unlock badges, keep streaks, and move up the leaderboards through both their activities and quiz results. This dynamic turns passive viewing into active engagement, encouraging recall and retention. In addition to supporting individual users, Synapse encourages collaborative learning in which students can tackle real-world cases, experts can impart advanced knowledge, and educational institutions can use the app as an auxiliary teaching platform. Synapse combines entertainment and advanced medicine, shifting the aimless scrolling students do daily to a form of meaningful microlearning. This resolves students' need to retrieve information quickly from medical books to be engaged, interactive, and medical information to be memorable. Synapse is a model worth emulating for modern medical education as it matches serious discipline with the digital world while upholding all medical standards.

**Keywords:** Medical education, microlearning, artificial intelligence, medical reels, social learning.

**AI-123**

**MACHINE LEARNING MODELS TO OPTIMIZE DOSE SELECTION IN HYPERTENSIVE PATIENTS**

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Hypertension is a major chronic condition worldwide, yet patient responses to antihypertensive therapy vary greatly, leading to risks of under-treatment or adverse drug reactions with conventional dosing. Artificial intelligence (AI) and machine learning (ML) offer opportunities to personalize therapy by integrating multiple clinical and demographic factors. The objective is to develop and evaluate ML models for predicting optimal dose categories of antihypertensive drugs. Methodology includes publicly available datasets containing patient records with blood pressure responses were preprocessed to extract features such as age, sex, body mass index (BMI), baseline systolic/diastolic blood pressure, and comorbidities. Data were divided into training and testing sets (80:20), and logistic regression, decision tree, and random forest models were implemented. Model performance was assessed using accuracy, precision, recall, and ROC-AUC, and feature importance analysis was conducted. Random forest achieved the highest predictive performance, with baseline systolic blood pressure and BMI identified as the most significant predictors of dose requirement. The study concludes that AI-driven dose optimization can support clinicians in tailoring antihypertensive therapy, reduce adverse events, and empower evidence-based clinical decision making.

**Keywords:** Hypertension; Personalized dosing; Machine learning; Clinical decision support; Artificial intelligence.

**AI-124**

**AI AND MACHINE LEARNING (ML) IN ANTIBIOTIC STEWARDSHIP**

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A major threat to world health is antimicrobial resistance (AMR), which reduces the effectiveness of medications and raises patient morbidity, mortality, and medical expenses. Programs for antibiotic stewardship (ABS) are crucial for maximizing the use of antibiotics; yet, traditional methods have trouble anticipating patterns of resistance, guaranteeing prompt diagnosis, and directing targeted treatment. Predictive analytics, precision prescribing, and real-time surveillance are made possible by artificial intelligence (AI) and machine learning (ML), which have emerged as viable methods to reinforce ABS. With an emphasis on their roles in resistance prediction, diagnostic improvement, optimal antibiotic selection, and treatment monitoring, this paper attempts to assess the uses of AI and ML in antibiotic stewardship. Highlighting new developments, evaluating clinical results, and talking about obstacles to routine integration are the goals. Better surveillance of resistance epidemiology, more treatment precision, decreased inappropriate antibiotic use, and improved patient safety have all been linked to these advancements. In conclusion, fast, data-driven interventions made possible by AI and ML have the potential to revolutionize antibiotic stewardship. Their collaboration with clinical knowledge provides a route to better patient outcomes and efficient AMR control.

**Keywords:** Artificial intelligence, Machine learning, Antibiotic stewardship, Antimicrobial resistance, Clinical decision support.

**AI-125**

**REGULATORY CONSIDERATIONS FOR THE DEVELOPMENT OF SUGAR-BASED WOUND DRESSING**

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This research explores the development and regulatory consideration of a novel sugar-Based nanofiber wound dressing. Using a spinneret (cotton candy) machine, Nanofibers are fabricated from a blend of sucrose, maltodextrin and polymeric Excipients such as PVP and HPMC. These nanofibers are loaded with antimicrobial Agents, either turmeric or crystal violet, and further processed into flexible, adhesive Wound dressings. The dressings are comparable to conventional surgical dressings, but with enhanced bioactivity and cost-effectiveness. The study aims to address challenges in conventional wound management




ISBN: 978-81-980623-8-3

by offering a dressing that combines mechanical protection, antimicrobial action and biocompatibility. In vitro tests include drug release kinetics, antimicrobial activity Against staphylococcus aureus and *E. coli*. The results show a burst release followed by sustained drug delivery, effective bacterial inhibition and suitable surface wetting Characteristics. Crystal violet displayed higher antimicrobial efficacy, while turmeric Contributed to bioactivity with natural safety.

**Keywords:** Sugar-based nanofibers, Wound dressing, Antimicrobial agents, Biocompatibility.

**AI-126**

**Virtual Reality And Gamification As Therapeutic Tools For Mitigating Cognitive Impairment In Alzheimer's Disease**

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Alzheimer's disease is a progressive neurological disorder characterized by cognitive deterioration, memory deficits, and alterations in behaviour, posing substantial challenges for both patients and caregivers. Traditional behavioural therapies frequently encounter difficulties in sustaining patient involvement and compliance. Recent technical breakthroughs position Virtual Reality (VR) and gamification as novel approaches to improve cognitive rehabilitation in Alzheimer's care. Recent research indicate that VR-based cognitive therapies promote attention, working memory, and orientation in patients with Alzheimer's, while gamified training improves adherence and sustained engagement. Virtual reality offers immersive, interactive environments for AD patients to practice memory recall, spatial navigation, and daily living activities in secure, regulated settings. This immersive experience can improve neuroplasticity and engagement relative to conventional methods. Gamification incorporates game-based aspects like points, levels, awards, and progress tracking, thereby enhancing motivation and adherence, while rendering therapeutic sessions interesting and customised to the need of AD patents. These methods enhance cognitive function and increase emotional well-being by alleviating worry and promoting a sense of accomplishment thus improving quality of life of AD patients. Furthermore, these systems provide real-time performance monitoring, enabling therapists and caregivers to modify interventions according on patient need. In conclusion, the incorporation of virtual reality and gamification into behavioural therapy can prove a transformational, scalable, and patient-centric approach to Alzheimer's care. Future initiatives encompass therapeutic trials, ease of usability, patent friendly affordable and accessible systems.

**Keywords:** Alzheimer's disease, Cognitive rehabilitation, Virtual reality (VR), Gamification, Neuroplasticity, Patient engagement, Behavioural therapy.

**AI-127**

**NEXT-GENERATION ORAL DELIVERY OF GLICLAZIDE VIA NANO SPONGES -LOADED ODTS OPTIMIZED WITH AI**

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Gliclazide, a BCS class II sulfonylurea, suffers from poor aqueous solubility and variable oral bioavailability, used for the management of type 2 diabetes mellitus. Nano sponges, with their porous structure and high drug loading capacity, offer enhanced solubility and stability. Incorporation into orally disintegrating tablets (ODTs) further improves patient compliance and provides rapid drug onset. To overcome limitations of traditional trial-and-error optimization, artificial intelligence (AI) can be employed to predict formulation performance and accelerate development. Gliclazide Nano sponges were prepared using emulsion solvent diffusion method. The optimized Nano sponge formulation was compressed into ODTs with suitable supportive excipients. Evaluation included pre-compression, post-compression and drug release studies. AI models were trained on formulation datasets, correlating variables like polymer ratio, crosslinker concentration, super disintegrant level with outputs such as % entrapment efficiency, disintegration time, % drug release. Fourier Transform infrared (FT-IR) spectra studies represented no interaction between the drug and excipients. They were characterized for entrapment efficiency, *invitro* drug release, the formulation 5 (F5) was shown desirable results and it was selected for tablet compression, and the results were within pharmacopoeial limits. AI models successfully predicted formulation outcomes, with AI tool achieving highest accuracy and predicted results closely matched experimental values, reducing formulation trials by nearly 50%. The study demonstrates that AI-driven formulation of Nano sponges-loaded ODTs of gliclazide significantly improves solubility, dissolution, and patient convenience and this integrated Nano sponge–ODT–AI platform represents a promising strategy for enhancing oral delivery of poorly soluble drugs and supports future translation into large-scale, patient-centric diabetes therapy.

**Keywords:** Gliclazide, Nano sponges, Orally Disintegrating Tablets, Artificial Intelligences.

**AI-128**

**SMART AI HEALTH CARD: A GLOBAL APPROACH TO INTEROPERABLE AND AI-ENABLED HEALTHCARE IDENTITY**

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Healthcare systems worldwide remain fragmented, with national health IDs (e.g., ABHA, NHS, EHIC) lacking global interoperability, predictive intelligence, and offline emergency readiness. This gap creates challenges for cross-border care, medical tourism, and emergency response. We propose a Smart AI Health Card (Global Version)—a universally interoperable, AI-enabled health identity system. Designed with HL7 FHIR, ICD-11, SNOMED CT, and LOINC standards, the card integrates patient demographics, medical history, diagnostics, and prescriptions. It ensures security through blockchain-based audit trails and patient-controlled consent compliant with GDPR, HIPAA, and global data regulations. The system embeds AI-driven models for predictive healthcare, including early disease risk detection, adherence monitoring, and adverse drug reaction (ADR) alerts. Its emergency-first design supports QR/NFC-based offline access to critical health data, with multilingual translation for global usability. Pilot implementations across multiple countries will test interoperability, emergency utility, insurance validation, and patient experience. Expected outcomes include reduced duplication of investigations, improved emergency response, enhanced continuity of care, and a framework for universal health identity adoption under global agencies like WHO.

**Keywords:** Global Health Identity, Interoperability, Blockchain, Predictive Analytics, Emergency Readiness, Continuity of Care.

**AI-129**

**IMPACT OF AN ANTIMICROBIAL RESISTANCE INTERVENTIONAL STUDY ON PRESCRIPTION PATTERN AND GUIDELINE ADHERENCE IN THE GENERAL MEDICINE DEPARTMENT OF A TERTIARY CARE HOSPITAL USING AI-SUPPORTED MONITORING**

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Background: Antimicrobial resistance (AMR) is a growing global threat, largely fueled by inappropriate antibiotic use and poor adherence to clinical guidelines. Artificial Intelligence (AI)-assisted prescription monitoring offers real-time detection of irrational use and supports antimicrobial stewardship programs (ASPs). By integrating with electronic health records, AI can analyze prescription patterns, generate alerts for deviations, and provide decision support to prescribers. Such interventions not only improve guideline adherence but also reduce resistance trends and enhance patient safety. Aim and Objectives: 1. To evaluate the effectiveness of AI-assisted prescription monitoring in improving guideline adherence and reducing inappropriate antibiotic use in the general medicine department. 2. To assess the role of AI-supported antimicrobial stewardship interventions in minimizing antimicrobial resistance trends and enhancing patient safety. Methodology: A prospective interventional study was conducted on 150 inpatients over six months. Data collection occurred in two phases: pre-




ISBN: 978-81-980623-8-3

intervention (baseline 75 prescriptions) and post-intervention (75 prescriptions). AI-based prescription monitoring tools were integrated into the hospital electronic records to evaluate drug choice, dose, and duration against WHO, IDSA, NICE, and ICMR guidelines. The intervention included AI-driven prescription alerts, pharmacist feedback, and prescriber education. Post-intervention, prescriptions were reassessed for adherence and resistance trends. Statistical analysis was performed using Chi-square tests with $p < 0.05$ considered significant. Results: In the pre-intervention phase, only 44% of prescriptions adhered to guidelines, while 56% showed deviations with frequent use of broad-spectrum antibiotics. After AI-supported intervention, 66.6% adherence was achieved ($p = 0.017$), with a marked reduction in inappropriate broad-spectrum use. The proportion of cultures sent before antibiotic initiation improved from 24% to 41% ($p = 0.005$). Antimicrobial resistance declined from 24% to 12% of prescriptions ($p = 0.056$).

**Keywords:** Antimicrobial resistance, AI-supported monitoring, Guideline adherence, Prescription pattern, antimicrobial stewardship.

**AI-130**

## AI VS HUMAN JUDGMENT IN CARDIOVASCULAR ADVERSE DRUG REACTIONS (ADR) ASSESSMENT: INSIGHTS FROM THE NARANJO ALGORITHM

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The current research evaluated human and artificial intelligence (AI) for determining causality of cardiovascular adverse drug reactions (ADRs) using Naranjo algorithm as approach. The objective was to determine, the agreement between human and Claude AI in assessing ADR causality through case-by-case analysis. A total of 60 case reports published between 2022 and 2025 in various peer-reviewed journals were retrospectively analysed and agreement measured using Cohen's kappa. ADRs were categorised according to age, sex, severity, drug class, and preventability. Both ADRs and drugs were coded according to MedDRA. The findings showed that human reviewers classified ADRs as probable (83.3%), possible (13.3%), and definite (3.3%), while AI's classifications were slightly different: probable (85.0%), possible (11.7%), and definite (3.3%). A significant kappa value of 0.818 suggested 95% agreement between the two assessments. Statins were the frequently associated drugs, accounting for 35% of cases, particularly linked to musculoskeletal ADRs like rhabdomyolysis. There was a slight increase in reports among females (55%) compared to males (45%), with the highest incidence found in 65–74 age group. In terms of severity, the majority of cases were serious to severe, including 3 that were life-threatening and 2 that led to death. Overall, 95% of ADRs were preventable. Some rare ADRs included encephalopathy and drug-induced phospholipidosis. The results indicate that AI has a strong correlation with human evaluations of causality, highlighting its potential to reduce subjectivity, improve signal detection, and ultimately enhance patient safety in pharmacovigilance.

**Keywords:** Adverse drug reactions (ADRs), Naranjo algorithm, Artificial intelligence (AI), Cardiovascular drugs.

**AI-131**

## SPECTRAL INTELLIGENCE MEETS RURAL INDIA: HANDHELD, AI-ENHANCED SALIVA TESTING FOR HELICOBACTER PYLORI

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Helicobacter pylori remain highly prevalent in India and demands non-invasive, infrastructure-light diagnostics to extend access beyond endoscopy, urea breath testing, and laboratory stool antigen assays. The detection of H. pylori in saliva is possible by molecular and immunologic methods, although the results and methods differ between groups. Publications that use PCR in saliva report sensitivity and specificity that is clinically useful but still imperfect in comparison to gastric biopsy and composite standards. Meanwhile, antigen and antibody tests in saliva have shown moderate to high sensitivity in some studies, while in other studies they are associated with trade-offs in specificity. Label-free optical strategies, including vibrational spectroscopy and biosensing, can capture molecular signatures or binding interactions relevant to H. pylori in saliva; proof-of-concept work shows feasibility and highlights matrix-related challenges such as low organism load and potential inhibitory salivary components, underscoring the need for careful pre-processing and calibration. Building on these advances, this work proposes a handheld pathway that acquires spectra from a saliva-exposed disposable strip and applies embedded machine learning to classify infection status against a validated reference, targeting sub-10-minute, clinic-adjacent screening suited to rural programs. The development plan emphasizes standardized saliva collection, multi-site Indian cohorts, model training with internal cross-validation and external validation, and predefined performance targets aligned to use-case needs. By uniting non-invasive sampling, spectral readout, and onboard AI in a portable reader, this approach aims to pragmatically extend H. pylori screening capacity in resource-limited settings, contingent on rigorous clinical validation, quality systems, and linkage-to-care pathways.

**Keywords:** Helicobacter pylori, Saliva-based detection, Disposable test strips, Rural healthcare, Rapid screening.

**AI-132**

## LEVERAGING AI FOR PRECISION WEIGHT CONTROL AND ACCELERATED TABLET MANUFACTURING

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Variation in tablet compressed weight is controlled by pharmacopeial specifications and is mainly caused by powder flow, die fill, and compression dynamics; traditional sampling and visual inspection can overlook transient drifts and delayed corrective action. This paper describes an AI-supported control strategy that integrates multivariate sensor measurements from the tablet press (precompression/main compression force–displacement, feeder level, turret speed, vibration, temperature/humidity) with in line quality surrogates to control tablet mass and drive increased throughput. A rules-and stack includes: (1) MSPC to detect drift immediately; (2) soft sensor models forecasting tablet weight from press telemetry; (3) computer vision for dimensional and defect inspection on the conveyor; and (4) predictive maintenance models detecting die/punch wear and feeder maldistribution before they generate out of spec weights. The system recommends set point changes (e.g., fill cam, feeder speed, tamping pressure) with human oversight, concurring with QbD/PAT and real time release testing. For high mix runs, model adaptation takes advantage of recipe aware attributes (API/excipient densities, PSD, lubrication level) and transfer learning for minimizing re calibration. Usability is centred around explainable alerts, traceable control actions, and batch wise continuous process verification dashboards. Expected benefits are less RSD in tablet weight, less capping/lamination rejection rates due to fill/compression instability, improved press uptime through premature tooling maintenance, and quicker deviation rectification. The methodology redefines weight control from interval inspection to real-time model-informed monitoring, allowing for consistent quality and increased productivity in tablet production.

**Keywords:** rapid, weight variation, machine learning, quality control.

**AI-133**

## DEMYSTIFYING AI-DRIVEN RSM AND SYNERGYFINDER TOOLS FOR DEVELOPING NEUROTHERAPEUTICS AND ANTI-CANCER NUTRACEUTICALS

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Advancing healthcare research and development is critical to enhancing medical infrastructure and supporting national progress, especially in context of ongoing global health challenges. As drug discovery progresses toward development and clinical application, the adoption of advanced computational tools is reshaping the landscape of pharmaceutical innovation. Two such tools—Response Surface Methodology (RSM) and Synergy Finder—have proven particularly


ISBN: 978-81-980623-8-3

valuable in optimizing formulations and identifying effective drug combinations. RSM combines experimental design with machine learning to simplify and enhance the formulation of phytomedicine-based nanoparticles, especially those targeting neurological disorders. Meanwhile, Synergy Finder aids in evaluating how different natural compounds interact, helping researchers identify combinations with improved therapeutic effects, particularly for cancer prevention. It systematically analyzes drug interactions—whether synergistic, additive, or antagonistic—across various dose ranges, enabling more precise and efficient formulation strategies. Through statistical modeling and bioinformatic analysis, Synergy Finder not only enhances efficacy but also supports the development of safer therapies with lower toxicity and the potential to overcome resistance. This study highlights real-world case studies that illustrate the practical use of both RSM and Synergy Finder, particularly in developing neurotherapeutic nanoparticles and cancer-preventive nutraceuticals. By integrating artificial intelligence with pharmaceutical research, this approach demonstrates how data-driven methodologies can streamline drug development and align with the growing emphasis on personalized, targeted therapies. Ultimately, this work emphasizes the value of bioinformatics in fostering innovation and supporting educational advancement in the rapidly evolving field of healthcare technology.

**Keywords:** Optimization; Synergy finder; Response Surface Methodology.

**AI-134**

**IMPACT OF ARTIFICIAL INTELLIGENCE ON REGULATORY AFFAIRS**

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Artificial Intelligence (AI) is revolutionizing the field of regulatory affairs by enhancing compliance, streamlining data management, and supporting faster, more informed decision-making throughout the drug development and approval process. The integration of AI enables automation of critical tasks such as document review, data analysis, and risk assessment resulting in improved efficiency and reduced human error. AI-powered tools facilitate real-time monitoring of regulatory compliance, automated document processing using natural language processing, and advanced predictive analytics, all of which ensure regulatory requirements are consistently met while optimizing resource utilization. However, the adoption of AI also presents significant challenges, including concerns about data privacy, security, ethical considerations, and the need for robust regulatory frameworks to govern the safe use of these technologies. Maintaining human oversight remains essential, as expert judgment is crucial for navigating complex regulatory scenarios and ethical dilemmas that AI may not fully address. The impact of AI is evident in various stages of regulatory affairs, from expediting regulatory submissions and drug/device approvals to enhancing post-market surveillance through improved pharmacovigilance and risk evaluation. As AI continues to advance, regulatory professionals must balance innovation with compliance and adapt to the evolving landscape to harness the full potential of AI while ensuring patient safety and data integrity. This study underscores the transformative effects of AI in regulatory affairs, highlighting both the opportunities and challenges posed by this rapidly evolving technology.

**Keywords:** Artificial Intelligence, Regulatory affairs, Compliance, Automation, Data privacy.

**AI-135**

**INTEGRATING COMPUTATIONAL INTELLIGENCE INTO PHARMACEUTICAL RESEARCH: A PATHWAY TO FASTER AND SAFER MEDICINES**

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In the present study, the potential of artificial intelligence (AI) is investigated within the pharmaceutical industry to accelerate drug discovery and strengthening manufacturing quality assurance. The methodology involved compiling datasets of molecular structures, clinical outcomes, and production records, which are then, analyzed using predictive modelling to identify drug-like candidates, anticipate molecular stability, and detect deviations in manufacturing. A comparative evaluation is performed between conventional experimental screening and AI-driven predictions to validate efficiency and accuracy. The result indicates that computational analysis reduced the time by nearly 40% while achieving above 90% accuracy in forecasting formulation stability and detecting process inconsistencies. Furthermore, predictive simulations revealed potential drug–target interactions that are consistent with available experimental references, suggesting the possibility of discovering novel therapeutic opportunities. Importantly, this approach not only optimizes industrial resources by reducing wastage but also emphasize the human-centered benefits of technology in healthcare. It can be concluded that AI, when integrated with pharmaceutical sciences, acts not as a substitute for human expertise but as a catalyst for precision, innovation, and compassionate healthcare. This review highlights the capacity of intelligent systems to bridge the gap between laboratory data and patient-centered outcomes to meet global health needs.

**Keywords:** Artificial intelligence, predictive modelling, drug discovery, quality assurance, healthcare innovation.

**AI-136**

**AI BASED PHYTOSOME DEVELOPMENT: A REVOLUTIONIZING PHYTOMEDICINE**

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The development of plant-based therapeutic agents is often hindered by their poor bioavailability and instability. Phytosome technology, which complexes phytochemicals with phospholipids, has emerged as a solution, significantly enhancing the absorption and efficacy of these compounds. This report examines how the integration of artificial intelligence (AI) can overcome the remaining challenges in this field.AI can accelerate the discovery of novel phytochemicals by leveraging predictive models to analyze complex botanical and ethnobotanical datasets. Furthermore, generative AI can be applied to design and optimize new phytosome formulations, moving beyond traditional trial-and-error methods to a more efficient, data-driven approach. In manufacturing, AI-augmented systems can provide real-time quality control, ensuring consistent and scalable production. This convergence of phytosome and AI technologies promises to streamline the entire R&D pipeline, reduce costs, and pave the way for a future of personalized phytomedicine tailored to individual patient needs.

**Keywords:** Phytosomes, artificial intelligence (AI), phytomedicine, drug delivery systems, generative AI.

**AI-137**

**AI-DRIVEN DRUG DISCOVERY: ACCELERATING THE PATH FROM TARGET TO DRUG CANDIDATE**

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The traditional drug discovery process is an inefficient, resource-intensive undertaking characterized by long timelines and high failure rates. This explores show artificial intelligence (AI) is fundamentally transforming this pipeline, significantly accelerating the journey from identifying a disease target to discovering a viable drug candidate. By leveraging advanced machine learning algorithms, AI can analyze vast, complex datasets, including genomic, proteomic, and clinical information, at a speed and scale impossible for human researchers. This capability is applied across multiple stages: first, in target identification to pinpoint the most promising biological targets; second, in molecule design and optimization through virtual screening and generative models to rapidly create and refine new chemical entities; and third, in preclinical and clinical phases by predicting a drug's efficacy and toxicity. These AI-driven approaches minimize the need for costly trial-and- error experimentation, enabling pharmaceutical companies to prioritize high-potential candidates, reduce development costs, and ultimately deliver life-saving therapies to patients faster.




ISBN: 978-81-980623-8-3

**Keywords:** Artificial Intelligence (AI), virtual screening, drug discovery, target identification, molecule design.

**AI-138**

**AI-DRIVEN DETECTION AND MANAGEMENT OF HERBAL INTERACTIONS WITH PROPYLTHIOURACIL TO ENHANCE PATIENT SAFETY**

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Propylthiouracil (PTU) is a widely used antithyroid drug for the management of hyperthyroidism, notably in Graves' disease. Despite its effectiveness, PTU therapy presents challenges due to potential interactions with various substances, including herbal medicines, which may affect its safety and efficacy. Herbal components such as ginkgo biloba, St. John's wort, and other supplements could potentially alter thyroid hormone levels or PTU metabolism, posing risks of adverse effects or reduced therapeutic outcomes. However, much of the herb-PTU interaction data remains limited and under-researched, posing challenges for clinicians and patients in managing safe PTU therapy. This proposes the development of an AI-powered digital platform, tailored for PTU users to identify and assess herbal interactions. The platform would incorporate natural language processing and machine learning to facilitate user-friendly identification of substances from text, image, or voice inputs, enabling bilingual support for broader accessibility. It will provide evidence-based interaction severity alerts with clear, color-coded feedback to patients and healthcare professionals. Such a tool aims to enhance medication safety by promoting awareness of herb-PTU interactions, helping prevent adverse outcomes related to unmonitored herbal supplement use. Future enhancements may include integration with electronic health records and personalized risk assessments based on patient medication profiles and genetic factors affecting PTU metabolism. This approach aligns with regulatory frameworks emphasizing medication safety, patient education, data privacy, and the responsible use of AI in healthcare technology advancements.

**Keywords:** Propylthiouracil, Herbal interactions, Hyperthyroidism, AI-powered medication safety, Patient education.

**AI-139**

**THE IMPACT OF ARTIFICIAL INTELLIGENCE (AI) ERRORS ON PATIENT SAFETY: A CASE STUDY ANALYSIS OF MEDICAL DEVICE RECALLS**

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AI has rapidly made its way into healthcare, promising better patient care. However, the use of AI-enabled medical devices also introduces new risks that must be carefully evaluated, especially when it comes to patient safety. In this study, we examine AI-related errors by looking at medical device recalls. Our goal is to understand when these errors occur and what kinds of adverse events hospitals face as a result. By analysing 5 to 8 case studies of recalled medical devices with AI components, we uncover recurring patterns and the root causes behind these failures. The research focuses on three critical areas—data quality, algorithm design, and regulatory oversight—to highlight the vulnerabilities in AI-powered devices. We also discuss potential safety concerns such as misdiagnoses, treatment delays, and negative patient outcomes. We anticipate that our findings will provide essential guidelines for hospitals, regulatory bodies, and manufacturers to reduce risks and improve the safe use of AI in healthcare. Ultimately, by recognizing these challenges, stakeholders can take concrete steps to make devices safer, improve patient outcomes, and ensure that AI is integrated into healthcare in a responsible and ethical way.

**Keywords:** Medical Devices, Class of medical device, Artificial Intelligence, AI errors.

**AI-140**

**A SURVEY ON USAGE OF AI IN SELF-DIAGNOSIS**

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Artificial intelligence (AI) is rapidly emerging in healthcare, particularly in self-diagnosis, raising questions about its acceptance and reliability. To explore this, a cross-sectional survey was conducted to assess awareness, attitude, usage patterns and perceptions regarding AI in self-diagnosis. The survey was conducted between 07/07/2025 and 23/08/2025. Demographic, knowledge, attitude, practice-based responses were collected using a structured questionnaire. The questionnaire was designed using Google forms and circulated to 150 individuals aged between 18 and above 50 years. All responses were systematically collected and analyzed. The following section presents the survey findings. Awareness of AI was high (97.3%), with 57.3% reporting its use for health-related queries, predominantly with ChatGPT (71.3%). While 52.6% acknowledged its potential in early disease detection, 72% believed it cannot replace human doctors, primarily due to accuracy concerns. Accuracy concerns persisted with 30% finding AI less correct than doctors. Nevertheless 64.6% agreed AI is transforming healthcare positively. In conclusion, the findings highlight strong awareness and growing acceptance of AI model in healthcare, especially in self diagnosis of symptoms, yet concerns about accuracy and reliability remain key barriers to its acceptance, while maintaining trust in human doctors as the cornerstone of clinical care.

**Keywords:** Artificial intelligence (AI), Awareness, Perception, Diagnosis, Healthcare.

**AI-141**

**Artificial Intelligence Applications In Clinical Trial Design And Data Management"**

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Clinical trials remain a cornerstone of evidence-based medicine, yet they are increasingly challenged by rising costs, prolonged timelines, and complex data requirements. Recent advances in Artificial Intelligence (AI) have begun to reshape the clinical research landscape by supporting more efficient trial design, patient recruitment, monitoring, and data handling. Techniques such as machine learning, natural language processing, and predictive analytics allow sponsors to optimize study protocols, identify suitable participants, and ensure higher-quality data management. This review highlights current applications of AI in clinical trial design and data management, examines the benefits and limitations of these approaches, and discusses future directions and regulatory considerations that will influence the responsible integration of AI into clinical research.

**Keywords:** Artificial Intelligence, Clinical Trial Design, Data Management, Machine Learning, Patient Selection.

**AI-142**

**COUNTERFEIT DRUG DETECTION: AL'S ROLE IN PROTECTING PATIENT SAFETY.**

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In the fight against this evolving threat of counterfeit drugs, AI is emerging as the cornerstone that can solve problems left unsolved by traditional methods. Counterfeit drugs are killing and decimating the global economy billions in losses yearly, there has never been a more compelling need for tech-driven, AI powered solutions. The vision is simple – A giant AI-Enabled shield covering pill, rebuilding trust in healthcare supply chain & showing a bare face to counterfeit drugs, because never again should any patient around the globe die from fake medicine.

**Keywords:** counterfeit drugs, AI powered solution, supply-chain, rebuilding trust in healthcare.

**AI-143**

**AI ROLE IN TRANSFORMING PRE-CLINICAL DRUG DEVELOPMENT.**

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The highest cost & lengthy timelines of Pre-clinical Drug Development post significant challenges to pharmaceutical innovation. AI role in Pre-clinical Drug Development is predicting pharmacokinetics, toxicity & efficacy identifying promising drug candidates & accelerating development. AI is changing how new drugs are developed before clinical trials. AI in Pre-clinical Drug Development developing new drugs is expensive & takes a long time especially in the early stages before human testing. AI tools like Insilico Medicine & Atomwise are changing this by using advanced technology to predict how drugs will work if they are safe & how effective they might be.These tool help scientists find the best drug candidates quickly cutting down usual 3-6 years of early research & saving money.This case study shows how AI reduces mistake in experiments & speeds up the process of creating new medicine, making life saving treatment available sooner.

**Keywords:** AI solution, faster drug development, Insilico Medicine, cost savings, lifesaving treatments.

**AI-144**

**AI FOR PERSONALIZED MEDICINE: PREDICTING PATIENT-SPECIFIC TREATMENT OUTCOMES**

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Personalized medicine aims to provide patient-centered treatment by considering genetic, clinical, and lifestyle factors. Traditional approaches often fail to capture complex biological interactions, leading to variable treatment outcomes. Artificial Intelligence (AI), with its ability to analyze large and diverse datasets, holds significant promise in predicting patient-specific responses to therapiesThe objective of this study is to explore the role of AI in predicting individualized treatment outcomes, thereby enhancing clinical decision-making and improving therapeutic efficacy. A systematic review of recent AI models applied in personalized medicine was conducted. Data from electronic health records, genomic sequencing, and clinical trials were analyzed using machine learning algorithms including random forest, deep learning, and support vector machines. Model performance was evaluated based on accuracy, sensitivity, and predictive value in forecasting treatment responsesAI-based models demonstrated high predictive accuracy, with deep learning achieving up to 85–90% precision in forecasting patient-specific outcomes for cancer immunotherapy and cardiovascular drug response. Integration of genomic and clinical data significantly improved model reliability compared to traditional statistical approachesAI has the potential to transform personalized medicine by accurately predicting patient-specific treatment outcomes. Early integration of AI-driven models into healthcare systems may reduce trial-and-error prescribing, minimize adverse effects, and improve overall treatment success rates. However, challenges such as data privacy, ethical concerns, and model interpretability need to be addressed for large-scale clinical adoption.

**Keywords:** Artificial Intelligence, Personalized Medicine, Machine Learning, Treatment Outcomes, Predictive Modeling, Genomics.

**AI-145**

**AI-ENHANCED CLINICAL PHARMACY STRATEGIES IN POSTURAL ORTHOSTATIC TACHYCARDIA SYNDROME (POTS): BRIDGING CARE GAPS IN EMERGING DISORDERS**

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Postural Orthostatic Tachycardia Syndrome (POTS) is an underdiagnosed autonomic disorder characterized by excessive heart rate increase upon standing, disproportionately affecting young adults and women. Despite its growing recognition, therapeutic interventions remain fragmented, with significant care gaps in diagnosis, medication optimization, and patient monitoring. Clinical pharmacy has a vital role in addressing these challenges, and artificial intelligence (AI) offers novel avenues to enhance this role. This study explores AI-driven clinical pharmacy strategies to improve the management of POTS, focusing on predictive algorithms, personalized pharmacotherapy, and continuous digital monitoring. AI models can aid in early detection through analysis of electronic health records, wearable device data, and symptom trends, reducing diagnostic delays. Furthermore, AI-enabled decision support systems assist pharmacists in tailoring pharmacological regimens—such as beta-blockers, ivabradine, or fludrocortisone—while minimizing adverse effects and drug interactions. Machine learning–based adherence tools and chatbots can empower patients with real-time education, medication reminders, and lifestyle guidance. Integrating AI into pharmacy practice bridges existing care gaps by enabling precise, patient-centred interventions and fostering multidisciplinary collaboration. Importantly, such strategies align with the global vision of digital health transformation, ensuring cost-effectiveness, improved quality of life, and long-term outcome monitoring in emerging disorders like POTS.

**Keywords:** Postural Orthostatic Tachycardia Syndrome, Artificial Intelligence, Clinical Pharmacy, Patient-Centred Care, Emerging Disorders.

**AI-146**

**AI-DRIVEN SMART HEALTHCARE SYSTEMS: A PHARMACOEPIDEMIOLOGICAL DATA ANALYSIS.**

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The integration of automation and Artificial Intelligence (AI) has revolutionized healthcare by enhancing diagnosis, remote monitoring, robotic surgery, and treatment strategies. With advancements in 5G, IoT, and edge computing, smart healthcare systems have created a highly connected and technology-driven medical environment. These AI-powered platforms can now make autonomous decisions, marking a significant shift in healthcare delivery. A mixed-methods study was conducted to examine AI adoption and perceptions within healthcare. Using a Google Forms survey, data were collected from 300 participants aged 18 and above who were familiar with smartphones, applications, and wearable devices. The survey assessed participants' knowledge of AI, trust in its decision-making abilities, privacy concerns, efficiency perceptions, and overall acceptance. Statistical analysis, including t-tests and correlation methods, was applied to interpret the results. Findings revealed that women, professionals, and individuals aged 31–60 demonstrated more favourable attitudes toward AI in healthcare compared to men, students, and younger participants aged 18–30. The study emphasizes the importance of targeted educational initiatives and hands-on AI demonstrations to enhance trust, awareness, and acceptance among diverse demographic groups, ultimately promoting wider AI integration in healthcare settings.

**Keywords:** Artificial Intelligence, Smart Healthcare, Public Perception, Dependency, Technology Acceptance Model.

**AI-147**

**AI RX: REIMAGINING INDIAN PHARMACY EDUCATION THROUGH CLINICAL, HOSPITAL, AND COMMUNITY INTELLIGENCE**

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Artificial Intelligence (AI) is no longer just a buzzword—it's becoming a powerful tool across clinical, hospital, and community pharmacy settings. In India, where pharmacy education often leans heavily on traditional methods, AI opens up exciting possibilities to modernize how we learn, practice, and serve patients. In clinical pharmacy, AI helps pharmacists make smarter decisions by analysing patient data, predicting drug interactions, and even tailoring therapies based on genetic profiles. Hospital pharmacies are seeing the rise of automated dispensing systems, predictive inventory tools, and real-time monitoring of adverse drug reactions. Meanwhile, community pharmacies are embracing chatbots, tele pharmacy platforms, and AI-driven tools that improve medication adherence and patient engagement. Despite these advancements, Indian pharmaceutical education hasn't fully caught up. These highlights the urgent need to integrate AI into the curriculum—through hands-on training, interdisciplinary learning, and exposure to real-world digital tools. It also touches on key challenges like data




ISBN: 978-81-980623-8-3

privacy, algorithm bias, and the importance of ethical AI use in healthcare. By embracing AI, we're not just upgrading technology—we're empowering future pharmacists to deliver safer, smarter, and more personalized care. This shift is essential if India wants to stay aligned with global healthcare trends and prepare a workforce that's ready for tomorrow.

**Keywords**: Artificial Intelligence, Clinical Pharmacy, Pharmacy Education, Digital Health, Telepharmacy.

**AI-148**

**ARTIFICIAL INTELLIGENCE INTEGRATION IN PHARMACY EDUCATION: INDIA'S PATH TO GLOBAL LEADERSHIP UNDER NEP 2020**

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Background: AI integration in pharmacy education is transforming global healthcare preparation. India's NEP 2020 and PCI curriculum revisions create unprecedented opportunities for modernization. Objective: Assess India's AI integration status in pharmacy education, compare with global standards, and propose implementation framework. Methods: Mixed-methods analysis of 2,847 students, 156 faculty, and 25 institutions across India (2024-2025), with international benchmarking. Results: India shows 31% AI preparedness vs. 59% global average. Only 34.6% of students actively use AI tools. Critical gaps exist in faculty competency (32% vs. 64% globally) and curriculum integration (25% vs. 59% globally). However, strong policy support and scale advantages provide transformation potential. Conclusion: Systematic AI implementation through NEP 2020 framework can position India as global leader by 2035.

**Keywords:** Artificial Intelligence, Pharmacy Education, NEP 2020, Global Competitiveness.

**AI-149**

***IN SILICO* TECHNOLOGY IN PHARMA FIELD**

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Pharmaceutical research and development has seen a revolution because to insilico technology, which combines machine learning, artificial intelligence (AI), and computer models to speed up drug discovery and improve therapeutic results.Incontrast to conventional in vitro and in vivo approaches, insilico techniques make use of computer-based simulations to evaluate pharmacokinetics, pharmacodynamics, and toxicity profiles, as well as to anticipate molecular interactions and find new drug candidates.Due to the inability of traditional methods like in vitro and in vivo to examine vast amounts of data, this frequently yields ineffective results. Advanced insilico methods have provided pharmaceutical companies with a wealth of opportunities to find new possible drug targets, which in turn influences the duration and success of conducting clinical trials to find new drug targets.The time, expense, and ethical issues related to preclinical and clinical research are greatly decreased by this technology. In order to create safer and more efficient treatments, the pharmaceutical industry uses insilico technologies for target identification, virtual screening, structure-based drug design, and personalized medicine.Virtual clinical trials and disease modeling also improve decision-making and regulatory procedures. All things considered, insilico technology offers a quicker, more economical, and patient-centered route to healthcare innovation.

**Keywords:** insilico technology,machine learning, artificial intelligence (AI), computer models,drug targets.

**AI-150**

**SURVEY BASED ON USE OF AI IN THE DETECTION OF NON-ALCOHOLIC FATTY LIVER**

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Non-alcoholic fatty liver disease represents one of the most prevalent chronic liver disorders worldwide, primarily linked to modifiable lifestyle factors such as obesity, sedentary behaviour, and dietary imbalances. In recent years AI has emerged as a promising tool in medical diagnostics. To evaluate public awareness of NAFLD and perceptions toward AI-driven healthcare, a cross-sectional survey was conducted and 178 participants responded. Findings revealed that 89% of respondents were aware of NAFLD, while 96% recognized the influence of unhealthy lifestyles on liver health. Additionally, 62% reported personal or familial liver-related diagnoses, reflecting the growing clinical burden. Preventive health practices were encouraging, with 79% expressing comfort with routine diagnostic procedures such as blood tests. Regarding digital health, 72% had prior knowledge of AI applications, and 77% believed AI could support physicians in achieving earlier and more precise NAFLD detection. Moreover, 74% indicated willingness to adopt AI-based liver health tests if recommended by clinicians. Among these, 36% prioritized accuracy and rapid results, whereas others emphasized affordability and data privacy. Concerning accessibility, 37% preferred mobile app-based self-screening, 36% supported community health camps, and the remainder favoured clinical or diagnostic centres. Importantly, 72% agreed that AI integration would enhance interest in preventive healthcare, and 81% expressed readiness to recommend AI-based screening if affordable. Overall, the survey indicates strong acceptance of ai based liver diagnostics, highlighting its potential in advancing NAFLD detection and preventive healthcare.

**Keywords:** Non-alcoholic fatty liver, AI, early detection, preventive health care, public perception.

**AI-151**

**AI-INTEGRATED UNIQUE MEDICAL IDENTITY SYSTEM: BRIDGING THE GAP BETWEEN HEALTH IDS AND SMART HEALTHCARE IN INDIA.**

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India's healthcare system is moving towards digitalization through the Ayushman Bharat Digital Mission (ABDM), which provides citizens with a unique health ID. However, current platforms mainly act as static record-keeping systems and lack intelligent features to support clinical decision-making. This gap often results in fragmented medical histories, duplicate tests, and medication errors. We propose an AI-integrated Unified Medical Identity System (UMIS), where every citizen is assigned a unique medical number similar to Aadhaar or PAN. All prescriptions, diagnostic results, and treatment histories from hospitals, pharmacies, and laboratories would automatically be linked to this ID. Artificial intelligence algorithms would analyze the longitudinal data to predict adverse drug reactions, check drug–drug interactions, support physician decision-making, and personalize treatment regimens. Additionally, anonymized datasets could accelerate pharmacovigilance and pharmaceutical research. This model envisions a dynamic, AI-driven ecosystem that ensures safer treatments, reduces healthcare costs, and strengthens India's digital health infrastructure.

**Keywords:** AI in pharma, Health ID, Unified Medical Identity, Pharmacovigilance.

**AI-152**

**AI-DRIVEN PERSONALIZED SKINCARE FORMULATIONS: A NEW ERA OF COSMECEUTICALS**

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Personalized skincare is becoming a key focus in cosmeceuticals, and artificial intelligence (AI) plays a central role in this transformation. Traditional formulations often fail due to variations in skin type, genetics, and environmental factors. AI technologies, including machine learning and deep learning, enable accurate skin diagnostics, bioactive compound selection, and the development of tailored formulations. These tools also support predictive safety analysis and formulation optimization, improving both efficacy and consumer trust. Future innovations such as digital twins, smart biosensors, and genomics integration hold great promise in advancing individualized skincare solutions. While issues like data privacy, algorithmic bias, and high costs remain challenges, AI has the potential to revolutionize cosmeceuticals




ISBN: 978-81-980623-8-3

by creating safe, effective, and highly personalized skincare products.
**Keywords:** Artificial intelligence, Cosmeceuticals, Personalized skincare, Predictive modeling, Biosensors.

**AI-153**

**GUAVA LEAF EXTRACT-LOADED NANOSTRUCTURED LIPID CARRIER (NLC) MICROEMULSION FOR ANTI-INFLAMMATORY TOPICAL DELIVERY**

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Inflammation plays a pivotal role in chronic disease progression, and while synthetic anti-inflammatory drugs are effective, their long-term use is often linked to adverse effects. Plant-based alternatives offer safer therapeutic options. The present study focused on formulating and evaluating a guava leaf (Psidium guajava L.) extract-enriched Nanostructured Lipid Carrier (NLC)-based topical microemulsion for anti-inflammatory application. Using a factorial design approach, the optimized formulation was characterized for particle size, polydispersity index (PDI), zeta potential, entrapment efficiency, and stability. Molecular docking confirmed strong binding of phytoconstituents like quercetin and caffeic acid with COX-2, supporting anti-inflammatory potential. Predicted and experimental values for particle size (~120 nm), PDI (0.112), and zeta potential (−27.5 mV) demonstrated stability and uniformity. Encapsulation efficiency (90.05%) ensured effective drug loading, aligning with predicted outcomes. Overall, the formulation showed desirable nanoscale characteristics, robust stability, and high encapsulation efficiency, confirming its potential as a safe and effective topical delivery system.
**Keywords:** Psidium guajava, Nanostructured Lipid Carrier, Anti-inflammatory, Topical microemulsion, Drug delivery.

**AI-154**

**THE TRANSFORMATIVE ROLE OF ARTIFICIAL INTELLIGENCE IN THE MODERN PHARMACEUTICAL SECTOR**

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Artificial Intelligence (AI) has emerged as a transformative force in the pharmaceutical sector, offering innovative solutions across the entire drug development and healthcare continuum. In pharmacy, AI technologies such as machine learning, natural language processing, and deep learning are increasingly being utilized to enhance drug discovery, formulation development, clinical trials, patient care, and pharmacovigilance. By analyzing large and complex biomedical datasets, AI enables the identification of novel drug targets, prediction of molecular interactions, and optimization of lead compounds, significantly reducing the time and cost traditionally associated with drug research and development. In clinical pharmacy, AI-driven decision support systems aid healthcare professionals in prescribing personalized therapies, optimizing dosages, and preventing adverse drug reactions. Moreover, AI plays a crucial role in supply chain management, inventory control, and precision marketing of pharmaceuticals, thereby ensuring better accessibility and affordability of medicines. Patient-centric applications, such as AI-powered mobile health apps, wearable devices, and chatbots, further support medication adherence, disease monitoring, and real-time health management. Despite its immense potential, the integration of AI into pharmacy faces challenges, including data privacy concerns, algorithm transparency, ethical considerations, regulatory compliance, and the need for skilled professionals who can bridge the gap between pharmacy and data science. Nevertheless, ongoing advancements and collaborations between academia, industry, and regulatory authorities are fostering the growth of AI in pharmacy.
**Keywords:** AI in Drug Discovery Personalized Medicine AI in Clinical Trials Predictive Analytics in Pharmacy Drug Repurposing with AI

**AI-155**

**ARTIFICIAL INTELLIGENCE IN PHARMACEUTICAL REGULATORY AFFAIRS**

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The complexity of pharmaceutical regulations is growing and requires smarter and more transparent systems, as manual dossier preparation and compliance monitoring often delay approvals and increase errors. By developing regulatory expertise, promoting transformative innovation, and enabling strategic decision-making, Artificial Intelligence (AI) can redefine regulatory affairs, enhancing operational efficiency, ensuring compliance, and safeguarding patient safety. A pilot AI-enabled automation tool was implemented at a leading Indian pharmaceutical company, where 120 historical submission dossiers (2018–2022) were digitized and analyzed using natural language processing (NLP) for automated classification and error detection. The model, trained with reviewer annotations, was validated on five new submissions in 2023, achieving 92% classification accuracy, a 43% improvement In error detection compared with manual review, and a 27% reduction in dossier preparation time. These gains translated into an estimated one and half to two month reduction in approval timelines. Globally, AI applications such as the FDA's Sentinel System for post-market surveillance and the EMA's AIassisted pharmacovigilance platforms demonstrate regulatory scalability. Beyond dossier automation, AI supports regulatory intelligence, consistency checks, pharmacovigilance, and decision support, reducing repetitive tasks and empowering professionals to focus on higherorder responsibilities. Therefore, AI-driven regulatory platforms can be effectively integrated within the Indian ecosystem, offering measurable improvements in accuracy, speed, and transparency. To sustain these benefits, professionals must be educated in digital tools, regulators and industry must innovate by co-developing adaptive frameworks, and all stakeholders must be empowered to accelerate patient access to safe and effective medicines.
**Keywords:** Artificial Intelligence, Regulatory Affairs, CDSCO, Pharmacovigilance, Digital Transformation.

**AI-156**

**ARTIFICIAL INTELLIGENCE IN PHARMACY EDUCATION: TRANSFORMING LEARNING FOR THE NEXT GENERATION**

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The rapid advancement of artificial intelligence (AI) is developing health sciences education globally. In pharmacy education, there is increasing potential for AI to improve learning outcomes and student engagement. This study explores how AI-powered tools are being integrated into pharmacy education, examines their benefits and challenges, and proposes a roadmap for future implementation. Databases searched include PubMed, Scopus, and Google Scholar. Key inclusion criteria were studies involving AI-driven adaptive learning, virtual patient simulation, automated assessments, and AI-tutoring systems evaluated among pharmacy students. However, challenges include high cost of implementation, lack of faculty training in AI, concerns about data privacy, and risk of over-dependence on technology. AI has strong promise for transforming pharmacy education. Future research should focus on longitudinal studies assessing learning retention, cost-effectiveness, and student satisfaction in diverse settings, including resource-limited environments.
**Keywords:** Artificial Intelligence, Pharmacy Education, Virtual Simulation, Adaptive Learning, Automated Assessment.

**AI-157**

**AI IN CANCER: A MACHINE LEARNING APPROACH FOR PREDICTING BREAST CANCER IMAGES**

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Cancer is a disease that continues to plague our modern society. Among all types of cancer, breast cancer is now the most common type of cancer occurring in women worldwide. Various factors, including genetics, lifestyle, and the environment, have contributed to the rise in the prevalence of breast cancer among women of all socioeconomic strata. Therefore, proper screening for early diagnosis and treatment becomes a major factor when fighting the disease. Artificial intelligence (AI) continues to revolutionize various spheres of our lives with its numerous applications. Using AI in the existing screening process makes obtaining results even easier and more convenient. Faster, more accurate results are some of the benefits of AI methods in breast cancer screening.




ISBN: 978-81-980623-8-3

Nonetheless, there are many challenges in the process of the integration of AI that need to be addressed systematically. The proposed methodology involves the integration of machine learning algorithms such as Support Vector Machines (SVM), K-NN and Convolutional Neural Networks to analyze complex biological data and identify key features associated with cancer cells. This innovative machine learning-based approach holds great potential for revolutionizing cancer therapy by improving precision and efficacy. In this research, the CNN model was trained on the Kaggle dataset which contains 277,524 breast cancer images, the algorithm performed well on this data and predicted the cancer cells automatically. Finally, the proposed CNN achieved an 87.89 accuracy for the prediction of cancer cells.

**Keywords:** Support Vector Machines (SVM), K-Means, Machine learning (ML), Convolutional Neural Networks (CNNs), Breast cancer Images.

**AI-158**

**INTEGRATING AI, SPECTRAL ANALYSIS, AND PRACTICAL STUDIES FOR ANTIMICROBIAL EVALUATION OF LEAVES OF *MOMORDICA DIOICA***

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Artificial intelligence (AI) and *in-silico* approaches are transforming natural product research by enabling the predictive screening of bioactivities prior to laboratory confirmation. In this study, the antibacterial potential of leaves of *Momordica dioica* (momordicin) was anticipated using AI-assisted spectrum analysis and molecular docking. The NMR interpretation using ChemDraw revealed hydroxyl, carbonyl, aromatic, and ether functionalities that are consistent with flavonoids, tannins, and phenolic glycosides, all of which have established antibacterial action. Docking computations against bacterial target proteins revealed a substantial binding affinity for momordicin (-11.3 kcal/mol), which is nearly identical to ciprofloxacin (-12.8 kcal/mol), indicating potent antibacterial activity. Ethanolic leaf extracts of M. dioica were used in in vitro experiments to confirm these hypotheses. Alkaloids, tannins, and phenols were verified by phytochemical analyses. With MIC values of 1, 4, 2, and 16 µg/ml for *Staphylococcus aureus, Bacillus cereus, Escherichia coli,* and *Salmonella typhi,* respectively, and $IC_{50}$ values ranging from 29.27 to 46.14 µg/ml, the extract demonstrated detectable inhibition against these pathogens. The *in-silico* predictions were confirmed by zone of inhibition experiments, which showed a concentration-dependent response. This combined AI-driven prediction and experimental validation strongly establishes *M. dioica* as a promising source of antimicrobial agents, bridging computational pharmacognosy with practical drug discovery.

**Keywords:** *Momordica dioica*, antimicrobial activity, *in-silico* docking, analysis, pharmacognosy.

**AI-159**

**"AI-ASSISTED LIGAND DESIGN AND MOLECULAR DOCKING OF THEOPHYLLINE DERIVATIVES WITH HUMAN SERUM ALBUMIN FOR POTENTIAL ANTI-ASTHMATIC ACTIVITY"**

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Asthma is a prevalent chronic inflammatory disorder of the respiratory system. It is characterized by airway remodelling and hyperresponsiveness. It poses a significant role global health burden. Current therapeutic strategies generally deal with bronchodilators such as theophylline, a well-established xanthine derivative with a long history of clinical use. The structural modification of theophylline to improve its efficacy and safety profile represents a valuable approach in the design of novel anti-asthmatic agents. In the present study, computational methods were utilized to design and find the binding affinity of theophylline derivatives with human serum albumin (HSA), which is a key plasma protein that involved in drug transport and modulation. The three-dimensional structure of HSA (PDB ID: 2VUE) was retrieved and prepared for docking by removing non-essential molecules and adding hydrogen atoms. Ligands were constructed using Chem Draw Ultra 12.0, Geomol and chem draw pro. Artificial intelligence-based molecular modelling (GeoMol) was applied to translate the SMILES strings into optimized three-dimensional geometries Molecular docking was carried out using Argus Lab 4.0.1, applying the Argus Dock engine to predict binding poses and calculate binding energies. Theophylline was used as the reference compound, which yield a binding energy of −5.36945 kcal/mol. Among these designed derivatives (A1–A20), compounds A8, A10, and A15 showed better binding affinities as compared to the standard theophylline, with binding energies of –10.1209, –9.95421, and –10.0143 kcal/mol, respectively.

**Keywords:** Argus lab, Asthma, Chem draw, Human serum albumin, Theophylline.

**AI-160**

**AI-ENABLED 3D PRINTING: SHAPING THE FUTURE OF PERSONALIZED MEDICINES**

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Personalized medicine is transforming healthcare by shifting from conventional "one-size-fits-all" therapies toward patient-focused treatment strategies. Standard dosage forms often lack the flexibility to adjust dose, combine multiple drugs, or control release patterns, which can reduce therapeutic success and patient adherence. Integrating artificial intelligence (AI) with three-dimensional (3D) printing offers a promising solution to these challenges. AI algorithms can interpret patient data, pharmacokinetic parameters, and excipient interactions to design optimized digital models of dosage forms. These can then be fabricated by 3D printing into customized tablets, polypills, and controlled-release systems that meet individual clinical requirements. The FDA-approved 3D-printed levetiracetam tablet (Spritam) demonstrates the clinical feasibility of this approach. Beyond this example, AI-enabled 3D printing reduces trial-and-error formulation, shortens development timelines, and supports cost-effective, on-demand manufacturing. Looking ahead, efforts may focus on expanding AI-driven formulation databases, incorporating real-time patient data, and developing scalable models to support wider clinical application. Together, these strategies could improve accessibility of personalized therapies and enhance patient outcomes. Overall, AI-assisted 3D printing represents a significant advance in pharmaceutical technology, with strong potential to optimize treatment efficacy, improve adherence, and foster a more patient-centric approach to drug delivery.

**Keywords:** Artificial intelligence, 3D printing, personalized medicine, patient-centric drug delivery, pharmaceutical technology.

**AI-161**

**PLAIN-LANGUAGE GAPS IN PATIENT INFORMATION LEAFLETS: USING NLP TO EVALUATE READABILITY, COMPLETENESS, AND RISK COMMUNICATION**

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Patient Information Leaflets (PILs) are essential for safe medication use, yet many are hard to understand, include insufficient information, or convey risks ambiguously. Pharmacists often compensate for these deficiencies. An analysis was conducted on 300 PILs (prescription, devices, over-the-counter; innovator vs generic; ≥8 classes). Readability (Flesch–Kincaid, Reading Ease, sentence length, jargon density) was evaluated after processing texts from PDFs/HTML. An eight-item checklist (indication, dose, administration, warnings, side effects, urgent care, storage, contact) gauged completeness. Risk clarity was measured as actionable ("Stop and call") versus hedged wording. Subgroup comparisons were made. Clarity and time to find urgent-care guidance were assessed (1–5 scale) in a subsample of 20 PILs with 40 laypeople. Wide variations were found in readability (F-K 4.8–19.2). Compared to OTC, prescription PILs were more difficult (median grade 11.0 vs 8.1, $p<0.01$). Completeness ranged 1/8–8/8; >80% lacked urgent-care




ISBN: 978-81-980623-8-3

instructions. Innovator brands scored higher than generics (7/8 vs 5/8). Only 22% of safety claims were actionable. Lay readers took longer to locate urgent-care instructions (92s vs 38s) and rated prescription PILs lower in clarity (2.8/5 vs 3.6/5). PILs are frequently challenging and lacking. Basic NLP tools can identify flaws. To standardize understandable, actionable PILs, a pharmacist checklist and plain-language templates are suggested.

**Keywords:** Patient Information Leaflet, Natural language processing, Patient education, Medical devices.

**AI-162**

**"AI IN PHARMA: A DOUBLE-EDGED SWORD OF INNOVATION AND RISK"**

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Artificial Intelligence (AI) is transforming the pharmaceutical industry by introducing cutting-edge solutions that enhance drug discovery, clinical trial design, and supply chain management. By processing extensive biological and clinical datasets, AI enables faster identification of potential drug candidates, more efficient trial protocols, and improved manufacturing processes. These innovations have the potential to accelerate the development of effective treatments, lower production costs, and expand access to medicines, particularly in regions with limited healthcare infrastructure. Despite its promising contributions, the adoption of AI brings considerable challenges that must be addressed. A primary concern is the protection of data privacy and cybersecurity, as AI applications depend on vast amounts of sensitive patient information, exposing systems to risks of breaches and unauthorized exploitation. Another critical issue involves black box algorithms, whose lack of transparency prevents healthcare professionals from fully understanding or validating AI-generated decisions, which undermines trust. Additionally, algorithmic bias may result in unfair or inaccurate treatment recommendations, particularly affecting marginalized or underrepresented populations. Regulatory frame works often lag behind the rapid development of AI technologies, creating vulnerabilities where insufficiently tested or unsafe solutions may enter clinical practice. Intellectual property complexities also emerge, with unclear ownership over AI-generated discoveries and proprietary models. To fully benefit from AI in pharmaceuticals, we need clear regulations, open and understandable methods, strong ethical rules, and global cooperation. These steps are important to make sure AI is used safely, fairly, and responsibly in healthcare.

**Keywords:** Data bias, Intellectual property (IP) challenges, Black-box algorithms, Cybersecurity risks.

**AI-163**

**NEXT GENERATION CLINICAL LABS WITH ARTIFICIAL INTELLIGENCE.**

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Laboratory medicine has evolved into a highly automated medical discipline. In recent years, the application of artificial intelligence (AI) in laboratory medicine has attracted increasing attention, offering the potential to optimize laboratory workflows and even transform the field in the future. Despite this promise, only a few commercially available AI models are currently approved for clinical laboratory use, and they face limitations such as high costs, limited accuracy, and the requirement for manual review of results. There is a scarcity of comprehensive literature reviews that examine the current research landscape, challenges, and future opportunities for AI in laboratory medicine. We provide a concise introduction to AI and its key subsets, followed by a review of AI models currently employed or emerging in clinical laboratories. AI models in the clinical laboratory, requiring the joint efforts of laboratory professionals, information technology experts, and other stakeholders. We discuss the challenges associated with their implementation, explore potential solutions, and offer perspectives on future developments in the field. Beyond that, outside of clinical laboratories, wearable sensors have a great potential to become another huge market for AI applications Additionally, we highlight the current status of AI integration and its potential applications across various stages of the clinical testing process.

**Keywords:** Artificial intelligence, Machine learning, Laboratory medicine, Clinical laboratory.

**AI-164**

**EMPOWERING MIND: AI AND NETWORK PHARMACOLOGY FOR NEUROLOGICAL ACTIVITY**

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Artificial intelligence (AI) has emerged as a powerful tool in the field of neurology, significantly impacting the diagnosis and treatment of neurological disorders. Recent technologies have given us access to a plethora of information relevant to many aspects of neurology. The discovery of effective therapeutics against Alzheimer's disease and other neurological disorders remains a significant challenge. Artificial intelligence tools are of considerable interest in modern drug discovery processes and, by exploiting machine learning (ML) algorithms and deep learning (DL) tools, as well as data analytics, can expedite the identification of new drug targets and potential lead molecules. AI tools offering promising advancements in the diagnosis, monitoring, and treatment of neurodegenerative diseases such as Alzheimer's and Parkinson's. These disorders are characterized by progressive neuronal loss and complex pathological changes that are often difficult to detect in early stages using conventional methods. AI algorithms, particularly ML & DL models, have demonstrated high accuracy in analyzing large volumes of neuroimaging data (MRI, PET, CT scans), genetic information, and clinical records to identify early biomarkers and predict disease progression. Moreover, challenges such as data privacy, algorithm transparency, and integration into clinical workflows remain. Overall, AI holds significant potential to revolutionize the management of neurological disorders, enabling earlier interventions and improving patient outcomes.

**Keywords:** AI algorithms, Neuro-imaging, Alzheimer, Machine Learning.

**AI-165**

**ADOPTION OF ARTIFICIAL INTELLIGENCE IN PHARMACY SERVICES: A CROSS-SECTIONAL STUDY AMONG PHARMACY PROFESSIONALS IN BANGALORE, INDIA**

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Artificial Intelligence (AI) is rapidly transforming healthcare delivery, with applications extending into pharmacy services such as clinical decision support, patient counseling, inventory management, pharmacovigilance, and drug dispensing. However, its adoption among Indian pharmacy professionals remains underexplored. To assess knowledge, attitudes, and practices (KAP) regarding AI applications in pharmacy services among pharmacy professionals in Bangalore and to determine associations with demographic and professional variables. A descriptive cross-sectional survey was conducted among 120 pharmacy professionals between April and July 2025 using a structured KAP-based questionnaire. Participants were recruited from hospital, retail, and community pharmacy settings. Data were analysed using descriptive statistics, Chi-square tests, and one-way ANOVA. A total of 120 respondents participated in the study of whom 80 (66.7%) were aged 21–30 years, and redistribution of cadres showed 45 (37.5%) B. Pharm, 20 (16.7%) PharmD, 14 (11.7%) M. Pharm, and 41 (34.1%) D.Pharm. Overall, 96 (80.0%) had heard of AI in Pharmacy Services, and 50 (41.7%) reported formal AI-related training. Awareness was highest for clinical decision support (76.7%), patient counselling (70.0%), and inventory optimization (65.0%), while lowest for drug dispensing (52.5%). Usage followed the same trend but remained significantly lower than awareness ($\chi^2 = 18.52$, $p < 0.001$). Younger pharmacists (21–30 years) were more AI-aware ($\chi^2 = 10.42$, $p < 0.05$), and those with <3 years' experience were more likely to have AI training ($\chi^2 = 8.92$, $p < 0.02$). ANOVA revealed higher KAP scores among PharmD professionals (9.1 ± 1.0) compared to other groups ($F(3,116) = 6.02$, $p = 0.0007$). Hospital pharmacists scored significantly higher than community and retail




ISBN: 978-81-980623-8-3

pharmacists (F (2,117) = 4.12, p = 0.02). This study showed that awareness of AI in pharmacy services was generally high, though actual adoption in practice was considerably lower, highlighting a persistent awareness–practice gap. Awareness was particularly strong in areas such as clinical decision support and patient counselling, while drug dispensing showed relatively less recognition.

**Keywords:** Artificial Intelligence, Pharmacy Services, Knowledge-Attitude-Practice, Pharmacists, Healthcare Technology, India.

**AI-166**

## AI-Driven Admet Profiling Of Tyrosine Kinase Ligands For Drug Discovery And Repurposing

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Tyrosine kinases (TKs) are critical therapeutic targets in oncology and other diseases, yet the identification of selective and safe ligands remains challenging. In this study, we integrated Cheminformatics filtering with Artificial Intelligence (AI)–based pharmacokinetic modeling to evaluate kinase-targeting ligands. A dataset of 28,314 small molecules targeting major TK families was obtained from ChEMBL via Kaggle. Activity-based filtering yielded 13,062 bioactive compounds, of which 6,294 molecules (48.1%) satisfied Lipinski's Rule of Five. These drug-like candidates were further profiled using ADMET-AI, a machine learning platform trained on large-scale pharmacokinetic and toxicity datasets, capable of predicting 41 endpoints spanning absorption, distribution, metabolism, excretion, and toxicity. The analysis showed that the mean Quantitative Estimate of Drug-likeness (QED) was moderate-to-high, with ~40–45% of compounds scoring above 0.67, a threshold for high-quality drug-like molecules. A majority displayed favorable solubility and logP values, suggesting good oral bioavailability potential. Predicted toxicity risks included hERG inhibition in ~15–20%, drug-induced liver injury (DILI) in ~12–15%, mutagenicity (AMES positive) in ~8–10%, and carcinogenicity in ~5–7%. Integrating both drug-likeness and toxicity filters, ~55–60% of compounds (≈3,500–3,800 molecules) were prioritized as promising candidates with favorable ADMET properties. This two-step workflow bioactivity enrichment followed by AI-based ADMET profiling demonstrates the utility of AI in systematically narrowing chemical space for kinase-targeted drug discovery. The reduced candidate pool provides a strong foundation for in silico drug design, repurposing studies, and future molecular docking and dynamics simulations.

**Keywords:** Tyrosine kinases, ADMET-AI, QED, DILI, In Silico Drug Discovery, Drug Repurposing.

**AI-167**

## AI-GUIDED DESIGN AND SYNTHESIS OF MULTI-TARGET DIRECTED LIGANDS FOR THE TREATMENT OF ALZHEIMER'S DISEASE

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Alzheimer's disease (AD) is a multifactorial neurodegenerative disorder characterized by cholinergic dysfunction, amyloid-β (Aβ) aggregation, tau hyper phosphorylation, and oxidative stress [1]. Due to the complexity of AD pathogenesis, single-target drugs have shown limited efficacy, prompting interest in multi-target directed ligands (MTDLs) [2]. This study presents an artificial intelligence (AI)-assisted pipeline for the design, synthesis, and biological evaluation of novel MTDLs targeting key pathological mechanisms in AD. A deep generative model, trained on CNS-active compounds from the ChEMBL database, was employed to generate a focused library of drug-like molecules. Virtual screening was conducted using molecular docking (AutoDock Vina), followed by MM-GBSA free energy calculations and ADMET profiling to identify lead candidates. Three top-ranking compounds were synthesized via conventional organic synthesis routes and characterized by NMR and LC-MS. Biological evaluation included Ellman's assay for acetylcholinesterase (AChE) and butyrylcholinesterase (BChE) inhibition, thioflavin T fluorescence for Aβ aggregation, and DPPH assay for antioxidant capacity. The lead compound, MTDL-2025A, showed potent inhibition of AChE ($IC_{50}$ = 45.2 nM) and BChE ($IC_{50}$ = 61.7 nM), along with 63% inhibition of $A\beta_{1-42}$ aggregation at 10 µM, and strong free radical scavenging activity. Additionally, cytotoxicity screening in SH-SY5Y neuronal cells confirmed its safety at effective concentrations. These findings highlight the potential of AI-integrated medicinal chemistry strategies to accelerate the discovery of multifunctional agents for complex diseases like AD. Further in vivo studies are ongoing to validate pharmacokinetic and behavioral effects in transgenic AD models.

**Keywords:** Alzheimer's disease; multi-target ligands; artificial intelligence; acetylcholinesterase inhibitors; amyloid-β.

**AI-168**

## AI-ENABLED MEDICAL DEVICES IN THE UNITED STATES (2020-2025): REGULATORY APPROVALS AND ETHICAL IMPERATIVES

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Between 2020 and 2025, the United States saw a significant rise in the number of medical devices using artificial intelligence (AI). As of mid-2025, there were 1,016 FDA-approved AI-enabled devices. These innovations, which include imaging, diagnostics, and decision-support systems, demonstrate how AI has the potential to transform the healthcare industry. However, there are particular ethical and regulatory issues because of adaptive algorithms which are dynamic. The FDA's 2025 draft guideline on lifecycle management, transparency, and bias reduction serves as one of the regulatory milestones that are outlined in this assessment. It also look at the dominance of the 510(k) pathway, which makes it easier to approve devices that are essentially the same as existing technologies. The ethical analysis highlights three critical areas. First, data ethics is a concern since non-representative training datasets can increase bias, undermining fairness in healthcare delivery. Second, autonomy and accountability raise questions about reduced medical judgment and unclear responsibility for AI-driven outcomes. Finally, transparency and trust are crucial for public confidence and regulatory legitimacy, highlighting the need for transparent AI and inclusive design in medical technologies. Despite recent regulatory advancements, there are still gaps in the way real-world implementation issues are addressed, particularly for adaptive AI systems that change after approval. To enable responsible innovation, the work promotes active stakeholder participation, globally harmonised ethical frameworks, and ongoing post-market surveillance.

**Keywords:** Artificial Intelligence, Medical Devices, FDA Approval, Ethics, Bias, Transparency, Regulatory Frameworks.

**AI-169**

## NEXT-GENERATION CANCER TREATMENT: THE ROLE OF NANOBOTS IN PRECISION ONCOLOGY

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Cancer remains a leading cause of mortality worldwide, responsible for approximately 7.6 million deaths each year due to the unchecked proliferation and dissemination of abnormal cells. Although chemotherapy and radiotherapy are standard treatment modalities, their clinical utility is often compromised by a lack of specificity, collateral damage to healthy tissues, and severe adverse effects that diminish patient quality of life. This scenario underscores the urgent need for precision-targeted, less toxic, and highly effective cancer therapies. Nanobots—Nano scale robotic systems engineered to function within the human body—have emerged as a ground breaking innovation in precision oncology. These devices are capable of actively traversing the circulatory system, overcoming biological barriers, and selectively homing in on tumor cells while sparing normal tissues. By functionalizing nanobots with ligands, peptides, or antibodies, researchers have achieved remarkable tumour specificity. Moreover, nanobots can be externally guided and activated using magnetic fields, ultrasound, or light, enabling controlled and site-specific drug release. In addition to targeted drug delivery, nanobots are being explored for cancer detection, imaging, bio sensing, and direct mechanical disruption of malignant cells. While these technologies are primarily in the research and development phase, nanobot-based cancer therapy represents a




ISBN: 978-81-980623-8-3

paradigm shift in oncology, offering the promise of safer, more effective, and personalized treatment strategies for the future.

**Keywords:** Cancer, Nanobots, Precision Oncology, Targeted Drug Delivery, Chemotherapy.

**AI-170**

## AI AUGMENTED QUANTITATIVE SYSTEM PHARMACOLOGY (QSP) MODELS IN CLINICAL TRIALS

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AI-enhanced Quantitative Systems Pharmacology (QSP) models integrate mechanistic, system level simulations and machine learning to provide the capability of integrating and interpreting large clinical and real-world datasets. Incorporating AI into QSP modeling is a leap forward for patients and all that are involved in the success of clinical trials. This models enable researchers to model full-patient responses, retaining both heterogeneity and variability of real life. It heralds a new age in drug development and clinical trial design. This model allows for development of digital twins and hybrid models that simulate individualized disease and treatment, optimize dosing strategies, and support adaptive clinical trial designs. Through automated data extraction, improved model parameterization, and interdisciplinary cooperation, this platforms have the potential to enhance predictive accuracy for outcomes and hasten decision-making. Nevertheless, QSP challenges in model validation, interpretability, and regulatory acceptability exist. By breaking these hurdles, AI-enhanced QSP promises to transform precision medicine, minimize the expense of clinical trials, and enhance patient outcomes through data-driven, personalized, and effective therapeutic development pipelines. This combination of machine learning and biological understanding assists doctors in predicting which therapies will most likely benefit various individuals, accelerating the development of drugs while minimizing the risks and uncertainty faced by patients in clinical trials. Clinical trials become more inclusive and representative, helping ensure that promising, safe therapies reach those who need them most faster and with greater confidence. By uniting human creativity with AI's analytical power, this approach puts patient outcomes and ethical progress at the heart of medical innovation, offering hope for better, more individualized care in the future.

**Keywords:** Artificial Intelligence, Quantitative Systems Pharmacology (QSP), Clinical trials, Digital twins, Hybrid models.

**AI-171**

## REIMAGINING DRUG SAFETY: ARTIFICIAL INTELLIGENCE AT THE HEART OF MODERN PHARMACOVIGILANCE

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The global acceleration of drug development, coupled with increasingly diverse patient populations and incomplete health records, has placed unprecedented demands on pharmacovigilance (PV). Established by the World Health Organization in 1961 to monitor and prevent adverse drug reactions, PV now faces a volume and complexity of safety data that far exceed the capacity of traditional, manually driven approaches. Artificial Intelligence (AI) has emerged as a pivotal response to these pressures. By applying machine learning (ML) and natural language processing (NLP), AI systems can automatically extract and synthesize information from fragmented and heterogeneous healthcare data. This not only reduces operational costs and turnaround times but also improves the accuracy and consistency of drug safety evaluations. A particularly transformative application is in the handling of Individual Case Safety Reports (ICSRs), whose numbers continue to escalate worldwide. AI techniques support both structured and unstructured content integration, enhance the quality of incomplete submissions, and accelerate expert decision-making. Platforms such as VigiBase, VigiAccess, VigiLyze, PharmGKB, Argus, XtalPi, and BenevolentAI exemplify how advanced analytics enable rapid signal detection, cross-dataset comparisons, and real-time safety insights. Beyond streamlining workflows, AI strengthens regulatory compliance, improves adverse event detection, and reduces reliance on human resources. The convergence of pharmaceutical expertise with cutting-edge information technologies is reshaping PV into a more proactive, data-driven discipline. Continued innovation in algorithms, integrated databases, and collaborative frameworks will be critical to unlocking AI's full potential in protecting public health.

**Keywords:** Drug Safety, Pharmacovigilance, Artificial Intelligence, Adverse Reaction Monitoring, Global Health Surveillance.

**AI-172**

## AI-POWERED PHARMACOVIGILANCE: ENHANCING SAFETY MONITORING OF NEUROACTIVE DRUGS.

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Pharmacovigilance is the science of monitoring and improving the safety of medicines, and it becomes especially important in the case of neuroactive drugs. Drugs used in treating depression, epilepsy, psychosis, and neurodegenerative diseases often causes adverse drug reactions (ADRs) that may appear late, remain hidden, or resemble the symptoms of the disease itself. This makes their detection extremely difficult. Traditional pharmacovigilance, which depends mainly on spontaneous reporting, suffers from problems like underreporting, fragmented information, and delayed recognition of safety signals. Here, artificial intelligence (AI) brings a transformative solution. Using machine learning, natural language processing (NLP), and big data analytics, AI can analyze massive amounts of information from electronic health records, clinical trials, pharmacovigilance databases, and even patient-reported outcomes. This helps in identifying hidden patterns, at-risk patient groups, and early warning signals much faster than conventional methods. Most importantly, AI shifts pharmacovigilance from a reactive approach to a proactive system. Instead of waiting for adverse effects to occur, AI enables real-time monitoring and early interventions, reducing risks and protecting patient safety. In the field of CNS therapies, this precision is crucial because ADRs can directly affect patient adherence and quality of life. AI-powered pharmacovigilance is not just a tool- it is the future of safer medicine, built on precision, protection, and trust. It acts as a shield that prevents harm before it occurs, while keeping patients at the center by restoring confidence and moving us closer to personalized care.

**Keywords:** Artificial Intelligence, Pharmacovigilance, CNS Drugs, Adverse Drug Reactions, Neuropharmacology.

**AI-173**

## FROM INNOVATION TO EMPOWERMENT: A RANDOMIZED STUDY ON THE EFFECT OF AI-BASED TOOLS IN ENHANCING PATIENT ADHERENCE AND OUTCOMES

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In managing chronic diseases, medication non-adherence is a significant problem that frequently results in subpar therapeutic outcomes. Tools powered by artificial intelligence (AI) offer creative ways to assist patient empowerment, adherence, and counselling. This study assessed how an AI-based mobile application combined with pharmacist counselling could help patients with Type 2 Diabetes Mellitus improve their clinical outcomes and medication adherence. 50 diabetic patients were randomised into two groups for a 6-month prospective interventional study: control (n = 25, traditional pharmacist counselling) and intervention (n = 25, pharmacist counselling + AI-enabled app). The app offered instructional videos, interactive chatbot assistance, and automated medicine reminders. HbA1c levels, patient empowerment (5-point Likert scale), and medication adherence (MMAS-8) were among the outcomes assessed. The adherence scores of the intervention group significantly improved (4.8 → 7.3; $p < 0.001$), while the control group experienced only minor changes (4.7 → 5.2). The intervention group's HbA1c levels decreased from 8.4% to 7.2% ($p < 0.05$), however the control group's levels did not significantly decrease. The intervention group experienced a significant improvement in patient empowerment




ISBN: 978-81-980623-8-3

scores (3.0 → 4.5; $p < 0.01$). These results suggest that AI-enabled solutions supplement pharmacist counselling by providing ongoing assistance that improves patient, confidence, adherence, education. By educating patients, developing adherence techniques, and enabling self-management, AI-driven interventions can revolutionise patient care when included into pharmacy practice. The management of chronic diseases and pharmacy practice have a bright future thanks to this hybrid model.

**Keywords:** Artificial intelligence, Medication adherence, Patient empowerment, Diabetes management, Digital health.

**AI-174**

**DIGITAL TWINS IN NEUROPHARMACOLOGY: AI-BASED SIMULATIONS FOR PERSONALIZED BRAIN DRUG RESPONSE**

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The concept of digital twins—virtual patient-specific replicas powered by artificial intelligence (AI)—is gaining momentum in neuropharmacology as a tool to simulate drug response, optimize therapy, and reduce trial-and-error in clinical practice. Neurological and psychiatric disorders are characterized by high inter-individual variability, where factors such as genetics, age, comorbidities, and environment influence drug efficacy and safety. Traditional approaches often fail to capture this complexity, leading to inconsistent outcomes and suboptimal dosing strategies. AI-enabled digital twins integrate multimodal data, including neuroimaging, genomics, electrophysiology, and pharmacokinetic/pharmacodynamic profiles, to build dynamic computational models of individual patients' brains. These models allow virtual testing of drug interactions, prediction of therapeutic efficacy, and identification of potential adverse effects before actual administration. In disorders such as epilepsy, Parkinson's disease, and depression, digital twins offer a promising pathway toward precision therapeutics by enabling personalized dose adjustments and treatment monitoring. By bridging computational neuroscience and clinical pharmacology, AI-driven digital twin technology has the potential to revolutionize CNS drug development and delivery, providing safer, faster, and more effective solutions in neurotherapeutics.

**Keywords:** Digital Twin, Artificial Intelligence, Neuropharmacology, Precision Medicine, Personalized Therapy.

**AI-175**

**EMPOWERING CLINICAL TRIALS WITH AI: FROM PATIENT MATCHING TO ADAPTIVE DESIGN**

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Clinical trials underpin medicine development but face major efficiency and retention challenges. AI is changing that. By scanning electronic health records and real-world data, AI tools now match patients to trials 10–20% faster and keep more participants engaged. Predictive analytics spot protocol issues before they occur, cutting delays and improving safety. Digital twins, virtual copies of patients, let researchers test dosing and outcomes without extra visits. Natural language processing handles document drafting and data cleanup, so teams can focus on patients. Early adopters report 80% faster recruitment and a 30% rise in data accuracy. Examples from oncology and rare disease trials show how AI-driven site choice and adaptive protocols speed decision-making and simplify mid-trial changes. Success depends on secure data sharing, transparent algorithms, and teamwork across all stakeholders. Looking ahead, mixed human-AI teams will fine-tune treatment plans in real time, and federated learning will unlock insights from patients around the world. Embracing AI now will redefine trials as flexible, patient-focused journeys accelerating lifesaving therapies more quickly and reliably than ever before.

**Keywords:** Clinical trial, patient matching, predictive analytics, digital twin, NLP, adaptive design, patient centricity.

**AI-176**

**THE ROLE OF DIGITAL BIOMARKERS IN PREDICTING TREATMENT OUTCOMES"**

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The emergence of digital health technologies has introduced digital biomarkers as innovative tools in clinical research. Digital biomarkers are objective, quantifiable physiological and behavioural data collected through wearable sensors, smartphones, and other connected devices. These biomarkers provide real-time insights into disease progression, treatment adherence, and therapeutic response beyond traditional clinical endpoints. By continuously monitoring patient activity, sleep patterns, heart rate variability, gait, or cognitive function, digital biomarkers enhance the precision of outcome measurements and allow early detection of treatment efficacy or adverse effects. In clinical research, the integration of digital biomarkers offers significant advantages, including reduction of recall bias, improved patient compliance, and the possibility of remote monitoring in decentralized trials. Furthermore, they enable personalized treatment strategies by identifying patient subgroups most likely to respond to specific therapies. Despite their promise, challenges remain in terms of data standardization, regulatory validation, interoperability, and patient privacy concerns. Addressing these issues is essential for the widespread adoption of digital biomarkers in clinical trials. This paradigm shift toward technology-driven outcomes has the potential to transform drug development, accelerate clinical decision-making, and improve overall patient care. As healthcare increasingly embraces digital innovation, digital biomarkers are likely to become critical components in predicting treatment outcomes and advancing personalized medicine.

**Keywords:** Digital biomarkers, clinical research, treatment outcomes, wearable devices, personalized medicine, artificial intelligence.

**AI-177**

**AI-DRIVEN NANO TECHNOLOGY FOR ADVANCED CANCER TREATMENT**

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Cancer treatment is complex because of how different it is from person to person. A single treatment doesn't work for everyone. Thankfully, new technologies like artificial intelligence (AI) and nanotechnology are helping to change that. Over the last ten years, nanotechnology has developed tools like tiny drug delivery systems and diagnostic devices that can improve how we treat cancer. But these tools still have limitations due to how much patients, tumors, and diseases can vary. This is where AI comes in. Using powerful machine and deep learning, AI can analyse huge amounts of patient data to help doctors create truly personalized treatment plans. It can even predict how a drug will interact with a specific tumor, helping to make nanomedicines more effective while reducing harmful side effects. The goal is to combine AI with nanomedicines to create a new way to fight cancer—one that moves away from a "one-size-fits-all" approach and gives each patient the specific, tailored treatment they need to improve their chances of a good outcome.

**Keywords:** AI (Artificial Intelligence), Nanotechnology, Personalized Treatment, Drug Delivery, Cancer.

**AI-178**

**PYTHON IN PHARMACY**

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The integration of programming languages like Python into the field of pharmacy has opened new avenues for innovation, efficiency, and precision. Python, known for its simplicity and versatility, is increasingly being utilized in pharmaceutical research, drug discovery, clinical data analysis, and healthcare automation. It allows pharmacists and researchers to process large datasets, model drug interactions, simulate pharmacokinetic and pharmacodynamic processes, and even support the development of AI-driven diagnostic tools. With powerful libraries such as NumPy. Pandas, SciPy, and machine learning frameworks like Scikit-learn and TensorFlow, Python empowers pharmaceutical professionals to analyze trends, predict outcomes, and make data-driven decisions. As the pharmaceutical industry embraces digital




ISBN: 978-81-980623-8-3

transformation, Python stands out as a key tool enabling smarter, faster, and more accurate pharmaceutical practices.

**AI-179**

**PREDICTION TOOL DEVELOPMENT USING A.I. FOR MDRO INFECTIONS IN CRITICALLY ILL PATIENTS**

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Multidrug-resistant organisms (MDROs) represent a significant clinical challenge in critical care, contributing to prolonged hospital stays, elevated healthcare costs, and increased mortality. Inappropriate antibiotic use, invasive procedures, and delayed diagnostic results exacerbate MDRO prevalence. Artificial Intelligence (A.I.) offers a promising approach for early risk prediction and targeted intervention. The objective of this research was to identify risk factors associated with MDRO infections and to develop an A.I.-based predictive tool for critically ill patients. An ambispective study was conducted at a tertiary care hospital in Kerala, utilizing retrospective data from 323 critically ill patients. Data variables included demographics, comorbidities, prior antibiotic exposure, and device usage. Machine learning models such as Decision Trees, Random Forests, Logistic Regression, Support Vector Machine (SVM), and XGBoost were developed and evaluated using accuracy, sensitivity, specificity, and AUC. Results revealed that 76 patients developed MDRO infections, with prolonged ICU stay, invasive device use, and broad-spectrum antibiotic overuse as major risk factors. Random Forest achieved the highest training accuracy (96%) and upon prospective validation, the A.I. model demonstrated 81.8% sensitivity. MDRO-positive patients had significantly longer hospital stays and higher mortality rates. This study concludes that the developed A.I.-based prediction tool has strong potential for early detection of MDRO risk in critically ill patients. Its integration into clinical practice may enhance antibiotic stewardship, optimize empirical therapy, and improve patient outcomes.

**Keywords:** MDRO, Artificial Intelligence, Critical Care, Antibiotic Resistance, Risk Prediction Tool, Machine Learning.

**AI-180**

**ARTIFICIAL INTELLIGENCE IN DRUG DESIGN & DEVELOPMENT REMODEL CHALLENGE INTO POSSIBILITY**

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Artificial intelligence is a branch of computer science that includes collecting information, developing rule and mimicking human behaviors. Artificial intelligence transformed formulation and development of pharmaceuticals. Researcher can optimize, design and develop formulation in a efficient and accurate way. The concept of artificial intelligence is to developed intelligent computer system which can operate with minimum human involvement or no involvement at all. The advantage of artificial in formulation of pharmaceuticals is it capacity to analyse huge data and spot pattern and connection which a human would miss. Tools such as ANN, Fuzzy logic, Neuro-Fuzzy logic used for pharmaceutics. Artificial intelligence can also be applied in improving formulation by study solubility, stability and bioavailability of drug. Artificial intelligence is also used in clinical trial help in reducing time and cost of process. Artificial intelligence is also applied to optimize and automize in various section of pharmaceutical industry. Traditional methods of drug development are time consuming, expensive and less efficient. The inclusion of artificial intelligence addressed challenges by examine compound from a huge pool of input drug. Artificial intelligence improve drug design by enhancing efficiency and predicting accurately drug properties like absorption, distribution, metabolism, bioactivity and toxicity. artificial intelligence is a effective tool in pharmaceutical formulation and developing, as artificial intelligence allow analysis of vast data. Enabling faster, effective, and effective drug design.

**AI-181**

**Artificial Intelligence In Early Detection Of Cardiac Disorders: Advancements And Clinical Implications**

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Background: Cardiac disorders remain a leading cause of global morbidity and mortality. Early detection plays a crucial role in reducing complications and improving survival outcomes. Artificial Intelligence (AI), particularly machine learning and deep learning models, has demonstrated strong potential in detecting subtle cardiac abnormalities using ECG, echocardiography, and wearable device data. Aim and Objective: To evaluate the role of Artificial Intelligence in improving the accuracy and efficiency of early detection of cardiac disorders. To compare the diagnostic performance (sensitivity, specificity, and accuracy) of AI-based tools with conventional cardiac diagnostic methods. To analyze the clinical implications of AI integration in early cardiac disorder detection, focusing on timely diagnosis and improved patient outcomes. Methodology:A prospective study was conducted with a sample size of 120 patients at a tertiary cardiac care hospital. Patients underwent conventional diagnostic methods (ECG, echocardiography) alongside AI-based predictive screening. Diagnostic accuracy, sensitivity, and specificity were compared between AI models and standard methods. Statistical analysis was performed using Chi-square tests, with significance set at $p < 0.05$. Results: AI-assisted detection demonstrated 92.5% sensitivity and 89.1% specificity, compared to 81.7% sensitivity and 78.4% specificity with conventional methods. Out of 120 patients, AI correctly identified 111 true positives, significantly higher than standard diagnostics (98 true positives). The improvement was statistically significant ($p = 0.002$). Furthermore, AI reduced the average detection time by 35%, enhancing clinical efficiency. Conclusion: AI-based approaches provide higher diagnostic accuracy and efficiency in early detection of cardiac disorders compared to conventional methods. Integration of AI into routine cardiac screening may improve early intervention, reduce complications, and optimize patient outcomes. However, further large-scale validation and ethical considerations are essential for widespread adoption.

**Keywords:** Artificial Intelligence, Cardiac Disorders, Early Detection, Machine Learning, Clinical Implications, Diagnostic Accuracy

**AI-182**

**THE USE OF AN AI IN MANAGEMENT OF PEPTIC ULCER DISEASE (PUD)**

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Peptic ulcer disease (PUD) remains a global health issue, with nearly 40% of cases being idiopathic. It involves ulceration of the gastric or duodenal mucosa due to gastric acid and digestive enzymes. Alongside conventional risk factors, emerging digital health technologies, particularly artificial intelligence (AI), offer potential for improving disease management through dietary monitoring and lifestyle modification. A cross-sectional survey was conducted among 150 participants to evaluate knowledge, attitude, perception, and practice (KAP) related to PUD. Awareness of risk factors, treatment, prevention, and the role of AI-based tools was assessed through percentage analysis across domains. Knowledge findings showed 41.8% recognised Helicobacter pylori as a key etiological factor. Attitude results revealed 56.2% believed AI apps could assist in diet and symptom tracking, while 57% trusted AI integration. Perception analysis indicated 62.5% willingness to adopt AI-driven dietary monitoring and 43.3% viewed it as cost-effective. In practice, 59.2% considered AI use in dietary management innovative, 68.8% were willing to adopt AI-based ulcer management tools, and 36.4% already used digital dietary trackers. Overall, the study highlights moderate knowledge but strong positive attitudes toward AI, suggesting its integration could enhance prevention, patient engagement, and clinical outcomes in PUD management

**Keywords:** Peptic ulcer, Artificial Intelligence, Management.

**AI-183**

**THE FUSION OF INTELLIGENCE AND IMAGINATION: AI'S ROLE IN THE NEXT ERA OF MEDICINE**

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ISBN: 978-81-980623-8-3

Artificial intelligence (ai) is no longer a supplementary tool but a transformative force within pharmaceutical sciences, redefining traditional paradigms of drug discovery and development. By replacing iterative experimentation with predictive and adaptive modelling, ai offers new precision in the design, evaluation, and optimization of therapeutic agents. In biopharmaceutics, pharmacokinetics, and drug metabolism, machine learning and deep learning algorithms are enabling high-accuracy predictions in bioanalytical studies, bioavailability and bioequivalence assessments, metabolic pathway mapping, and drug transport simulations. Emerging innovations such as digital twins and wearable biosensors extend these capabilities further, creating opportunities for real-time, patient-specific pharmacokinetic profiling and advancing the promise of personalized medicine. Concurrently, medicinal chemistry is undergoing a paradigm shift where computational intelligence expands molecular creativity. Generative design algorithms, AI-driven retrosynthesis planning, and quantum-enabled molecular simulations accelerate the identification and optimization of novel chemical entities. These advances are complemented by AI-supported green chemistry initiatives, ensuring that discovery pipelines align with principles of sustainability. The integration of predictive pharmacokinetics with computational molecular design forms a dynamic feedback loop, where biological evaluation informs and strengthens the models that guided synthesis. This convergence signals more than technological advancement; it represents a structural transformation in pharmaceutical sciences. Future progress demands interdisciplinary expertise, cultivating scientists fluent in both molecular and computational domains. It requires innovation beyond conventional trial-and-error and collaborative frameworks that democratize intelligent tools globally. The critical challenge is not whether AI will transform pharmaceutical sciences, but how effectively the discipline adapts to harness its full potential for precision, sustainability, and personalization in healthcare.

**AI-184**

**INTEGRATING AI FOR OPTIMIZED THERAPEUTIC STRATEGIES AND QUALITY OF LIFE EVALUATION IN ALLERGIC CONJUNCTIVITIS PATIENTS**

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Allergic conjunctivitis is one of the most common ocular surface disorders, significantly affecting patient comfort, vision, and quality of life. Conventional management involves antihistamines, mast cell stabilizers, and corticosteroids. However, therapeutic optimization and systematic assessment of patient-reported outcomes remain limited. The advent of Artificial Intelligence (AI) provides new opportunities for enhancing decision-making in treatment strategies and quality of life evaluation. To evaluate therapeutic management strategies in patients with allergic conjunctivitis. To assess the impact of allergic conjunctivitis on quality of life. To explore the role of AI in optimizing treatment outcomes and patient-reported experiences. A prospective observational study was conducted on 200 patients diagnosed with allergic conjunctivitis were enrolled and assessed using structured questionnaires and clinical parameters. Therapeutic regimens were evaluated, and quality of life was measured using validated scales. AI-based predictive modelling and data analysis were integrated to identify treatment response patterns and optimize management strategies. Among 200 patients, eye symptoms (itching 88.5%, redness 84%, watery eyes 74%) were most common. House dust mites (96.8%) were the leading allergens. Sublingual Immunotherapy (SLIT) in 105 patients showed marked improvement, while antihistamines benefited 95%. Quality of life scores improved significantly ($p=0.0025$; Cohen's $d=1.62$). AI-assisted analysis highlighted predictive response patterns, enabling optimized therapy selection and demonstrating substantial enhancement in patient outcomes and quality of life. Integrating AI with conventional therapeutic approaches enhances personalized management of allergic conjunctivitis and provides deeper insights into quality-of-life outcomes. This approach has the potential to guide clinicians in selecting evidence-based, patient-centric therapies, ultimately improving clinical outcomes and patient satisfaction.

**Keywords:** Allergic conjunctivitis, Artificial Intelligence, Therapeutic management, Quality of life, Personalized medicine.

**AI-185**

**ARTIFICIAL INTELLIGENCE IN CLINICAL RESEARCH**

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Artificial Intelligence (AI) is revolutionizing the field of clinical research by enhancing efficiency, accuracy, and decision-making. Traditional clinical trials are often time-consuming, resource-intensive, and prone to human error. AI-driven technologies, such as machine learning, natural language processing, and predictive analytics, are increasingly being integrated into various stages of research, including patient recruitment, trial design, data management, and outcome prediction. AI enables rapid analysis of large and complex datasets, thereby facilitating precision medicine and identifying novel therapeutic targets. Moreover, AI-based algorithms can improve patient stratification, ensure real-time monitoring, and predict adverse events, reducing the overall cost and risk associated with clinical studies. Integration of electronic health records and wearable devices with AI platforms further supports continuous data collection and personalized interventions. Despite these advancements, challenges remain in terms of data privacy, regulatory approval, ethical considerations, and the need for standardized frameworks to validate AI tools. Collaborative efforts among researchers, clinicians, industry, and policymakers are essential to establish trust, transparency, and accountability in AI-driven clinical research. As the healthcare industry moves towards digital transformation, AI holds the potential to accelerate drug discovery, optimize trial outcomes, and ultimately improve patient care. The successful integration of AI into clinical research could mark a paradigm shift in the way medical evidence is generated and applied in practice.

**Keywords:** Artificial Intelligence, Clinical Research, Machine Learning, Patient Stratification, Drug Discovery, Data Management.

**AI-186**

**STEM CEL BASED BIO THERAPIES ON AI: AI-DRIVEN ADVANCEMENTS IN STEM CELL-BASED BIOTHERAPIES**

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Stem cell-based bio-therapies integrated with Artificial Intelligence (AI) involve using AI to enhance the entire stem cell therapy process, from cell discovery and characterization to personalized treatment planning and monitoring. AI algorithms analyze large datasets to improve cell quality, optimize differentiation, predict patient outcomes, and manage cell delivery. This integration aims to overcome challenges in cell therapy, such as variability in cell quality and the complexity of biological systems, ultimately leading to more effective, personalized, and scalable regenerative treatments for various diseasesThe combination of AI and stem cell therapy is still in its early stages, but it holds immense potential for a new era of personalized regenerative medicine. Future developments will likely involve more sophisticated AI models, improved ethical frameworks, and the integration of AI into routine clinical practice to revolutionize the treatment of many debilitating diseases. AI can provide therapists with data-driven insights that inform treatment decisions and interventions by identifying patterns and trends in this data.

**Keywords:** Cell Discovery and Selection, Cell Quality and Differentiation, Personalized Treatment by Ai, Predictive Analytics by AI.

**AI-187**

**ARTIFICIAL INTELLIGENCE IN NEUROPHARMACOLOGY: TRANSFORMING DRUG DISCOVERY, PERSONALIZATION, AND THERAPEUTIC MONITORING**

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ISBN: 978-81-980623-8-3

The integration of artificial intelligence (AI) into neuropharmacology is reshaping the landscape of drug development, therapeutic optimization, and clinical monitoring in neurological and psychiatric disorders. Traditional approaches to neuroactive drug discovery face challenges such as high attrition rates, limited predictability of blood-brain barrier (BBB) permeability, and variability in patient response. AI-driven methodologies—including deep learning, molecular modeling, and neuroimaging analytics—enable accelerated identification of novel compounds, prediction of receptor-ligand interactions, and simulation of neurotransmitter dynamics. Moreover, machine learning algorithms facilitate precision therapeutics by stratifying patients based on genetic, metabolomic, and imaging biomarkers, allowing for personalized dosing and improved treatment outcomes. In clinical settings, AI-powered pharmacovigilance and natural language processing (NLP) enhance detection of adverse drug reactions to CNS medications. Together, these innovations offer a paradigm shift toward faster, cost-effective, and more precise neurotherapeutic development, highlighting AI's transformative role in advancing neuropharmacology.

**Keywords:** Artificial Intelligence, Neuropharmacology, Drug Discovery, Precision Therapeutics.

**AI-188**

## ARTIFICIAL INTELLIGENCE MODELS FOR PREDICTING BLOOD- BRAIN BARRIER PERMEABILITY: TOWARDS SMARTER NEURODRUG DESIGN.

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The blood-brain barrier (BBB) acts as a selective gatekeeper that controls which substances can pass from the bloodstream into the brain. While this barrier protects the brain from harmful chemicals, it also makes it difficult for many potential drugs to reach their targets in the central nervous system (CNS). Traditionally, researchers test drug permeability using cell-based (in vitro) or animal (in vivo) models. However, these methods are costly, take a lot of time, and often fail to fully represent the complexity of the BBB in humans. Artificial intelligence (AI) offers a powerful alternative. By applying machine learning algorithms such as deep learning, random forest, or support vector machines, AI can analyze large datasets of drug molecules. These datasets include molecular descriptors, physicochemical properties (like lipophilicity, size, charge), and other cheminformatics features. Using this information, AI models can accurately predict whether a drug candidate is likely to cross the BBB.This predictive capability helps researchers quickly identify compounds with CNS potential, saving both time and resources. Moreover, AI reduces the risk of late-stage drug failure, thereby improving the efficiency of CNS drug discovery. Ultimately, AI-driven modeling could enable smarter drug design, personalized neurotherapies, and better outcomes for patients with brain disorders.

**Keywords:** Blood-Brain Barrier, Artificial Intelligence, CNS Drug Discovery, Predictive Modelling.

**AI-189**

## LEVERAGING ARTIFICIAL INTELLIGENCE (AI) FOR EFFECTIVE SCALE-UP, SCALE-DOWN, AND TECHNOLOGY TRANSFER IN PHARMACEUTICAL INDUSTRIES

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Scale-up, scale-down, and technology transfer are critical processes in pharmaceutical industries. Scale-up involves increasing production from laboratory to pilot or commercial scale while maintaining product quality and process efficiency. Scale-down models replicate large-scale conditions on a smaller scale to predict performance, optimize parameters, and troubleshoot issues. Technology transfer ensures seamless knowledge and process movement between development and manufacturing sites or partners, including documentation, training, and validation. Artificial Intelligence (AI) is emerging as a transformative enabler in pharmaceutical research, development, and manufacturing. As the industry seeks to enhance efficiency, compliance, and product quality, the integration of AI into critical operations-including process development, scale-up, scale-down, and technology transfer-offers unprecedented opportunities. AI-driven methodologies applied to scale-up and scale-down of pharmaceutical processes, as well as their seamless technology transfer from R&D to commercial manufacturing. AI models trained on experimental and process data are shown to predict process performance across scales, optimize critical process parameters (CPPs) and ensure consistent product quality attributes (CQAs), thereby reducing trial-and-error and minimizing batch failures. Key challenges in the adoption of AI during scale transitions-such as data scarcity, model interpretability, regulatory compliance, and cross-site variability-are critically analyzed. The study also highlights the role of digital twins, machine learning (ML) algorithms, and process simulation models in facilitating knowledge transfer and decision support during tech transfer between facilities or contract manufacturing organizations (CMOS).Several case studies from formulation development, continuous manufacturing, and biopharmaceutical production demonstrate the practical impact of AI in accelerating timelines, improving scalability predictions, and enabling data-driven decisions across the product lifecycle.

**AI-190**

## TRANSFORMING HEALTHCARE: A COMPREHENSIVE REVIEW OF TELEHEALTH INNOVATIONS THROUGH ARTIFICIAL INTELLIGENCE

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Healthcare is expanding exponentially, and with it comes AI in telehealth, which is the new face of patient care and operational productivity. This article is a comprehensive look at the new frontiers of telehealth that AI technologies have opened up and how they are reshaping the landscape of accessibility, diagnosis, treatment, and patient engagement. We look at some of the latest research and case studies, and how artificial intelligence and its machines like virtual nurses, predictive analytics, machine learning algorithms, are aiding in clinical decision support and patient care. This review discusses how telehealth innovations will make healthcare more accessible to rural and low socioeconomic populations, reduce the overall cost of health care, and make patients more satisfied. We talk about the problems and ethics with AI in telehealth, such as data privacy and algorithmic bias, and we need regulatory structures. This article provides some unique insights, not only for doctors and policy makers, but for those who develop technology as well, medical systems all over the world are having to adapt to this post-pandemic world. When the stake holders understand the impact of AI in tele medicine, the complexities of today's health care delivery system will be a lot easier to handle. This article serves as a key reference for anyone interested in the marriage of technology and medicine, but also gives a glimpse of the future telehealth developments. Explore how not only is AI altering telehealth, but is actually paving the path to a more efficient, more equal, and more patient centered health care system.

**Keywords:** Telehealth, Artificial Intelligence (AI), Healthcare transformation, Telemedicine, Remote patient monitoring.

**AI-191**

## AI-DRIVEN NANO TECHNOLOGY FOR ADVANCED CANCER TREATMENT

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Cancer treatment is complex because of how different it is from person to person. A single treatment doesn't work for everyone. Thankfully, new technologies like artificial intelligence (AI) and nanotechnology are helping to change that. Over the last ten years, nanotechnology has developed tools like tiny drug delivery systems and diagnostic devices that can improve how we treat cancer. But these tools still have limitations due to how much patients, tumors, and diseases can vary. This is where AI comes in. Using powerful machine and deep learning, AI can analyse huge amounts of patient data to help doctors create truly personalized treatment plans. It can even predict how a drug will interact with a specific tumor, helping to make nanomedicines more effective while reducing harmful side effects. The goal is to combine AI with nanomedicines to create a new way to fight cancer—one that moves away from a "one-size-fits-all" approach and gives each patient the specific, tailored treatment they need to improve their chances of a good outcome.




ISBN: 978-81-980623-8-3

**Keywords:** AI (Artificial Intelligence), Nanotechnology, Personalized Treatment, Drug Delivery, Cancer.

**AI-192**

**GAME BASED LEARNING: A NEW APPROACH FOR CLASSROOM TEACHING**

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In today's era, newer innovative teaching learing methodologies are emerging to facilitate teaching with fun. Among which game-based learning is an educational approach that combines the engagement of games with the learning objectives of education, making it a fun and interactive way to learn. Game-based learning aims to strenthen critical thinking among students and less distraction in the class. It also gives solution to common problem i.e declining attendance of student faced by the teachers in the classroom. Most of the time I give creative assignments in the pharmaceutical chemistry class to develop interest in the students, as chemistry is known as the toughest subject for remembering many chemical reactions with structures at a time. Students always feel bored in the class so I use innovative methods to get their attention on board and create a stress free environment for learning in the classroom. Tic-tac-toe game motivates students to learn by making the learning process more enjoyable and more interactive. Crossword puzzle game requires group of students to solve puzzle which helps in the development of critical thinking and problem-solving skills. Puzzle on name reactions of organic chemistry and their mechanism was tailored to individual learning styles and pace, making it an effective tool for personalized learning. In the classroom teaching I divide the students in a team and ask them to solve the puzzle and give marks as per the right (+10)/wrong (-05) marks, and calculate the score at last. This exercise makes them active during the whole class. Some time I examine the level of knowledge of students on the perticular topic by asking them to frame questions (open book test) and make the corrections, if needed and give those questions to another team to solve it and vice versa. As a facilitator my role is to check whether each and every student has contributed in this question making exercise or not. It improves communication skills of students by interacting with peers in the classroom during question answer session. Interactive experiences can help students remember information better than traditional learning methods. Multiplayer games can promote teamwork and collaboration among students.

**Keywords:** Game based learning, classroom teaching, tic-tac-toe game, crossword puzzle, organic chemistry.

**AI-193**

**AI-INTEGRATED MOLECULAR INSIGHTS: TRANSFORMING PHARM D EDUCATION AND CLINICAL PRACTICE**

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The future of pharmacy lies at the intersection of molecular biology, artificial intelligence (AI), and clinical practice. Pharm D students must be equipped not only with therapeutic knowledge but also with exposure to emerging technologies that drive drug discovery and personalized medicine. In line with this vision, an educational visit to the Centre for Cellular and Molecular Biology (CCMB), Hyderabad, was undertaken to bridge the gap between research laboratories and clinical pharmacy. During the visit, students interacted with scientists and explored advanced research facilities such as genomics, cell culture, protein engineering, and high-end instrumentation including cryo-electron microscopy and flow cytometry. Emphasis was placed on pharmacogenomics, molecular diagnostics, and AI-driven predictive modeling in identifying drug targets and patient-specific therapeutic responses. These interactions showcased how big data analytics and AI tools are accelerating drug discovery and optimizing treatment outcomes. The experience highlighted that integrating AI and molecular biology into Pharm D education can empower students to contribute meaningfully to pharmacovigilance, precision medicine, and clinical research. Such exposure transforms students from passive learners into innovators, capable of translating laboratory science into bedside application. This initiative exemplifies how experiential learning prepares Pharm D professionals to lead the next generation of pharmacy practice in an era dominated by technology and innovation.

**Keywords:** Artificial Intelligence, Pharm D, Molecular Biology, Pharmacogenomics, Personalized Medicine, Clinical Pharmacy.

**AI-194**

**REVOLUTIONIZING PHARMACY EDUCATION WITH CHATGPT AND LARGE LANGUAGE MODELS: TOWARDS AI-DRIVEN LEARNING**

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Background: Pharmacy education in India faces persistent challenges such as rote learning, limited clinical exposure, and inadequate alignment with industry expectations. With the adoption of National Education Policy (NEP) 2020, there is a need for innovative tools that foster critical thinking, problem-solving, and continuous learning. Artificial intelligence (AI), particularly ChatGPT and large language models (LLMs), offers transformative opportunities to bridge this gap. Objectives: This study aimed to evaluate the potential of ChatGPT in pharmacy education by assessing its utility in enhancing learning outcomes, student engagement, and knowledge accessibility. Methodology: A mixed-method pilot study was conducted with 50 final-year B. Pharm students. Participants were introduced to ChatGPT for academic assistance in pharmacology, pharmaceutical jurisprudence, and patient counseling scenarios. Pre- and post-intervention questionnaires measured changes in understanding, problem-solving, and satisfaction. Qualitative feedback was collected through focus group discussions to identify perceived advantages and limitations. Results: Post-intervention analysis revealed a 38% improvement in conceptual understanding and a 46% rise in problem-solving accuracy compared to baseline. Students reported increased engagement and accessibility to complex concepts in simplified language. However, concerns were raised regarding occasional inaccuracies, lack of context in clinical scenarios, and the necessity of faculty supervision. ChatGPT and LLMs hold significant potential in personalizing pharmacy education, aligning with NEP 2020 goals of competency-based learning. Integration of AI into pharmacy curricula can empower students, but regulatory frameworks and ethical guidelines are essential for safe adoption.

**Keywords:** ChatGPT, Pharmacy Education, Artificial Intelligence, National Education Policy 2020, Large Language Models, Digital Learning

**AI-195**

**AL AND TECHNOLOGY FOR FUTURE OF CLINICAL PHARMACY AND PATIENT CARE**

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Today's world is dominated by artificial intelligence (AI) and technology, and this is going to be more dominant in clinical pharmacy and patient care. In the past, pharmacists mainly dispensed medicines and offered basic counselling, but future roles will be far more data-driven and patient-centred. New technologies and AI-based platforms can support pharmacists in delivering personalised, effective, and efficient care beyond routine practice. Based on an extensive literature survey, our study highlights three major fields where AI is transforming pharmacy practice. Predictive analytics enables early identification of patients at risk of adverse drug reactions, non-compliance, or disease progression. Studies show AI systems can reduce medication errors by up to 15% and increase patient compliance by 10%. Machine learning tools predicting conditions like diabetes or hypertension achieve over 85% accuracy, supporting early intervention. Personalised medicine will benefit greatly from genetic profiling and biomarker analysis. AI-assisted drug selection and dose optimisation have been shown to reduce prescription processing time by 40%, giving pharmacists more time for clinical decision-making. Pharmacogenomic platforms have demonstrated a 30% improvement in antidepressant therapy outcomes and a 25% reduction in serious adverse events in cancer treatment. Telepharmacy and remote monitoring further extend pharmacist reach. Wearables and digital platforms support real-time patient oversight and proactive interventions. AI-based image analysis in teledermatology detects drug-




ISBN: 978-81-980623-8-3

induced skin reactions with 92% sensitivity. Automation of routine tasks such as medication reconciliation and inventory management also enhances efficiency. Our findings emphasise that pharmacy education is increasingly integrating informatics and data science. Embracing AI will strengthen pharmacists' roles within the healthcare team and lead to improved patient care and system-wide benefits.

**Keywords:** Clinical Pharmacy, Artificial Intelligence (AI), Patient Care, Personalised Medicine, Telepharmacy, Predictive Analytics, Digital Health, Medication Management.

**AI-196**

## ARTIFICIAL INTELLIGENCE IN DRUG DISCOVERY AND DEVELOPMENT

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The integration of Artificial Intelligence (AI) into the pharmaceutical industry has significantly transformed various facets of research and development. It explores the impactful applications of AI in key areas such as drug discovery and development, drug re-purposing, improving pharmaceutical productivity, and enhancing the efficiency of clinical trials. By reducing human workload and accelerating processes. The adoption of AI not only helps reduce human workload but also accelerates the achievement of critical milestones within a shorter time frame. AI has contributed to achieving targets within shorter time frames also discusses the tools and techniques utilized in AI-driven pharmaceutical solutions,this has led to a reduction in time and cost associated with traditional drug development processes while enhancing success rates. The application of AI also enables better decision-making through real-time data analysis and simulation, improving the efficiency and safety of drug development pipelines.the challenges encountered during implementation, and potential strategies to overcome these barriers. Finally, the review highlights the future prospects of AI in advancing pharmaceutical innovation and healthcare delivery.

**Keywords:** Artificial intelligence in pharmaceutical industry, Drug discovery, Drug re-purposing, Clinical trials & life cycle of pharmaceutical products.

**AI-197**

## AI-DRIVEN PHARMA: BUILDING KNOWLEDGE, DRIVING INNOVATION, EMPOWERING HEALTHCARE

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Artificial Intelligence (AI) and modern technological advancements are transforming the pharmaceutical industry, creating new possibilities in research, development, and patient care. The theme "AI & Technology in Pharma: Educate, Innovate, Empower" highlights the pivotal role of digital transformation in shaping the future of pharmacy and healthcare. Educating pharmacy professionals and students in AI-driven tools such as machine learning, predictive analytics, and bioinformatics ensures the development of a workforce capable of adapting to global technological trends. Innovation is fostered through applications like AI-assisted drug discovery, virtual screening, molecular modeling, precision medicine, automated manufacturing, and digital health monitoring, all of which accelerate processes and reduce costs. Furthermore, technology empowers pharmacists, researchers, and healthcare providers to make data-driven decisions, enhance regulatory compliance, and improve patient-centric approaches. Integration of AI in pharmacovigilance, supply chain management, telepharmacy, and wearable-based drug monitoring ensures safe, effective, and accessible healthcare. This holistic approach educating the next generation, innovating through technology, and empowering communities strengthens the bridge between science and society. By embracing AI and digital tools, the pharmaceutical sector not only transforms traditional practices but also ensures sustainable growth, global competitiveness, and improved quality of life.

**Keywords:** Artificial Intelligence (AI), Pharmaceutical Technology, Drug Discovery, Machine Learning, Precision Medicine, Digital Health, Pharmacovigilance, Automation.

**AI-198**

## TRANSFORMING CLINICAL PRACTICE: THE ROLE OF AI-POWERED MEDICAL ASSISTANTS IN ENHANCING HEALTHCARE EFFICIENCY AND DECISION-MAKING

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The integration of Artificial Intelligence (AI) into clinical practice has emerged as a transformative force in modern healthcare. AI-powered medical assistants, driven by Natural Language Processing (NLP) and Machine Learning (ML), enhance efficiency by supporting clinicians in documentation, diagnosis, triage, and decision-making. These systems streamline patient interaction, improve the accuracy of electronic medical records, and reduce the administrative workload that often contributes to clinician burnout. Furthermore, AI-enabled assistants facilitate personalized treatment recommendations, optimize resource utilization, and ensure continuity of care. Despite their significant promise, challenges remain regarding algorithmic bias, data privacy, interoperability, and regulatory compliance. Addressing these issues is critical for building trust and ensuring ethical adoption. This paper underscores the potential of AI-powered medical assistants to revolutionize healthcare efficiency while emphasizing the importance of transparent governance frameworks and robust quality standards to safeguard patient safety.

**Keywords:** Artificial Intelligence, Clinical Efficiency, AI Medical Assistants, Digital Health, Decision Support, Healthcare Automation.

**AI-199**

## AI-DRIVEN ZLD: TURNING PHARMA WASTEWATER INTO A RESOURCE

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Pharmaceutical formulation plants generate wastewater streams containing high salinity, organic loads, and cleaning chemicals, making sustainable water management a critical challenge. Traditional Zero Liquid Discharge (ZLD) systems, while effective, are energy-intensive and operationally complex. This study proposes an innovative smart ZLD architecture that integrates Internet of Things (IoT) and Artificial Intelligence (AI) with energy-efficient process technologies. The system combines advanced biological and membrane processes (MBR, UF, high-recovery RO, FO/MD) with thermal concentration steps (MVR, crystallizer). The approach is supported by renewable energy integration and waste-heat recovery to optimize performance. IoT-enabled sensors and AI-driven control systems enable real-time monitoring and process optimization, resulting in improved water recovery, energy efficiency, and operational flexibility. The combination of advanced treatment technologies ensures compliance with environmental regulations and enables resource recovery from pharmaceutical wastewater. The proposed AI-driven ZLD system offers a sustainable and cost-effective solution for pharmaceutical wastewater management, transforming wastewater into a valuable resource and minimizing environmental impact.

**Keywords:** Zero Liquid Discharge, Pharmaceutical Wastewater, Artificial Intelligence, Internet of Things, Sustainable Water Management.

**AI-200**

## AI-INTEGRATED SMART MEDICAL DISPENSARY SYSTEM: BRIDGING RURAL HEALTHCARE GAPS AND ENHANCING URBAN CONVENIENCE

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Access to essential healthcare varies greatly between rural and urban populations, with rural areas facing shortages of medical infrastructure and professionals, and metropolitan cities struggling with overcrowding, long queues, and limited 24×7 access. To address both challenges, a Smart Medical Dispensary System integrated with Artificial Intelligence


ISBN: 978-81-980623-8-3

(AI) is proposed. The system ensures round-the-clock availability of critical drugs, including emergency medications, cardiac drugs, and antidiabetic therapies, supported by the presence of a pharmacist or doctor either on-site or via teleconsultation. Villagers can utilize medical cards linked to primary healthcare centers for accurate patient identification and treatment history, while urban residents benefit from digital health record integration and faster access in high-footfall areas such as hospitals, metro stations, and residential complexes.AI-based prescription scanning and analysis improve safety by detecting potential errors, interactions, and duplications before dispensing. The system also employs data analytics to monitor medication demand, send refill reminders, and optimize stock management.By reducing travel in rural regions and saving time in metropolitan cities, the proposed model creates a scalable, community-centric, and technology-driven healthcare solution. It has the potential to strengthen healthcare delivery, improve adherence in chronic disease management, and ensure equitable access to life-saving medicines for diverse populations.

**AI-201**

**AI-ASSISTED PH-SENSITIVE NANOPARTICLES FOR DUAL DRUG DELIVERY OF CATECHIN AND CURCUMIN IN PERSONALIZED ANTICANCER THERAPY**

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Artificial intelligence (AI) is rapidly reshaping the development of nanomedicine by enabling predictive modelling and intelligent optimization of different dosage forms. This study aims to the design of pH-sensitive nanoparticles co-loaded with catechin and curcumin. Catechin and curcumin are natural polyphenols having anticancer, antioxidant, anti-inflammatory activities. The tumor microenvironment, characterized by acidic pH and oxidative stress, provides an ideal target for such stimuli-responsive delivery systems. Different AI assisted software such as *Design expert* can be used to optimize formulation parameters including polymer ratio, surfactant concentration, particle size, zeta potential and drug loading efficiency. AI-assisted predictive tools such as Gastroplus further used to study drug release kinetics under tumor simulated acidic conditions, significantly reducing experimental workload and accelerating formulation screening. Preliminary simulations suggest synergistic cytotoxicity and sustained release, enhancing drug accumulation at the tumor site while minimizing systemic toxicity. This innovative approach illustrates how AI educates formulators, innovates dual-drug nanocarrier design and empowers oncology therapy through targeted, patient-centric solutions. The work emphasizes the future role of AI-driven nanomedicine in developing safer, more effective and personalized anticancer strategies.

**Keywords:** AI-assisted drug delivery, pH-sensitive nanoparticles, dual drug release, formulation.

**AI-202**

**ARTIFICIAL INTELLIGENCE IN OPTIMIZING COMBINATION OF ANTIBIOTIC FORMULATIONS**

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The design and optimisation of antibiotic formulations and combinations are being accelerated by artificial intelligence (AI), which is changing the pharmaceutical development environment. Artificial intelligence driven systems that incorporate enormous amounts of biological, chemical, and clinical data are gradually replacing conventional trial-and-error drug formulation techniques. While predictive models employing machine learning and natural language processing evaluate toxicity, pharmacokinetics, and modes of action, generative models—such as deep learning, reinforcement learning, and evolutionary algorithms—can suggest new compounds with desirable antibacterial characteristics. While network-based technologies like INDIGO and synergy-predictive models like CoSynE offer insights into the best antibiotic pairings, platforms like IDentif.AI have been effectively used to quickly prioritise multiple regimens against infectious illnesses. The capacity of AI to find extremely efficient antibiotics with lower toxicity and broad-spectrum effectiveness against multidrug-resistant organisms is demonstrated by notable achievements, such as the discovery of halicin. Candidate validation is further improved by combining AI with physics-based modelling, such as molecular docking, molecular dynamics, and quantum-chemical simulations, which forecast binding energies, conformational changes, and possible off-target effects at the atomic level. This blend of generative and physics-based approaches ensures that AI-driven discovery yields results that are clinically useful by bridging computational prediction with experimental confirmation. AI may be used to find antibiotic combinations that work well together and lower the risk of resistance. For instance, by closely examining medication interactions, these models are able to forecast which compound combinations work best against resistant strains, perhaps leading to the development of innovative combination medicines that are superior to single-drug treatments.

**Keywords:** Artificial intelligence; Machine learning; Antimicrobial Resistance; Synergic prediction.

**AI-203**

**ARTIFICIAL INTELLIGENCE IN DRUG DISCOVERY**

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Artificial Intelligence (AI) is a branch of computer science that develops algorithms to simulate human intelligence. In recent years, AI has transformed drug discovery and development by accelerating and optimizing multiple stages of the process. De novo drug design, which generates novel molecules with desired properties; Structure–Activity Relationship (SAR) modeling, which elucidates how chemical structures influence biological activity; and toxicity prediction, which forecasts potential adverse effects early in development, are some of the key applications. Target identification, which predicts potential biological targets for new therapies; virtual screening, which enables rapid evaluation of large compound libraries; and de novo drug design are all examples of these applications. AI-driven methods enhance the efficiency of drug research by analyzing complex molecular structures, identifying promising candidates, and reducing time and cost associated with traditional drug discovery approaches. Moreover, AI facilitates precision in predicting pharmacokinetics, pharmacodynamics, and safety profiles, improving the likelihood of clinical success. AI provides insights that guide rational drug design and the creation of novel therapies for complex diseases by integrating large datasets from genomics, proteomics, and chemical databases. This presentation focuses on the role of AI in modern drug discovery, highlighting how it streamlines candidate identification, optimizes molecular design, and predicts potential adverse effects. The incorporation of AI into pharmaceutical research represents a paradigm shift because it opens the door to the production of drugs that are safer and more efficient while simultaneously lowering overall development costs.

**Keywords:** Artificial Intelligence, Drug Discovery, Drug Toxicity, Molecular Properties, Target Identification.

**AI-204**

**ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN RADIOLOGY**
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The quantitative evaluation of Artificial Intelligence (AI) systems in a clinical context is a challenging endeavor. Here, we propose a scientific concept, Artificial Intelligence Prospective Randomized Observer Blinding Evaluation (AI-PROBE) for quantitative clinical performance evaluation of radiology AI systems within prospective randomized clinical trials. To demonstrate the applicability of our AI-evaluation framework, we present a first prospective randomized clinical trial on investigating the effect of automatic identification of Intra-Cranial Hemorrhage (ICH) in emergent care head CT scans on radiology study Turn-Around Time (TAT) in a clinical environment. Here, we acquired 620 consecutive non-contrast head CT scans from CT scanners used for inpatient and emergency room patients at a large academic hospital over




ISBN: 978-81-980623-8-3

a time period of 14 consecutive days. Study TAT was measured automatically as the time difference between study completion and first clinically communicated study reporting, with time stamps for these events automatically retrieved from various radiology IT systems. TATs for flagged cases (73 ± 143 min) were significantly lower than TATs for non-flagged (132 ± 193 min) cases, where 105 of the 122 ICH-AI+ cases were true positive reads. Total sensitivity, specificity, and accuracy over all analyzed cases were 95.0%, 96.7%, and 96.4%, respectively. In a broader context, our results suggest that our AI-PROBE framework can contribute to a systematic quantitative evaluation of AI systems in a clinical workflow environment with regards to clinically meaningful performance measures, such as TAT or diagnostic accuracy metrics.

**Keywords:** Artificial Intelligence (AI), Turn-Around Time (TAT), Intra-Cranial Hemorrhage (ICH), Radiology, Clinical Trial, AI-PROBE.

**AI-205**

**REVOLUTIONIZING PHARMACOLOGY: AI-POWERED APPROACHES IN MOLECULAR MODELING AND ADMET PREDICTION**

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The fusion of Artificial intelligence (AI) with computational chemistry has revolutionized drug discovery by enhancing compound optimization, predictive analytics, and molecular modeling. This review explores the integration of AI techniques, including machine learning (ML), deep learning (DL), and generative models with traditional computational methods such as molecular docking, quantum mechanics, and molecular dynamics simulations. It outlines the evolution of computational chemistry and the transformative role of AI in interpreting complex molecular data, automating feature extraction, and improving decision-making across the drug development pipeline. Core AI algorithms support vector machines, random forests, graph neural networks, and transformers are examined for their applications in molecular representation, virtual screening, and ADMET property prediction. Special attention is given to de novo drug design using generative adversarial networks (GANs) and variational autoencoders (VAEs), as well as AI-driven high-throughput virtual screening that reduces computational costs while improving hit identification. The review also discusses platforms like Deep-PK and Deep Tox for pharmacokinetics and toxicity prediction using graph-based descriptors and multitask learning. In structure-based design, AI-enhanced scoring functions and binding affinity models outperform classical approaches, while DL transforms molecular dynamics by approximating force fields and capturing conformational dynamics. The convergence of AI with quantum chemistry and density functional theory (DFT) is illustrated through surrogate modeling and reaction mechanism prediction. Despite these advances, challenges remain in data quality, model interpretability, and generalizability. The review concludes by highlighting future directions, including hybrid AI-quantum frameworks and multi-omics integration, underscoring AI's potential to accelerate safer, more cost-effective drug discovery.

**Keywords:** Virtual screening; Computational chemistry; Molecular modeling; ADMET prediction; Drug discovery; Predictive toxicology.

**AI-206**

**AI-DRIVEN PLATFORM FOR PERSONALIZED DRUG RISK ASSESSMENT AND DOSE OPTIMIZATION**

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The increasing use of multiple medications and genetic variability among patients make safe and effective prescribing more difficult. Adverse drug reactions remain a leading cause of illness, largely due to the traditional "one-size-fits-all" approach that overlooks individual differences. To address this challenge, we developed an AI-powered clinical decision support system that provides personalized drug risk assessments and optimized dosing recommendations. Patient data including clinical history, laboratory results, and pharmacogenomic markers are processed through a modern web-based platform integrating Google's Gemini 2.5 Flash multimodal AI model via the GenAI and JavaScript SDK. Structured JSON outputs were used to ensure consistent and interpretable predictions. The frontend, built with React, TypeScript, and Tailwind CSS, delivers a lightweight, responsive, and clinician-friendly interface. The model was trained with alignment with global evidence-based standards such as CPIC and FDA recommendations, enabling translation of complex patient data into clear, prioritized, and actionable insights. The system identifies patient-specific risks, including drug-drug and drug-gene interactions, and presents them through intuitive reports that align with existing clinical workflows rather than overwhelming clinicians with reactive alerts. By enabling faster, safer, and more precise prescribing decisions, this platform advances the integration precision medicine into routine clinical practice and has a strong potential to reduce adverse drug reactions and improve therapeutic outcomes across diverse patient populations in India and beyond.

**Keywords:** Artificial Intelligence, Pharmacogenomics, Clinical Decision Support, Personalized Medicine, Adverse Drug Reactions.

**AI-207**

**TRANSFORMATION OF AI AND TECHNOLOGY IN PHARMACEUTICAL SECTOR**

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Background: The study was needed because traditional pharma methods are slow, costly and less patient-centric.AI and Technology can speed up research, improve education, drive innovation and empower patients and professionals, making healthcare more efficient and accessible. Specific Problems when relaying on AI are Incorrect Dosing and Treatments, Ignoring Patient-Specific Factors, Drugs Interactions and Side Effects, Over Reliance on AI, Data Privacy and Security Issues. Aim: The aim is to leverage AI and Technology in the pharmaceutical sector to educate stakeholders with data-driven insights, faster innovation in drug development and healthcare delivery, and empower patients, professionals and researchers for a more efficient and patient-centric system. Method: The application of AI in pharmacy education and practice is transforming the field through various innovative approaches such as AI-Powered e-learning Platforms provide personalized learning experiences for Students and Professionals, while Virtual and Augmented Reality Stimulations enhance understanding of Drug Mechanisms and Clinical Practices, AI Chat boxes, Digital Libraries, Machine Learning Algorithms, Robotics and Smart Manufacturing are improving Pharmaceutical Production, Mobile Health Apps, Telemedicine. By utilizing AI Algorithms that analyze extensive biological data, including genomics and proteomics. Result: This study provides an overview of various AI-Based Approaches utilized in Pharmaceutical Technology, highlighting their benefits and draw backs. Nevertheless, the continued investment in and exploration of AI in the Pharmaceutical Industry offer exciting prospects for enhancing drug development processes and patient care. Conclusion: AI and Technology are transforming the pharmaceutical industry by enhancing education, driving innovation and empowering all stakeholders. They shorten drug development timelines; improve decision-making and enables personalized care. By integrating AI tools, pharma can become more efficient, inclusive in patient-centric, ensuring better healthcare outcomes for future. The Government of India launched the National Strategy for AI (2018) under NITI Aayog, positioning AI as "AI FOR ALL".

**Keywords:** Artificial intelligence (AI), Smart Diagnostics, Automation, Big Data Analytics, Drug Discovery, Personalized Medicine and Digital Healthcare Technology.

**AI-208**

**APPLICATION OF AI AND TECHNOLOGY TO EDUCATE, INNOVATE, EMPOWER**

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The pharmaceutical industry is undergoing a significant transformation with the integration of Artificial Intelligence (AI) technology. As the industry continues to evolve, there is a growing need for innovative solutions to address complex challenges in drug discovery, development, and delivery and improving patient outcome. AI has the potential to revolutionize the pharmaceutical industry by enhancing education, driving innovation, and empowering professionals. Enhancing the




ISBN: 978-81-980623-8-3

learning of professionals and virtual experimentation aligning with ethical and regulatory guidelines. By leveraging AI-powered tools and platforms, pharmacists and researchers can access vast amounts of data, analyze complex information, and make informed decisions. To investigate the transformative potential of Artificial Intelligence (AI) technology in the pharmaceutical industry, with a focus on its role in educating professionals, driving innovation, and empowering decision-making. By Integration of AI into curricula, Hands-on training, online courses and resources, reduction of disruption in supply chain, certification program, interdisciplinary collaboration between academia, industry and government, support entrepreneurship. The integration of Artificial Intelligence (AI) technology in the pharmaceutical industry has the potential to revolutionize the way we approach education, innovation, and professional empowerment. By educating professionals, driving innovation, and empowering decision-making, AI can improve patient outcomes, streamline processes, and enhance the overall quality of care. AI is essential to address the complex challenges as the industry continues to evolve. By embracing AI technology, we can unlock new opportunities, drive growth, and create a brighter future for healthcare.

**Keyword:** Artificial intelligence (AI), Education, Innovation, Empower, Drug discovery, Development and Delivery.

**AI-209**

**AI FOR PERSONALIZED MEDICINE AND PHARMACOGENOMICS**

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Pharmacogenomics is a rapidly evolving field that investigates the relationship between an individual's genetic makeup and their response to medications. This personalized approach to medicine moves beyond the traditional "one-size-fits-all" model by analyzing genetic variations that influence drug metabolism, efficacy, and the risk of adverse drug reactions (ADRs). By tailoring drug therapy to a patient's unique genetic profile, healthcare professionals can select the most effective medication at the optimal dose from the outset, thereby increasing treatment success and minimizing dangerous side effects. This strategy has gained significant traction in clinical areas such as oncology, psychiatry, and cardiology, where genetic differences can drastically impact drug response.

**Keywords:** pharmacogenomics, personalized medicine, genetic makeup, drug metabolism, drug efficacy, adverse drug reactions, precision medicine, genetic testing.

**AI-210**

**ARTIFICIAL INTELLIGENCE IN PHARMACOGENOMICS: SURGE IN PERSONALIZED MEDICINES WITH DATA-DRIVEN UNDERSTANDING**

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Pharmacogenomics is the science behind the individual's genetic makeup and drug action. Pharmacogenomics introduced the transformative concept of personalized medicines with the collaboration of Artificial Intelligence. By simplifying intricate and large-scale genomic datasets, it offers revolutionary therapeutic solutions accompanied by minimized adverse drug reactions. Artificial Intelligence is the cornerstone of pharmacogenomics. The subsets of AI, such as machine learning and deep learning, elucidate the genetic profile, study the drug response for personalized medicines, and aim at accurate dosing regimens. Additionally, AI unveils the interactions between genes and medicines. This allows multipurpose therapeutic repositioning of medicines. Healthcare specialties, namely oncology, cardiology, and psychiatry leverage AI to compare possible therapeutic options by studying the tumour's genomic structure. Therefore, AI-driven pharmacogenomics facilitates dose modifications for antidepressants and anticoagulants like warfarin based on CYP450 gene variants. AI in pharmacogenomics offers accessible treatment solutions for chronic and acute disorders by in-depth analysis of individualized gene configuration. The substantial breakthrough of AI in pharmaceutical progress enables millions of healthcare professionals to improve drug delivery, treatment results, and reduced errors in prescription. Although the numerous benefits of AI and pharmacogenomics overweighs the limitations, the unexplored genomic datasets, ethical concerns, and continuous adaptation still posses a threat for the best outcomes. The integration of AI and pharmaceutical sciences emphasizes a future with innovative solutions and ideal patient performance. This transformation is not only qualitative but also optimized.

**Keywords:** Pharmacogenomics, Personalized medicines, Therapeutic repositioning, genomic datasets.

**AI-211**

**ARTIFICIAL INTELLIGENCE IN POST-MARKETING SURVEILLANCE: REDEFINING PHARMACOVIGILANCE**

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Post-Marketing Surveillance (PMS) plays a crucial role in ensuring the ongoing safety and efficacy of medicines once they are introduced into the market. Traditional pharmacovigilance methods face challenges due to the exponential growth of adverse event reports, data fragmentation and delays in signal identification. AI offers novel opportunities to enhance efficiency, accuracy, and timeliness in drug safety monitoring. AI algorithms, particularly machine learning and language processing, can analyse large-scale heterogeneous data sets, including electronic health records, social media discussions, adverse event reports, and insurance claims. These techniques ensure the early detection of rare ADRs, prediction of at-risk populations and identification of hidden safety patterns that conventional methods may miss. AI tools also enhance case processing efficiency, automate signal detection and provide continuous monitoring across diverse patient populations. Furthermore, predictive risk-benefit assessment enables regulatory authorities and pharmaceutical companies to make data-driven decisions with higher accuracy. The intervention of AI in PMS leads to better outcomes by reducing the manual load and allowing the pharmacovigilance team to focus on complex analyses. It also focuses on mitigating bias and adhering to ethical guidelines. AI-driven PMS represents a paradigm shift in pharmacovigilance, promising a more robust, efficient, and patient-centric approach to drug safety monitoring.

**Keywords:** Post-Marketing Surveillance, Drug Safety Monitoring, AI, Risk-Benefit Assessment, Patient-Centric, Regulatory Authorities.

**AI-212**

**THE SYNERGY OF AI AND VALUE-BASED PRICING: ADVANCING REGULATORY AND MARKET ACCESS FRAMEWORK**

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The integration of Artificial Intelligence (AI) with value-based pricing (VBP) models is composed to redesign the landscape of healthcare market access and regulatory decision making. As health systems progressively shifting toward value-driven approaches, leveraging AI's analytical power offers new opportunities to optimize pricing strategies based on real-world outcomes and patient-centric system of measurement. The integration supports more accurate and transparent evaluations of value, enabling the development of systems that are both flexible and based on real-world evidence. Furthermore, AI can streamline regulatory pathways by enabling predictive modelling, risk stratification, and data-driven scenario analysis, thereby accelerating time-to-market for innovative therapies. This model shift holds significant potential to align stakeholder - including clients, regulators, providers, and patients - around outcomes-focused care delivery, while also addressing cost- effectiveness and impartiality considerations. Ultimately, the junction of AI and VBP can drive more sustainable healthcare systems and foster access to high-value medical innovations globally.

**Keywords:** Value based pricing, market access, integration, stratification.

**AI-213**

**Dish & Dose: A Mobile Interaction Application For Identifying And Managing Food-Drug Interactions To Enhance Patient Safety And Medication Adherence**




ISBN: 978-81-980623-8-3

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Food-drug interactions are a major concern in clinical practice as they may reduce therapeutic efficacy, alter pharmacokinetics, or increase the risk of adverse reactions, ultimately affecting patient safety and medication adherence. The present study focused on the development of Dish & Dose, a mobile-based interactive application designed to identify, predict, and manage food-drug interactions in real time. The application integrates a structured database of commonly prescribed medications with dietary components and utilizes a rule-based algorithm to provide users with clear, patient-friendly alerts regarding potential interactions. The objective of this work was to evaluate the efficiency of the application in improving patient awareness, supporting medication adherence, and reducing the likelihood of interaction-related complications. The system was tested for accuracy of interaction detection, usability, and patient acceptance. Preliminary evaluations indicated that Dish & Dose demonstrated high accuracy in identifying clinically significant interactions and was well accepted by users for its simplicity and accessibility. By offering tailored guidance, this tool aims to bridge the communication gap between healthcare professionals and patients, promoting safe medication use and improved therapeutic outcomes. Thus, the study concludes that Dish & Dose can serve as a practical digital health intervention to enhance patient safety and adherence in routine clinical practice.

**Keywords:** Food-drug interactions, mobile application, patient safety, medication adherence, digital health.

## AI-214

## AI GUIDED OPTIMIZATION OF A TOPICAL POLYHERBAL GEL. A SYNERGISTIC FORMULATION OF CURCUMA LONGA AND BOSWELLIA SERRATA FOR ENHANCED ANTI-INFLAMMATORY ACTIVITY.

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This research demonstrates the application of machine learning (ML) to optimise a Polyherbal topical gel formulation, moving beyond traditional tests and error methods. The study focuses on synergistic blend of methanolic extracts from Curcuma longa(Turmeric) and Boswellia serrata (Indian Frankincense) both are famous for their anti-inflammatory properties. The aim is to use AI to identify the ideal ratio for maximum effect. The function includes a lab based approach. At first, methanolic extracts will be prepared from the raw materials and their phytochemical profile will be determined using HPLC-High Performance Liquid Chromatography and then, mixture design of experiments(DoE) will be employed to prepare gel formulation with varying ratios of the two extracts. Anti-inflammatory activity will be evaluated in vitro using the protein denaturation inhibition assay, with a standard anti-inflammatory drug (e.g., Diclofenac) as a positive control. A machine learning model will be trained using experimental data. This model will learn the relationship between the components and biological response, allowing for the prediction of the most effective combination. This project shows how AI can streamline research and accelerate the development of safe and effective herbal products.

**Keywords:** Phytochemistry, Herbal Gel, Machine Learning.

## AI-215

## OPTIMIZATION IN CHRONIC DISEASE: MACHINE LEARNING–GUIDED THERAPY IN DIABETES, COPD, AND HEART FAILURE

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Introduction: Chronic diseases such as diabetes mellitus (DM), chronic obstructive pulmonary disease (COPD), and heart failure (HF) impose significant morbidity and healthcare burden. Standard guideline-based treatments may not account for interpatient differences in disease progression or therapeutic responsiveness. Artificial intelligence, and specifically machine learning (ML), offers potential to individualize therapy, thereby optimizing clinical outcomes. Objectives: To design, validate, and simulate deployment of ML-based decision support models for therapy optimization in individuals with DM, COPD, and HF, and to estimate the possible improvements in outcomes (e.g. exacerbations, hospitalizations, glycemic control). Methods: A retrospective cohort of patients with DM, COPD, or HF was assembled from institutional databases. Input features included demographics, comorbidities, laboratory values, longitudinal biomarker trends, medication adherence data, imaging or sensor/remote monitoring data. We applied supervised ML algorithms (e.g. random forest, gradient boosting machines, neural networks) to predict individualized therapy adjustments (dose changes, drug selection) that maximize composite outcome metrics (e.g. reduction in adverse events, hospital visits, biomarker targets). Models were cross-validated internally and tested on external holdout sets. Simulation modeling projected the potential impact of applying ML recommendations in routine care over a 12-month horizon. Across disease groups, the best ML models achieved AUROC values in the range 0.82 to 0.89 for correctly recommending therapy adjustments. Simulation application suggested a potential reduction in hospitalizations by 12–18%, and disease-specific complications by 8–15%. Feature importance analyses revealed that past exacerbation frequency, biomarker trajectories, adherence metrics, and comorbid burden were among the strongest predictors influencing decision logic. Conclusion: Machine learning–guided optimization in chronic disease therapy shows promise for enhancing personalization, improving outcomes, and reducing healthcare burden in diabetes, COPD, and heart failure. Prospective clinical trials are needed to validate these findings in real-world settings.

**Keywords:** machine learning, personalized therapy, chronic disease, diabetes, COPD, heart failure, decision support.

## AI-216

## AI IN PHARMACEUTICAL DEVELOPMENT AND MANUFACTURING: DATA-DRIVEN INSIGHTS WITHIN THE ICH Q8–Q14 FRAMEWORK AND INDIAN INDUSTRY ADOPTION

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In the present study, the applications of Artificial Intelligence (AI) and Machine Learning (ML) in pharmaceutical development and manufacturing were systematically evaluated in alignment with ICH Q8–Q14 guidelines. The objective was to analyse the impact of AI-driven technologies on drug discovery, clinical trials, manufacturing, and regulatory submissions, with a specific focus on Indian pharmaceutical companies. A structured review of 65 peer-reviewed publications (2018–2024), regulatory reports (FDA, EMA, ICH), and industry case studies was performed. Data from global leaders (Pfizer, Roche, AstraZeneca, Johnson & Johnson) and Indian firms (Sun Pharma, Dr. Reddy's, Biocon, Lupin, Cipla, Glenmark, Zydus) were compared to assess improvements in cycle time, cost savings, and regulatory readiness. The analysis revealed that AI integration reduced drug discovery timelines by 6–12 months with 15–20% lower costs, while oncology trial enrolment increased by 18% (AstraZeneca, 2021). AI-enabled predictive maintenance in manufacturing demonstrated 30% downtime reduction and 5–10% faster batch release in Indian pilot studies. Regulatory agencies (FDA, EMA) have published AI-related guidance (2021–2023), whereas CDSCO has yet to issue India-specific frame works. It was concluded that AI provides measurable benefits in global and Indian pharmaceutical operations, particularly when mapped to ICH Q8 (development), Q9 (risk management), Q10 (quality systems), and Q13 (continuous manufacturing). However, limitations remain in data integrity, algorithm transparency, workforce skills, and regulatory harmonization. The study highlights the urgent need for India to build AI-ready infrastructure and policies to ensure sustained quality, safety, and efficacy of medicines.

**Keywords:** Artificial Intelligence, ICH Q8–Q14, Pharmaceutical Development, Manufacturing, Regulatory Submissions, India, Continuous Manufacturing, Risk Management.

## AI-217

## INTEGRATING MACHINE LEARNING WITH NANOTECHNOLOGY: A PATHWAY TO NEXT-GENERATION DRUG DELIVERY SYSTEMS

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ISBN: 978-81-980623-8-3

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Nanoparticulate drug delivery systems have emerged as a promising approach to overcome the limitations of conventional therapeutics, including poor solubility, low bioavailability, off-target effects, and uncontrolled release profiles. However, the design and optimization of nanoparticles with desired physicochemical properties and biological performance remain challenging due to the complexity of formulation variables and biological interactions. Machine learning (ML), a subset of artificial intelligence, offers powerful tools to accelerate the development of nanoparticulate drug delivery systems by enabling predictive modeling, data-driven optimization, and pattern recognition. ML algorithms can be applied to predict nanoparticle size, shape, surface charge, drug loading efficiency, and release kinetics, as well as to assess biocompatibility, biodistribution, and therapeutic efficacy. Moreover, the integration of ML with high-throughput screening and computational simulations allows for rational design, reduced experimental workload, and improved translational potential. This convergence of nanotechnology and machine learning holds the potential to create personalized, efficient, and safe drug delivery systems. This review highlights the role of ML in enhancing nanoparticle-based drug delivery, emphasizing its applications, challenges, and future perspectives in precision medicine.

**Keywords:** Machine learning, Nanoparticles, Drug delivery.

**AI-218**

## A BLUEPRINT FOR A FUTURE-READY PHARMACY WORKFORCE: INTEGRATING AI AND TECHNOLOGY INTO INDIA'S RURAL PHARMACY EDUCATION SYSTEM

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The Indian pharmaceutical sector stands at a critical juncture. While globally recognized as the "Pharmacy of the World," its continued leadership is contingent on the modernization of its educational infrastructure, particularly in rural areas. A significant chasm exists between the rapid technological advancements in the global pharmaceutical industry—driven by artificial intelligence (AI), the Internet of Things (IoT), and data analytics—and the systemic limitations of India's traditional, rural-centric pharmacy education system. This report provides a comprehensive diagnostic analysis of this challenge, examining the outdated curriculum, the profound digital and infrastructural divide, and a pervasive human resource crisis. It then outlines a strategic, multi-stakeholder pathway to transformation. The analysis finds that the recent, forward-looking curriculum changes initiated by the Pharmacy Council of India (PCI) provide a crucial foundation for this reform. However, the successful implementation of this new curriculum is contingent on addressing deep-seated issues in rural institutions, including a lack of reliable internet, a shortage of qualified faculty, and a crisis of accountability evidenced by the "ghost faculty" phenomenon. The report proposes a collaborative framework for implementation, leveraging Public-Private Partnerships (PPPs), targeted government policy, and industry-led Corporate Social Responsibility (CSR) initiatives. By moving beyond traditional funding models to a strategic, outcome-oriented approach, India can not only bridge the existing skills gap but also cultivate a future-ready pharmacy workforce that solidifies its position as a global leader in healthcare innovation and delivery.

**Keywords:** Educational infrastructure, Artificial intelligence (AI), the Internet of Things (IoT), Pharmacy Council of India (PCI), Public-Private Partnerships (PPPs), targeted government policy

**AI-219**

## NEURO-RESPONSIVE SMART INHALER: EEG-GUIDED AI FORPRE-SYMPTOMATIC PREDICTION AND CLOSED-LOOP RESCUE IN ASTHMA AND COPD

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Respiratory disorders such as asthma and chronic obstructive pulmonary disease (COPD) remain major global health challenges, largely due to delayed intervention and improper inhaler use.Conventional smart inhalers monitor adherence but cannot predict imminent attacks or guide patients in real time. To address this gap, we present a Neuro-Responsive Smart Inhaler— an innovative device integrating neuro-sensors, respiratory flow sensors, and artificial intelligence (AI). The system employs a lightweight 28 g dry-electrode EEG headband (or adhesive neuro-patch) to capture stress-related brain activity, a micro-machined airflow mouthpiece to assess inhalation dynamics, and a ring $SpO_2$ sensor to monitor oxygen saturation. These multimodal signals are processed on-device through a TinyML pipeline. Patient-specific 1-D CNN–LSTM models, trained on EEG β/θ ratios, inspiratory flow skewness, and oxygen-saturation slopes, can forecast exacerbations a median of 7.4 minutes before clinical symptoms or a ≥20% drop in peak expiratory flow (AUC 0.94, sensitivity 0.91, specificity 0.87). When risk thresholds are exceeded, the system initiates tiered interventions: (i) haptic vibration to coach inhaler technique, (ii) smartphone alerts to caregivers, and (iii) if critical status is confirmed via redundant safety checks, electronic actuation of a bronchodilator valve within 150 ms. A modeled 12-month randomized controlled trial with 300 patients predicts 40% fewer exacerbations, 30% fewer emergency visits, 18% higher adherence, and a cost-effectiveness ratio of £9,800/QALY. By merging predictive neuro-respiratory monitoring with closed-loop drug delivery, this device enhances safety, personalizes therapy, and offers clinicians and pharmacists real-time adherence insights, representing a next-generation tool for global respiratory care.

**Keywords:** EEG-based prediction; smart inhaler; AI early detection; closed-loop drug delivery; personalized respiratory therapy.

**AI-220**

## AI USED IN HERBAL FORMULATIONS

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The integration of artificial intelligence (AI) in herbal drug research has emerged as a promising approach to overcome challenges associated with complexity, variability, and standardization of herbal formulation. A reviews highlight that AI tools – including machine learning –model which are predicts there therapeutics effects and optimize the herbal growth promoter, deep learning –traditional medicines text, Scientific Literature, quantitative structure activity relationships (QSAR), and network pharmacology – are increasing applied to identify bioactive phytoconstituents, optimize formulation parameters and predicts pharmacological activity. Studies report that AI-assisted methods improve quality control through chromatographic and spectroscopic data analysis, ensure authentication of raw botanicals, and support toxicity prediction and herb-drug interaction assessment, while integration with clinical data and interaction in genetics variation integrate data from pharmacogenomics, and Predicting therapeutics outcomes. AI can optimise the formulation of herbal with combination of herbs with synergistic and antagonistic action – reinforcement learning. This study concluded that, AI bridges traditional herbal knowledge with pharmaceuticals science. The reviewed confirms its potentials to enhance efficiency, reproducibility, and personalization of herbal medicines, stronger regulatory acceptance to ensure safe and effective integration of AI into herbal drug development.

**Keywords:** Artificial Intelligence, QSAR Modelling, Machines Learning, Herb-Drug Interaction, Quality Control.

**AI-221**

## Digital Twins In Healthcare

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Digital twins (DTs) represent a transformative technology in healthcare, creating dynamic virtual replicas of patients, organs, or healthcare systems through real-time data integration from electronic health records, wearable devices, medical imaging, and genomic profiles. These


ISBN: 978-81-980623-8-3

sophisticated computational models leverage artificial intelligence, machine learning, and Internet of Things technologies to enable unprecedented personalized medicine capabilities. The primary applications of healthcare digital twins span personalized treatment planning, surgical simulation, drug discovery acceleration, and chronic disease management. By integrating multi-omics data with physiological parameters, DTs facilitate precise disease progression modeling, treatment response prediction, and proactive intervention strategies. Real-time monitoring capabilities enable continuous patient assessment, particularly beneficial for managing cardiovascular diseases, cancer treatment optimization, and remote patient care. Current implementations demonstrate significant improvements in diagnostic accuracy, reduced surgical complications, and enhanced clinical decision-making through predictive analytics. The global healthcare digital twins market, valued at approximately $1.37-2.69 billion in 2024, is projected to reach $3.55-59.94 billion by 2030-2032, reflecting a compound annual growth rate of 25.7-68.0%. Despite promising applications, challenges persist including data privacy concerns, system interoperability issues, computational infrastructure requirements, and ethical considerations regarding patient consent and algorithmic bias. Technical barriers encompass model validation, real-time data integration complexity, and resource-intensive implementation costs. Future developments focus on autonomous digital twins, AI-driven surgical planning with haptic feedback, and integration with emerging technologies like blockchain for enhanced security. The convergence of digital twins with precision medicine promises to revolutionize healthcare delivery through predictive, preventive, and personalized therapeutic approaches.

**Keywords:** Digital Twins, Personalized Medicine, Precision Healthcare, Virtual Patient Models, AI-Driven Medical Simulation.

**AI-222**

**Navigating The Future Of Pharmacy: The Impact Of Digitalization And Technological Innovation**

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In the face of rapid technological advancement, the pharmacy sector is undergoing a significant digital transformation. This review explores the transformative impact of digitalization in the global pharmacy sector. We illustrated how advancements in technologies like artificial intelligence, blockchain, and online platforms are reshaping pharmacy services and education. The paper provides a comprehensive overview of the growth of online pharmacy platforms and the pivotal role of telepharmacy and telehealth during the COVID-19 pandemic. Additionally, it discusses the burgeoning cosmeceutical market within online pharmacies, the regulatory challenges faced globally, and the private sector's influence on healthcare technology. Conclusively, the paper highlights future trends and technological innovations, underscoring the dynamic evolution of the pharmacy landscape in response to digital transformation.

**Keywords:** Digital transformation, Healthcare technology, Cosmeceuticals, Global health, 2019 novel coronavirus.

**AI-223**

**ARTIFICIAL INTELLIGENCE FOR THE FUTURE OF PHARMACEUTICALS: APPLICATIONS, CHALLENGES, AND OPPORTUNITIES**

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Artificial Intelligence (AI) has become a transformative force across multiple sectors, with the pharmaceutical industry at the forefront of this technological evolution. This review explores the diverse and rapidly growing applications of AI within the pharmaceutical domain, including drug discovery, drug design, drug repurposing, clinical trial management, and the optimization of pharmaceutical manufacturing and supply chains. Through the use of machine learning, deep learning, natural language processing, and other AI-driven techniques, pharmaceutical processes are becoming faster, more accurate, and less resource-intensive. By automating complex data analysis, predicting drug-target interactions, and identifying novel therapeutic compounds, AI significantly accelerates early-stage research and reduces the high failure rates traditionally associated with drug development. Additionally, AI contributes to the design of more efficient and adaptive clinical trials by enabling patient stratification, real-time monitoring, and predictive modeling of outcomes. The integration of AI not only improves decision-making and productivity but also helps reduce human workload and operational costs. This review also examines the tools and platforms currently driving AI innovation in the pharmaceutical sector, the interplay between various AI technologies, and the ongoing challenges, such as data privacy, regulatory constraints, algorithm transparency, and integration into existing workflows. Finally, it discusses prospects and strategic directions, emphasizing the potential of AI to reshape the pharmaceutical landscape and contribute to more personalized, accessible, and effective healthcare solutions.

**Keywords:** Artificial Intelligence (AI), Pharmaceutical Industry, Drug Discovery, Drug Development.

**AI-224**

**A REVIEW ON USING ARTIFICIAL INTELLIGENCE AND OTHER TOOLS FOR FRAMING BACHELOR OF PHARMACY SYLLABUS**

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Artificial Intelligence [AI] is being integrated into the pharmacy under the Pharmacy council of India [PCI] to equip future pharmacist with digital and computational skills. The revised syllabus for Bachelor of Pharmacy, Diploma in Pharmacy, and Master of Pharmacy, emphasizes Artificial Intelligence applications in drug discovery development and patient care. Artificial Intelligence introduced through computer applications, Bio-informatics, Pharmaceutical Analysis, Clinical Pharmacy, Pharmacovigilence modules. Students learn about machine learning tools for molecular modelling, predictive analytics for adverse drug reactions and Artificial Intelligence based clinical decisions supported system. Present Scenario of pharmacy syllabus need modifications with recent updated tools like Artifcial Intelligence, quantum, Data science. Artificial Intelligence in relevance to Data science, Pharmacy like driven education helps pharmacy students grasp complex data sets efficiently.

**Keywords:** Data Science, Pharmacy Curriculum, Quantum, Artificial Intelligence

**AI-225**

**ARTIFICIAL INTELLIGENCE DRIVEN GREEN CHEMISTRY FOR PHARMA**

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The integration of Artificial Intelligence (AI) with green chemistry principles is transforming pharmaceutical research, development, and manufacturing. Traditional drug synthesis often relies on resource-intensive processes, toxic solvents, and generates significant chemical waste. Artificial intelligence-driven green chemistry provides a sustainable alternative by employing predictive algorithms, machine learning models, and big data analytics to design eco-friendly synthetic routes, optimize reaction conditions, and minimize hazardous by-products. By simulating reaction pathways, Artificial intelligence can identify safer catalysts, renewable raw materials, and energy-efficient processes without exhaustive experimental trials. This not only reduces environmental burden but also accelerates time-to-market, lowers production costs, and ensures regulatory compliance with sustainability guidelines. Furthermore, Artificial intelligence -assisted green chemistry supports circular economy practices in pharma by promoting waste valorization and greener process scale-up. Thus, the convergence of Artificial intelligence and green chemistry represents a significant leap toward sustainable, cost-effective, and innovative pharmaceutical manufacturing.

**Keywords:** Artificial Intelligence (AI); Green Chemistry;Sustainable Pharmaceuticals; Eco-friendly Drug Synthesis; Machine Learning; Process Optimization; Waste Minimization.

**AI-226**




ISBN: 978-81-980623-8-3

**ETHICAL CONSIDERATIONS AND SECURITY IN AI-DRIVEN DRUG DISCOVERY: NAVIGATING DATA SHARING, BIAS, AND ACCOUNTABILITY**

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The rapid adoption of artificial intelligence in drug discovery is transforming the pharmaceutical landscape, ushering in remarkable efficiencies and new possibilities. Yet, alongside these advancements, the field faces significant ethical and security dilemmas. This work examines how AI's dependence on vast, often sensitive datasets raises urgent questions about data privacy, responsible data sharing, and consent. Furthermore, it delves into the risks of algorithmic bias—where unbalanced training data can inadvertently reinforce health disparities—and highlights how the "black box" nature of complex AI systems challenges transparency and trust. The discussion also addresses accountability: when AI errors occur, who is responsible? Through real-world examples, this study explores practical frameworks for ensuring fair, safe, and trustworthy AI-driven drug discovery, emphasizing collaborative governance, transparency, and ongoing ethical evaluation. By acknowledging these challenges and proposing actionable solutions, we can harness the promise of AI while safeguarding the interests of patients and society.

**Keywords:** Artificial Intelligence, Pharmaceutical Landscape, Black Box, AI-Driven Drug Discover.

**AI-227**

**A STUDY ON AI ADOPTION AND PERCEPTION AMONG HOSPITAL PHARMACISTS IN CHENNAI**

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Artificial Intelligence (AI) is surfacing as a revolutionary force within the healthcare sector, presenting chances to enhance efficiency, improve patient safety, and support clinical decision-making. This study explores the degree of awareness, implementation, attitudes, and barriers surrounding AI among hospital pharmacists in Chennai. A carefully designed structured questionnaire was distributed to 100 pharmacists from private, public, and educational hospitals. The data were examined using descriptive statistics, chi-square analyses, t-tests, ranking assessments, and thematic categorization of open-ended feedback. Results indicate that although awareness of AI is at a moderate level, adoption rates are significantly higher in private hospitals compared to public and educational institutions. Pharmacists generally possess a positive outlook regarding AI's capability to boost patient safety and alleviate workload. Primary barriers consist of insufficient training, high costs of implementation, concerns regarding data privacy, and inadequate infrastructure, with resistance from staff being the least reported issue. Survey participants strongly advocated for training workshops, government assistance, and policy frameworks to ease the integration of AI. The study concludes that pharmacists are open to AI, yet systematic and resource-related challenges impede its adoption. Tackling these barriers through training, infrastructure enhancement, and supportive policies could hasten AI adoption in the healthcare framework of Chennai.

**Keywords:** Artificial Intelligence, Pharmacists, Healthcare, Adoption, Perception, Barriers.

**AI-228**

**PHARMACEUTICAL SCIENCE, SUSTAINABLE DEVELOPMENT GOALS AND ROLE OF ARTIFICIAL INTELLIGENCE**

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The role of artificial intelligence (AI) in global healthcare is increasingly important in the context of the "United Nations Sustainable Development Goals" (SDGs) and the vision "Viksit Bharat 2047". AI presents a transformative tool and significant opportunities for enhancing healthcare delivery systems by improving access, equity, and efficiency. AI and digital technologies can significantly contribute to achieving Sustainable Development Goals 3, 9, 12, and 17 related to health. The ongoing digital transformation presents opportunities for integrating new technologies and AI to address health challenges, particularly drug discovery and design through molecular screening, nano-drug design and virtual screening, pre-clinical development, and clinical trials etc. The key areas can be marked as drug discovery and development, supply chain optimisation, waste reduction, and access to healthcare. AI technologies, such as machine learning, deep learning, natural language processing, robotics, automation, and predictive analytics, can be a game-changer in the pharma industry in many ways. AI-based molecular modelling and predictive algorithms shorten the traditional drug discovery process by simulating molecular interactions, identifying potential drug compounds, reducing trial-and-error methods, enhancing innovation and improving global health outcomes. AI-driven process optimisation in pharmaceutical manufacturing enhances efficiency, reduces waste, and shields quality control. Predictive analytics detect production line deviations, reducing errors and recalls, aligning with SDGs 9 and 12. AI plays a key role in healthcare delivery systems, from chatbots assisting patients with medical queries to AI-supported diagnostic imaging tools detecting diseases at early stages. These applications increase access to affordable and timely care. AI also recommends that policymakers facilitate knowledge transfer and technology, signifying digital learning platforms to improve health literacy and training for healthcare staff.

**Keywords:** Global Health, Pharmacy, Artificial Intelligence, Healthcare, Sustainable Development Goals.

**AI-229**

**AI-DRIVEN BIOMARKER DISCOVERY FOR PRECISION TOXICOLOGY**

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Introduction: Early and accurate prediction of drug toxicity remains a critical challenge in preclinical and clinical development, contributing to high attrition rates and adverse patient outcomes. Conventional toxicological assessments often fail to capture the complex biological mechanisms underlying variability in drug response. Artificial intelligence (AI) provides powerful tools for analyzing multi-omics datasets to uncover predictive biomarkers. This study explores machine learning (ML) and deep learning (DL) approaches for identifying genetic, proteomic, and metabolomic biomarkers in precision toxicology. Methods: A comprehensive multi-omics dataset—including genomic variants, proteomic expression profiles, and metabolomic signatures—was curated from public repositories and toxicology consortia. Data preprocessing involved normalization, feature selection, and dimensionality reduction. Supervised ML models (random forests, support vector machines) and DL architectures (convolutional and recurrent neural networks) were trained and validated using cross-validation and independent test cohorts. Explainable AI techniques, including Shapley Additive Explanations (SHAP), were applied to identify biologically relevant features. Results: The models successfully identified panels of candidate biomarkers predictive of toxicity across multiple drug classes. Genomic variants correlated with hepatotoxicity, proteomic signatures indicated cardiotoxicity, and metabolomic alterations predicted nephrotoxicity. Integration of multi-omics features enhanced predictive accuracy and generalizability compared with single-omics approaches. Conclusion: AI-driven biomarker discovery demonstrates strong potential to transform precision toxicology by enabling earlier and more reliable toxicity prediction. This approach can lower drug development costs, improve patient safety, and accelerate the design of safer therapeutics.

**Keywords:** Precision toxicology; Biomarker discovery; Machine learning; Deep learning; Multi-omics; Drug safety.

**AI-230**

**Multi-Objective Optimization (MOO) In Generative AI For Effective Nanoparticle-Based Formulation And Design**

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Nanoparticle-based systems are central to next-generation drug delivery, diagnostics, and therapeutic platforms. The development of high-




ISBN: 978-81-980623-8-3

performing nanoparticles (NPs) for targeted drug delivery is fundamentally limited by the requirement to simultaneously optimize multiple, often conflicting, critical quality attributes (CQAs). For example, achieving high drug loading capacity frequently compromises colloidal stability, while controlling hydrodynamic diameter to ensure effective biodistribution may reduce synthesis yield. Traditional empirical and single-objective computational screening methods may be inefficient at navigating this vast, multi-dimensional formulation space. Multi-Objective Optimization (MOO) in generative Artificial Intelligence (AI) may reshape this landscape by enabling simultaneous optimization across critical, and often competing, factors such as particle size, stability, drug loading, biocompatibility, release kinetics etc. Generative models—ranging from Variational Autoencoders and Adversarial Networks to transformer-based architectures—can be integrated with MOO strategies, such as Pareto Front Analysis, Reinforcement Learning, and Bayesian optimization, to rapidly navigate vast formulation spaces and generate the designs that are both functionally robust and practically manufacturable. Importantly, this framework can incorporate regulatory, scalability, and cost considerations at early stages, thereby aligning innovation with translational feasibility. By reducing dependence on extensive wet-lab iterations, MOO-driven generative AI has the potential to significantly accelerate discovery timelines, lower development costs, and expand the range of viable nanoparticle platforms. The application of MOO-driven generative AI thus represents a shift from experimental-based formulation design toward a data-driven, adaptive, and scalable process. By bridging computational intelligence with nanoscience, this approach has the potential to shorten development cycles, minimize resource utilization, and unlock novel nanoparticle designs that were previously inaccessible through conventional methods.

**Keywords:** Nanoparticles, Multi-Objective Optimization, Artificial Intelligence, Critical Quality Attributes.

**AI-231**

**Integration Of Multi-Omics And Artificial Intelligence To Uncover Mechanisms Of Drug Resistance**

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Introduction: Drug resistance remains a major barrier to effective treatment in oncology and infectious diseases, leading to therapeutic failure and poor patient outcomes. Traditional single-omic approaches provide partial insights but often fail to capture the complexity of resistance mechanisms. Integrating multi-omics data—including genomics, transcriptomics, proteomics, and metabolomics—offers a holistic view of biological systems. However, the vast dimensionality and heterogeneity of these datasets require advanced computational strategies. Artificial intelligence (AI), particularly machine learning and deep learning, provides powerful tools to analyze and integrate multi-omics data, enabling the discovery of novel resistance pathways and predictive biomarkers. Methods: We systematically integrated multi-omics datasets from cancer cell lines and microbial isolates with documented drug response profiles. Data harmonization was achieved through standardized preprocessing pipelines, followed by dimensionality reduction using autoencoders. AI models, including random forests and deep neural networks, were trained to identify patterns correlating with resistance phenotypes. Network-based analyses were applied to map interactions across omics layers. Results: The integrative AI-driven framework successfully identified multi-layered signatures of resistance. Key findings included genomic mutations in drug target genes, transcriptomic reprogramming of survival pathways, and metabolomic shifts supporting adaptive phenotypes. Cross-validation confirmed robust predictive performance, with improved accuracy compared to single-omic models. Pathway analysis revealed novel resistance-associated networks, including metabolic rewiring and epigenetic regulation. Conclusion: This study demonstrates that AI-enabled multi-omics integration provides mechanistic insights into drug resistance and identifies predictive biomarkers for therapy response.

**Keywords:** Multi-omics integration, artificial intelligence, drug resistance, machine learning, precision medicine, biomarkers.

**AI-232**

**ARTIFICIAL INTELLIGENCE IN CLINICAL PHARMACY: ENHANCING DRUG SAFETY, ADHERENCE,AND PATIENT –CENTERED CARE**

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Artificial Intelligence (AI) rapidly transforms clinical pharmacy by enhancing the drug safety, medication adherence, and patient-centered care. This topic explores the application of AI in clinical pharmacy and its potential to revolutionize the pharmacy practices by improving the patient outcomes. It highlights the AI-driven innovations in drug safety through predictive analytics for adverse drug event detection and prevention and advancements in pharmacovigilance. Additionally, AI's role is to optimize the medication adherence through personalised strategies, reminders, and digital tools is discussed, emphasizing the importance of improving patient compliance for better therapeutic outcomes. The integration of AI into patient-centered care is to examine, while focusing on personalized medicine, clinical decision support, and AI-powered patient engagement tools that improve counselling and patient monitoring. Despite the promising benefits, challenges such as regulatory, ethical, and technological barriers to AI adoption in clinical pharmacy are addressed. Finally, the topic provides recommendations for the future integration of AI into clinical pharmacy, which emphasizes the need for clear regulatory frameworks, ethical guidelines, and technological advancements to ensure safe, effective and equitable implementation.

**Keywords:** Artificial Intelligence, Drug Safety, Medication Adherence, Patient-Centered Care, Pharmacovigilance, Predictive Analytics.

**AI-233**

**AI-INTEGRATED, SENSOR-ENABLED LIVER-ON-CHIP FOR REAL-TIME DRUG-INDUCED LIVER INJURY (DILI) AND ADME PROFILING**

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Background: The liver governs drug metabolism, yet animals and 2D cell cultures often mis predict human liver toxicity. Liver-on-chip systems replicate sinusoidal structure, spatial zonation, multicellular cross-talk, and gentle perfusion to improve disease models, metabolism studies, and safety testing. Methods: This synthesis compares device classes (patterned 2D co-cultures, matrix-free spheroids, matrix-embedded 3D constructs), biomaterials, and cell sources (primary and iPSC-derived hepatocytes plus endothelial, stellate, and Kupffer cells). It evaluates oxygen/zonation control, multi-organ couplings for first-pass ADME, and embedded optical/electrochemical sensors against benchmarks (albumin/urea, phase I/II metabolism, bile canaliculi, inflammatory/fibrotic responses, functional longevity, and clinical concordance). Results: Perfusion with tailored extracellular matrix and non-parenchymal cells preserved differentiated hepatocyte function for weeks, restored paracrine and immune signalling, and increased sensitivity to drug-induced liver injury and drug–drug interactions. Integrated sensors enabled real-time tracking of oxygen, glucose, lactate, albumin, and redox state for kinetic toxicity profiling. Platforms recapitulated NAFLD/NASH, alcoholic injury, viral hepatitis, tumour–liver interfaces, and gut–liver first-pass metabolism; remaining gaps include bile-excretory modelling, small-molecule sorption by polymers, scalable oxygen-gradient control, iPSC immaturity, and limited standardization. Conclusion: Advances in vascularization and zonation control, engineered matrices, immune-competent co-cultures, patient-specific organoids, and multimodal analytics can reduce animal use and improve clinical predictivity, provided harmonized protocols, reference compounds, scalable manufacturing, and prospective validation are adopted.

**Keywords:** Liver-on-chip, Micro physiological systems, Hepatotoxicity, Drug metabolism, Biosensors.

**AI-234**

**"AI-DRIVEN PHARMACOLOGY: ACCELERATING DRUG DISCOVERY FROM MOLECULE TO MECHANISM"**


ISBN: 978-81-980623-8-3

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The integration of Artificial Intelligence (AI) into pharmacology is rapidly transforming the drug discovery landscape by enabling more efficient and accurate prediction of drug behavior from the molecular level to therapeutic mechanisms. Traditional drug development pipelines face significant challenges, including high costs, long timelines, and a high rate of late-stage failures. AI offers a promising solution by augmenting each stage of the pharmacological workflow—from molecular design and target identification to pharmacokinetic/pharmacodynamic (PK/PD) modeling and mechanism-of-action prediction. This study explores the application of machine learning and deep learning models in key areas such as virtual screening, de novo drug design, ADMET prediction, and systems pharmacology. We highlight the role of AI in integrating diverse data sources—including chemical structures, biological assays, genomics, and real-world data—to identify lead compounds with higher success potential. Additionally, we discuss how AI algorithms are being used to simulate drug-target interactions, predict side effect profiles, and uncover underlying molecular mechanisms that drive therapeutic or adverse outcomes. AI-driven pharmacology not only accelerates the pace of drug discovery but also enhances the accuracy and reliability of early-stage decision-making. This poster underscores the potential of AI to bridge the gap between chemistry and pharmacology, paving the way for faster, safer, and more personalized drug development.

**Keywords:** Artificial Intelligence (AI), Drug Discovery, Machine Learning, Molecular Modeling, Target Prediction.

**AI-235**

## AI-DRIVEN INNOVATIONS IN CLINICAL PHARMACY FOR ENHANCING DRUG SAFETY, COMPLIANCE AND INDIVIDUALIZED PATIENT CARE.

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Artificial intelligence (AI) is increasingly shaping healthcare, and its application in clinical pharmacy provides opportunities to improve medication safety, promote compliance, and deliver individualized care. With rising therapeutic complexity and polypharmacy, clinical pharmacists face growing challenges that AI tools such as machine learning, predictive analytics, and natural language processing can help address.A narrative review was conducted using PubMed, Scopus, and Google Scholar to identify publications from 2015–2025. Keywords included artificial intelligence, clinical pharmacy, drug safety, medication compliance, individualized care, and pharmacogenomics. Relevant studies were analyzed to explore AI-driven innovations, their benefits, and implementation challenges in clinical pharmacy. Findings highlight three major areas of AI impact. First, in drug safety, AI-enabled clinical decision support systems reduce prescription errors, predict adverse drug reactions, and assist with precision dosing using pharmacogenomic insights. Second, in medication compliance, AI-powered smart devices, mobile health applications, and predictive models identify non-adherent patients and enable timely interventions. Third, in individualized care, AI supports personalized therapy, automates routine processes, and facilitates patient counselling through virtual assistants. Collectively, these applications enhance pharmacist efficiency, patient engagement, and treatment outcomes.

AI offers transformative potential in clinical pharmacy by enhancing safety, improving compliance, and supporting individualized patient care. Addressing challenges such as data privacy, algorithmic bias, and interoperability is essential for sustainable integration. With appropriate adoption, AI can complement clinical pharmacists and contribute significantly to precision medicine and patient-centered healthcare.

**Keywords:** Artificial intelligence, Clinical pharmacy, Drug safety, Medication compliance, Pharmacogenomics, Individualized care, Precision medicine.

**AI-236**

## ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN PHARMACEUTICAL SCIENCES: ADVANCES, CHALLENGES, AND CLINICAL IMPACT

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Artificial intelligence (AI) and machine learning (ML) are revolutionizing the pharmaceutical sciences by providing powerful tools to accelerate drug discovery, optimize clinical development, streamline manufacturing, and strengthen pharmacovigilance. Recent research underscores this momentum: multi-agent large language model systems now simulate entire drug discovery pipelines (Pharm Agents, 2025); generative models such as IDO Lpro (2024) enable multi-objective molecular design balancing potency and synthetic feasibility; and AI methods are increasingly applied to pharmacovigilance, leveraging structured electronic health records and unstructured clinical text for adverse drug event detection. These innovations illustrate how AI/ML is rapidly advancing from experimental applications toward integration across the full medicinal product lifecycle. Alongside these scientific gains, regulatory oversight is becoming a critical focus. Authorities including the USFDA, EMA, MHRA, TGA, and WHO emphasize risk-based approaches to AI adoption, highlighting the need for transparency, robust data quality, lifecycle model management, human oversight, and mitigation of algorithmic bias. The USFDA's draft guidance on AI/ML for regulatory decision-making marks an important step in framing standards for safe and effective use in drug and biological product development. Persistent challenges include ensuring data integrity, improving model explainability, addressing bias, and harmonizing regulatory practices globally. Overcoming these barriers will require collaborative engagement between regulators, industry, academia, and civil society. In conclusion, AI and ML hold transformative potential to enhance efficiency, quality, and patient outcomes in pharmaceutical sciences. Their successful adoption depends on robust validation, ethical deployment, and globally aligned regulatory frameworks that foster both innovation and trustworthiness.

**Keywords:** Artificial Intelligence, Machine Learning, Pharmaceutical Sciences, Regulatory Frameworks, Drug Development, Pharmacovigilance.

**AI-237**

## TRANSFORMING CLINICAL TRIAL MANAGEMENT WITH AI: SMARTER DECISIONS, FASTER OUTCOMES

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The integration of Artificial Intelligence (AI) into clinical trial management is reshaping the pharmaceutical landscape by enabling smarter decision-making and accelerating trial outcomes. Traditional clinical trials often face challenges such as high costs, complex protocols, recruitment delays, and data management inefficiencies. AI-driven technologies—including machine learning, predictive analytics, natural language processing, and real-world data integration—offer powerful solutions to overcome these barriers. By streamlining patient recruitment, enhancing protocol design, monitoring trial progress in real time, and improving risk assessment, AI ensures greater efficiency, accuracy, and compliance. Furthermore, AI supports adaptive trial designs and predictive modeling, allowing for faster identification of safety signals and efficacy trends. Ultimately, the use of AI in clinical trial management not only reduces timelines and costs but also empowers researchers, regulators, and sponsors to make informed, data-driven decisions that benefit patients. This transformation signifies a paradigm shift toward a more agile, efficient, and patient-centric drug development ecosystem.

**Keywords:** Clinical Trial Management, AI Machine Learning, Predictive Analytics, Protocol design adaptive Trials, Real-World Data Drug Development.

**AI-238**

## EVALUATING AI-DRIVEN DRUG DISCOVERY IN POLYCYSTIC OVARIAN SYNDROME (PCOS) MANAGEMENT USING ANIMAL MODELS

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Polycystic Ovarian Syndrome (PCOS) affects 8-13% of women of reproductive age worldwide, highlighting the urgent necessity for novel therapeutic strategies. This study was the first to combine traditional animal model validation with computational methods driven by artificial intelligence to change the way drugs are found for PCOS. A complete AI pipeline that used machine learning algorithms like support vector machines, random forests, and deep neural networks was used to test large libraries of compounds against molecular targets linked to PCOS. Network pharmacology and molecular docking simulations identified lead compounds that target important pathways like insulin signaling, androgen metabolism, and inflammatory cascades. The AI algorithms accurately identified 15 new therapeutic candidates that had a strong binding affinity for PCOS-related targets like ESR1, PPARG, and CYP17A1. They were 98% accurate in predicting drug-target interactions. Subsequent validation employed established animal models, including letrozole-induced, dehydroepiandrosterone (DHEA)-induced, and prenatal androgen (PNA) exposure PCOS models in rodents. In vivo studies demonstrated that AI-identified compounds markedly reestablished hormonal equilibrium, characterized by diminished luteinizing hormone and testosterone levels, normalized estrous cyclicity, and enhanced ovarian morphology relative to conventional treatments. Metabolic parameters, such as insulin resistance markers and lipid profiles, showed significant improvement, confirming the predictions made by computers. Combining AI-driven drug discovery with strict animal model validation creates a new way to treat endocrine disorders. This speeds up the development process and makes it easier to find the right therapeutic targets.

**Keywords:** Artificial Intelligence, Drug Discovery, Polycystic Ovarian Syndrome, Animal Models, Machine Learning, Computational Pharmacology, Network Pharmacology, Molecular Docking, Preclinical Validation.

**AI-239**

## MINIMALLY INVASIVE AND DIGITAL SOLUTIONS ENHANCING OUTCOME IN PCOD TREATMENT

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Polycystic Ovary Disease (PCOD) is a prevalent endocrine disorder that affects reproductive, metabolic, and hormonal health in women. Traditional approaches to diagnosis and treatment have often been limited by delayed detection and generalized treatment plans. However, recent advancements in minimally invasive techniques and digital healthcare solutions are transforming PCOD management, offering improved outcomes and patient-centric care. Minimally invasive surgical techniques, particularly robotic-assisted ovarian drilling, provide greater precision with fewer complications, reduced recovery times, and minimal scarring. These approaches are especially beneficial for women who are resistant to medical therapy and seek fertility restoration. On the digital front, advanced imaging technologies like 3D ultrasonography and high-frequency transvaginal imaging allow for accurate ovarian assessment, enabling early and more reliable diagnosis. Artificial Intelligence (AI) is also playing a critical role by analyzing hormonal profiles, ultrasound data, and patient history to detect PCOD patterns and support personalized treatment strategies. Telemedicine platforms further enhance care by providing remote consultations, continuous monitoring of metabolic parameters, and timely treatment adjustments, making specialized care accessible even in underserved regions. Additionally, nanotechnology-based drug delivery systems enable targeted therapy, improving drug efficacy while reducing side effects. These innovations collectively shift the focus from symptom management to a more comprehensive, root-cause-driven approach. By integrating minimally invasive procedures with digital health technologies, PCOD treatment becomes more precise, accessible, and effective—ultimately improving the quality of life and long-term outcomes for affected women.

**Keywords:** Polycystic Ovary Disease (PCOD), 3D Ultrasonography Transvaginal Imaging, Artificial Intelligence (AI), Personalized Treatment, Robotic-Assisted Surgery.

**AI-240**

## "AI IN PHARMA: CHALLENGE, OPPORTUNITIES, BREAKTHROUGH"

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Artificial Intelligence (AI) is quickly revolutionizing the pharmaceutical sector with data-driven drug discovery, clinical trials optimization, and personalized medicine. AI-driven platforms are capable of examining enormous biological datasets, foreseeing molecular interactions, and speeding up the identification of potential new drug candidates, drastically cutting costs and timelines for research. Yet, issues including data privacy, compliance with regulations, few high-quality datasets, and concerns about transparency and bias present huge hurdles. Pharma integration with AI also requires skilled manpower and strong infrastructure, which are still in the making in most parts of the world. In the face of these challenges, the potential remains huge. AI has the capability to enhance accuracy of drug design, enhance adverse effect prediction, and optimize patient recruitment in trials. Further, advances in generative AI, quantum computing, and multi-omics integration are creating new avenues for precision therapeutics and rare disease research. Strategic partnerships among technology firms, academia, and pharma companies are also boosting innovation. As AI keeps evolving, the convergence of AI with biotechnology and digital health can bring a revolution in pharma research and healthcare delivery by making treatments more effective, cost-friendly, and patient-focused. Challenges will be overcome by regulatory regimes, ethical practices, and inter-disciplinary cooperation to unlock the transformational power of AI in pharma.

**Keywords:** Artificial Intelligence, Pharma, Drug Discovery, Clinical Trials, Precision Medicine, Data Challenges, Breakthroughs, Opportunities.

**AI-241**

## AI-DRIVEN PHARMACOVIGILANCE IN PSYCHIATRY: DETECTING ADRS OF ANTIDEPRESSANTS AND ANTIPSYCHOTICS IN REAL TIME

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Psychiatric medications such as antidepressants and antipsychotics are associated with a wide range of adverse drug reactions (ADRs), including metabolic disturbances, extrapyramidal symptoms, QT prolongation, and suicidality risks. Underreporting of ADRs in psychiatry is common due to patient stigma, cognitive impairment, and delayed symptom recognition. With the rapid integration of Artificial Intelligence (AI) into healthcare, there is an emerging opportunity to strengthen pharmacovigilance practices in psychiatry for real-time ADR detection and improved patient safety. To explore the role of AI-driven systems in enhancing ADR detection, monitoring, and reporting of psychiatric medications. A narrative review was conducted using PubMed, Scopus, and WHO-UMC databases. Literature from 2015–2025 was screened for studies applying AI, machine learning, and natural language processing (NLP) in pharmacovigilance. Key focus areas included AI-enabled electronic health record (EHR) mining, social media monitoring, and predictive algorithms for ADR detection in psychiatric drugs. AI-based models demonstrated higher sensitivity in detecting ADRs compared to traditional methods. NLP algorithms effectively identified ADRs related to antidepressants and antipsychotics from unstructured clinical notes. Machine learning tools enabled prediction of high-risk patients for metabolic syndrome and EPS, facilitating early interventions. Social media mining provided additional insights into underreported ADRs such as emotional blunting and sexual dysfunction. Integration of AI with national programs like Pv PI has the potential to bridge underreporting gaps and provide real-time pharmacovigilance in psychiatry. AI-driven pharmacovigilance offers a transformative approach in psychiatry, enabling proactive detection of ADRs, reducing underreporting, and enhancing patient safety. Future integration of AI with routine psychiatric care could empower clinicians and pharmacists to provide more personalized and safer treatment strategies




ISBN: 978-81-980623-8-3

**Keywords:** Pharmacovigilance, Artificial Intelligence, Psychiatry, Antidepressants, Antipsychotics, ADR Detection.

**AI-242**

**THE ROLE OF ARTIFICIAL INTELLIGENCE IN PHARMACOGENOMICS AND PERSONALIZED MEDICINE EDUCATION**

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Artificial intelligence (AI) is rapidly emerging as a transformative tool in pharmacogenomics and personalized medicine education. AI can help with clinical decision-making, enhance the interpretation of complicated genomic data, and speed up the identification of gene–drug interactions by utilizing machine learning, natural language processing, and predictive analytics. In education, AI-driven platforms offer interactive learning modules, adaptive assessments, and virtual simulations that enhance understanding of pharmacogenomic principles among healthcare professionals and students. These technologies not only simplify the integration of genetic data into clinical contexts but also allow learners to engage with real-world case scenarios in a dynamic and personalized manner. Additionally, AI makes it possible to create intelligent decision-support systems that are integrated into electronic health records and help physicians apply pharmacogenomic knowledge to patient treatment. Furthermore, by customizing information for each student, AI-based training technologies can close knowledge gaps and foster proficiency in a variety of healthcare environments. Notwithstanding its potential, issues like algorithm openness, moral dilemmas, data privacy, and fair access must yet be resolved. By utilizing AI in pharmacogenomics education, the next generation of medical professionals can be empowered, promoting safe, evidence-based medication therapy globally and guaranteeing the successful implementation of customized medicine.

**Keywords:** Healthcare Education, Genomic Medicine, Personalized Medicine, Pharmacogenomics, Adaptive Education.

**AI-243**

**"PERSONALIZED MEDICINE POWERED BY AI: A NEW ERA IN PHARMA"**

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The inclusion of Artificial Intelligence (AI) is inherently revolutionizing the landscape of the pharmaceutical sector and evolving a new paradigm of personalized medicine (PM). Conventional drug development is expensive and time-consuming, with prevalent reliance on the "one-size-fits-all" strategy for treatment. AI, which includes Machine Learning (ML) and Deep Learning (DL), benefits from the exponential expansion of big data—genomic, clinical, lifestyle, and real-world evidence—to design more customized therapeutic approaches. AI algorithms are particularly good at inspecting large, intricate datasets for subtle patterns and biomarkers of disease risk, optimal drug targets, and individual patient responses. The ability to do this is transforming drug discovery by streamlining virtual screening and molecular design and significantly accelerating target identification through clinical candidate selection. In addition, AI optimizes clinical trial design, patient stratification, and real-time monitoring, making clinical trials more efficient and ethical. In the clinical setting, precision diagnostics and pharmacogenomics with AI-enabled tools enable clinicians to choose the best type and dosage of drug, reducing side effects and enhancing therapeutic responses, especially in such challenging areas as oncology. Despite its immense promise, the adoption of AI in personalized medicine faces challenges related to data quality, security, regulatory frameworks, and addressing algorithmic bias to ensure equitable healthcare. Future progress requires rigorous validation, ethical oversight, and interdisciplinary collaboration to fully realize the potential of AI to deliver truly personalized and effective patient care.

**Keywords:** Artificial Intelligence (AI), Precision Medicine, Personalized Medicine, Pharmaceutical Industry, Drug Discovery, Machine Learning, Deep Learning, Genomics, Clinical Trials, Pharmacogenomics.

**AI-244**

**"THE ROLE OF ARTIFICIAL INTELLIGENCE IN THE FUTURE OF PHARMACEUTICALS"**

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By speeding up innovation and changing each phase of the drug lifecycle, artificial intelligence (AI) is completely changing the pharmaceutical sector. AI-driven technologies are opening up previously unheard-of possibilities to increase productivity, cut expenses, and improve patient outcomes in everything from early-stage drug discovery to post-market surveillance. Drug development failure rates have historically been high, but machine learning algorithms, predictive modeling, and big data analytics are helping researchers find new drug candidates more quickly and precisely. AI improves reliability and safety in clinical trials by streamlining patient recruitment, streamlining trial design, and guaranteeing real-time monitoring. Additionally, by evaluating genetic, clinical, and lifestyle data to customize treatments for specific patients, AI is assisting personalized medicine. In supply chain management and manufacturing AI ensures reliable delivery of safe medications by improving productivity, quality assurance, and predictive maintenance. By identifying negative drug reactions and tracking long-term drug safety using empirical data, artificial intelligence (AI) supports pharmacovigilance after the product is marketed. Additionally, platforms driven by artificial intelligence (AI) and natural language processing (NLP) are revolutionizing regulatory affairs, medical education, and decision-making throughout the pharmaceutical industry. Notwithstanding its enormous potential, there are still issues like data privacy, ethical concerns, system integration, and the demand for qualified personnel. But AI is poised to be a key component of pharmaceuticals' future with responsible application and ongoing development, propelling a paradigm shift toward creativity, accuracy, and patient-centered care.

**Keywords:** Artificial Intelligence, Pharmaceuticals, Drug Discovery, Clinical Trials, Personalized Medicine, Pharmacovigilance, Big Data, Machine Learning, Healthcare Innovation, Patient-Centric Care.

**AI-245**

**AI-POWERED PHARMACOVIGILANCE AND CLINICAL TRIALS: BRIDGING INNOVATION WITH SUSTAINABLE HEALTHCARE**

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Artificial Intelligence (AI) has emerged as a transformative force in clinical trials and pharmacovigilance, addressing key limitations of conventional approaches such as prolonged timelines, high attrition rates, and resource-intensive safety monitoring. This study employed a mixed-method research framework involving systematic literature review (2015–2025) of peer-reviewed articles, case studies of AI applications in global trials, and meta-analysis of secondary datasets from regulatory and pharmacovigilance repositories. AI models, including machine learning, natural language processing, and generative AI, were evaluated for predictive modelling, adverse event detection, and real-time trial monitoring. Tools such as digital twins, wearable devices, Internet of Medical Things (IoMT), and blockchain-enabled platforms were assessed for their role in enhancing trial efficiency and ensuring transparent, secure data management. Findings demonstrate that AI-powered analytics improved adverse drug reaction prediction accuracy by up to 38% compared to conventional models. Implementation of digital twins and IoMT reduced trial completion timelines by approximately 27%, while blockchain-based systems enhanced data security and regulatory compliance. Cloud-based AI platforms further streamlined reporting processes, reducing manual effort by nearly 42%. Collectively, these interventions supported cost-effectiveness, minimized bias, and promoted environmentally sustainable practices in drug development. Integration of advanced AI technologies is shifting pharmacovigilance and clinical trials from reactive to predictive frameworks. By enhancing efficiency, precision, and inclusivity, AI fosters sustainable healthcare systems capable of delivering safer therapies with reduced ecological footprint.

**Keywords**: Artificial Intelligence, Clinical Trials, Pharmacovigilance,




ISBN: 978-81-980623-8-3

Machine Learning, Deep Learning, NLP, Generative AI, Digital Twins, IoMT, Blockchain, Big Data Analytics, Sustainability, Predictive Healthcare.

**AI-246**

**"INNOVATIVE NEUROLOGICAL DISORDER DETECTION DEVICE: ADVANCING EARLY DIAGNOSIS AND PERSONALIZED HEALTHCARE THROUGH CUTTING-EDGE SENSOR TECHNOLOGY AND MACHINE LEARNING ALGORITHMS"**

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Neurological disorders represent a significant global health challenge, often detected only at advanced stages due to the limitations of conventional diagnostic tools. Early identification is critical for improving patient outcomes, enabling timely interventions, and reducing the overall healthcare burden. To address this gap, we propose an Innovative Neurological Disorder Detection Device that integrates advanced biosensor technology with machine learning algorithms to provide accurate, non-invasive, and real-time diagnosis. The device employs multimodal biosensors capable of detecting subtle physiological and biochemical variations associated with the early onset of neurological dysfunctions. These data are analyzed using optimized machine learning models that enhance sensitivity, ensure reliable pattern recognition, and generate patient-specific risk profiles. Unlike standard diagnostic approaches, the system emphasizes personalized healthcare, offering continuous monitoring and adaptability to individual needs. Preliminary evaluations suggest the device can identify early biomarkers of neurodegenerative and neurological conditions with higher precision compared to existing methodologies. Its portability, cost-effectiveness, and suitability for both clinical and remote healthcare environments make it highly scalable. By combining sensor-driven data acquisition with artificial intelligence, the device bridges the gap between traditional diagnostics and next-generation healthcare technologies. This innovation demonstrates strong potential to transform the landscape of neurological disorder management by advancing early diagnosis, promoting precision medicine, and improving accessibility to patient-centered care worldwide.

**AI-247**

**ARTIFICIAL INTELLIGENCE IN PHARMACY**

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Artificial Intelligence (AI) is rapidly transforming the field of pharmacy by enhancing drug discovery, personalized medicine, clinical decision-making, and pharmacy operations. This poster explores the integration of AI technologies—such as machine learning, natural language processing, and predictive analytics—in various aspects of pharmacy practice. AI-driven tools enable accelerated identification of novel drug candidates, optimize dosage regimens tailored to individual patient profiles, and improve medication adherence through intelligent monitoring systems. Furthermore, AI facilitates efficient inventory management and pharmacovigilance by predicting drug demand and detecting adverse drug reactions early. As pharmacy evolves towards precision healthcare, AI serves as a critical enabler for improving therapeutic outcomes and operational efficiency. Challenges such as data privacy, ethical considerations, and the need for interdisciplinary collaboration are also addressed. This presentation aims to provide insights into current AI applications and future prospects within pharmacy education, research, and clinical practice.

**Keywords:** Artificial Intelligence, Pharmacy, Drug Discovery, Personalized Medicine, Machine Learning, Pharmacovigilance, Predictive Analytics, Precision Healthcare, Medication Adherence, Clinical Decision Support.

**AI-248**

**ARTIFICIAL INTELLIGENCE–DRIVEN EXPLORATION OF BOERHAVIA DIFFUSA IN RHEUMATOID ARTHRITIS: CURRENT EVIDENCE AND FUTURE DIRECTIONS**

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Rheumatoid arthritis (RA) is a chronic autoimmune disorder that primarily affects the joints, leading to pain, swelling and eventual joint destruction with unknown etiology. Bottom of Form Conventional treatments provide relief but are limited by incomplete response and adverse effects, creating a need for safe, multi-target alternatives. Boerhavia diffusa (Punarnava), a traditional herb, possesses anti-inflammatory and immunomodulatory phytoconstituents such as punarnavine, flavonoids, and rotenoids. This review aims to evaluate the therapeutic promise of B. diffusa in RA and explore the emerging role of artificial intelligence (AI) in accelerating its discovery, standardization, and clinical translation. Studies conducted between 2010 and 2024 were reviewed from PubMed, Scopus, Google Scholar, and Web of Science, focusing on pharmacological studies of B. diffusa, AI-driven drug discovery, and computational approaches in RA management. Preclinical investigations demonstrate significant attenuation of pro-inflammatory cytokine release, and oxidative stress in RA models treated with B. diffusa. In parallel, AI-based tools show promise in predicting therapeutic targets, optimizing extraction methods, and integrating data. Furthermore, AI can aid in identifying synergistic phytochemical interactions, formulating standardized transdermal or oral preparations, and advancing precision medicine by predicting patient-specific responses. The integration of B. diffusa pharmacology with AI analytics offers a novel, safe, and personalized therapeutic pathway for rheumatoid arthritis, bridging traditional herbal medicine with cutting-edge technology.

**Keywords:** Rheumatoid arthritis, Boerhavia diffusa, Artificial intelligence, Immunomodulation.

**AI-249**

**ARTIFICIAL INTELLIGENCE IN CARDIOVASCULAR PHARMACOLOGY: ADVANCING DRUG DISCOVERY AND PERSONALIZED THERAPY**

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Cardiovascular diseases (CVDs) remain the leading cause of mortality worldwide, with therapeutic outcomes often limited by inter-individual variability, polypharmacy, and unpredictable drug responses. Traditional drug development and monitoring approaches are time-consuming and resource-intensive, posing challenges for rapid identification of effective cardiovascular therapies. Artificial intelligence (AI) has emerged as a transformative tool in cardiovascular pharmacology, offering predictive models for drug efficacy, safety, and patient-specific response. Machine learning algorithms and deep learning frameworks can analyze large-scale datasets from electronic health records, genomics, proteomics, and clinical trials to identify novel drug candidates, optimize dosing regimens, and predict adverse cardiovascular events. AI also enables the development of digital twins of the cardiovascular system, allowing virtual simulation of pharmacodynamic and pharmacokinetic responses in individual patients. Furthermore, AI-powered predictive analytics can support early detection of drug-induced cardiotoxicity, facilitating timely intervention and reducing adverse outcomes. By integrating AI into cardiovascular drug discovery and clinical management, researchers and clinicians can accelerate precision medicine, enhance patient safety, and improve therapeutic efficacy, ultimately transforming the landscape of cardiovascular healthcare.

**Keywords:** Artificial Intelligence, Cardiovascular Pharmacology, Drug Discovery, Precision Medicine, Predictive Analytics.

**AI-250**

**GREEN SYNTHESIS AND IN SILICO EVALUATION OF A NOVEL QUINAZOLINONE SCAFFOLD AS POTENTIAL LEAD AGAINST CANDIDIASIS**

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The discovery of new therapeutic agents by integrating sustainable synthetic strategies with modern computational approaches is rapidly




ISBN: 978-81-980623-8-3

emerging as promising approach. Quinazolin-4-one is recognized as versatile scaffold with diverse pharmacological activities. In the present work, 3-aminoquinazolinone were synthesized using a green, microwave-assisted synthetic approach producing higher yields, shorter reaction times, and reduced solvent consumption compared to conventional methods. The synthesis involves condensation of methyl anthranilate with acetic anhydride in the presence of pyridine, followed by treatment with hydrazine hydrate to yield 2-methyl-3-amino-4-quinazolinone. The synthesized compounds were purified and monitored by thin layer chromatography, while melting points were determined using the open-ended capillary tube method. Structural elucidation was confirmed through FT-IR, GC-MS, and NMR spectroscopy. In silico evaluation of synthesized molecule was performed against key antifungal targets (1IYK, 4HOE, 5V5Z) of *Candida albicans*—the causative pathogen of candidiasis, a life-threatening opportunistic fungal infection. The ligand showed moderate binding affinities (–6.7 to –6.8 kcal/mol) compared to the standard antifungal drug voriconazole (–6.9 to –7.7 kcal/mol). On further analysis, overlapping of amino acid residues with co-crystal ligands, confirm the correct orientation and competitive binding within active sites. This study highlights the successful integration of eco-friendly microwave synthesis with computational antifungal activity evaluation, indicating 3-amino-2-methylquinazolin-4-one as a potential lead scaffold for the development of novel antifungal agents against candidiasis.

**Keywords:** Quinazolinone, Microwave-assisted synthesis, Candidiasis, Molecular docking.

**AI-251**

**TRANSFORMING HEALTHCARE SUPPORT WITH WELLNESS AI: AN AI-DRIVEN MEDICAL CHATBOT**

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India continues to face significant healthcare challenges, particularly in rural and semi-urban areas where 65% of the population resides. The doctor-patient ratio is 1:1500, far below the WHO standard of 1:1000, leading to delayed treatment and reliance on unverified local advice. Limited health literacy, language barriers, and the lack of real-time emergency support further contribute to preventable complications and poor outcomes. To address these gaps, we developed WellnessAI, an AI-powered medical chatbot designed to deliver safe, reliable, and accessible healthcare support. The system is built on a prompt engineering framework and powered by the Google Gemini large language model, ensuring accurate, context-aware, and structured outputs. Users interact with the chatbot through WhatsApp, IVR, or mobile apps in Hindi, English, and regional languages using both voice and text. The chatbot integrates multiple modules: a symptom checker for guided triage, SOS emergency support with step-by-step instructions for six critical conditions (CPR, choking, bleeding, burns, fractures, and snake bites), a medical report simplifier that explains lab results and prescriptions in layman's terms, and a doctor/hospital locator powered by Google Maps and Just Dial APIs. To ensure accuracy and relevance, the system combines curated datasets with real-time web data extraction, using Beautiful Soup for static sources and Playwright for dynamic content. Structured JSON outputs provide interpretable and consistent responses, aligned with safety protocols. By merging domain-specific prompt engineering, real-time knowledge retrieval, and inclusive design, WellnessAI delivers a safer, smarter, and more accessible digital health solution for India's underserved communities.

**Keywords:** AI-Powered Healthcare, Prompt Engineering, Emergency Medical Support, Rural Health Accessibility, Multilingual Chatbot.

**AI-252**

**ARTIFICIAL INTELLIGENCE IN ADVERSE DRUG REACTION PREDICTION: A STEP TOWARDS SAFER PHARMACOVIGILANCE**

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Background: Adverse drug reactions (ADRs) remain a major challenge in global healthcare, contributing to hospitalizations and patient morbidity. Traditional pharmacovigilance methods rely heavily on manual case reporting and signal detection, often leading to delays in recognizing potential risks. Artificial Intelligence (AI) offers new opportunities to predict ADRs by analyzing large and complex datasets more efficiently. Objectives: The aim of this study is to explore the application of AI and machine learning techniques in predicting ADRs, thereby improving patient safety and regulatory compliance. Methodology: A curated dataset of ADR case reports and electronic health records was analyzed using machine learning algorithms such as Random Forest, Support Vector Machines, and Neural Networks. Features including patient demographics, co-medications, and treatment history were used for model training. Performance was evaluated using accuracy, sensitivity, and specificity metrics. Results: AI-based models demonstrated an improved ability to detect potential ADR signals compared to traditional methods. The Random Forest model achieved 87% accuracy, while Neural Networks provided early identification of high-risk drug–patient combinations. This approach reduced the average detection time for safety signals by 40%. Conclusion: AI-driven pharmacovigilance systems can significantly enhance ADR prediction and signal detection. By enabling faster, data-driven insights, these technologies support proactive risk management and strengthen the overall safety monitoring framework.

**Keywords:** Pharmacovigilance, Artificial Intelligence, ADR Prediction, Machine Learning, Drug Safety.

**AI-253**

**APPLICATION OF ARTIFICIAL INTELLIGENCE IN THERAPEUTIC DECISION-MAKING: A SURVEY-BASED STUDY IN BENGALURU**

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Artificial intelligence (AI) has emerged as a valuable tool in optimizing therapeutic decision-making by supporting dose adjustments, drug interaction detection, and personalized treatment planning. The present study aimed to assess the awareness, attitudes, and acceptance of AI-based tools among clinicians and pharmacists in Bengaluru. A structured questionnaire was designed using Google Forms and distributed to healthcare professionals across tertiary hospitals between January and March 2025. The survey included sections on demographic information, familiarity with AI applications in healthcare, attitudes toward AI in clinical decision support, and responses to hypothetical case vignettes presenting AI-suggested regimens. A total of 210 responses were analyzed (54% physicians, 46% pharmacists; mean age 36.7 ± 7.9 years). Only 32% reported prior exposure to AI in healthcare, yet 68% expressed willingness to integrate AI into therapeutic decision-making. Case vignette analysis demonstrated 70% concordance with AI-suggested dose modifications, particularly in renal impairment and polypharmacy scenarios. Reported concerns included lack of transparency of algorithms (41%) and clinical accountability for adverse outcomes (29%). Younger clinicians and pharmacists showed higher acceptance compared to senior physicians ($p < 0.05$). Thus, the study concludes that healthcare professionals in Bengaluru demonstrate favorable attitudes toward AI adoption in therapeutic decision-making, although trust, transparency, and liability issues remain challenges. These findings highlight the need for pilot implementation and training programs to support AI integration in clinical practice.

**Keywords:** Artificial intelligence, therapeutic decision-making, clinical decision support, clinician perceptions.

**AI-254**

**AI CHATBOTS AND VIRTUAL ASSISTANCE IN PHARMA**

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Artificial Intelligence (AI) is revolutionizing healthcare and the pharmaceutical sector, with chatbots and virtual assistants emerging as innovative tools to enhance patient care, streamline operations, and support research. In pharmacy practice, AI-driven chatbots provide real-time drug information, dosage reminders, adverse effect alerts, and patient counseling, thereby improving adherence and safety. Virtual




ISBN: 978-81-980623-8-3

assistants are being integrated into pharmacovigilance systems for adverse drug reaction (ADR) detection, monitoring, and reporting, significantly reducing manual workload and minimizing human error. In the industrial sector, AI-enabled assistants contribute to drug discovery, clinical trials, and regulatory documentation by accelerating data analysis and decision-making. Moreover, their role in consumer education ensures rational medicine use and combats issues such as antimicrobial resistance (AMR). Despite these advancements, challenges remain regarding data privacy, regulatory acceptance, ethical concerns, and the need for pharmacist training to effectively adopt AI tools. The future of pharmacy will likely witness a hybrid model where pharmacists collaborate with AI-based systems to deliver personalized care, enhance pharmacovigilance activities, and support public health initiatives. This highlights the growing significance of AI chatbots and virtual assistants in shaping modern pharmacy practice and industry, emphasizing their potential to complement the pharmacist's role rather than replace it.

**Keywords:** Artificial Intelligence, Chatbots, Virtual Assistants, Pharmacovigilance, Pharmacy Practice.

**AI-255**

**AI-BASED COMPUTATIONAL APPROACHES FOR TARGET IDENTIFICATION AND DRUG DISCOVERY IN RHEUMATOID ARTHRITIS**

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Rheumatoid arthritis (RA) is a chronic, systemic autoimmune disorder characterized by persistent joint inflammation, cartilage degradation, and progressive disability. Despite the availability of disease-modifying antirheumatic drugs (DMARDs) and biologics, such as incomplete therapeutic response, adverse effects, and drug resistance highlight the urgent need for novel therapeutic strategies. Artificial Intelligence (AI), integrated with in silico computational approaches, is using Artificial Intelligence to dramatically speed up and improve the process of finding and developing new medicine, prediction of bioactive compounds, and optimization of drug–protein interactions. This study provides, the methods used by AI such as machine learning (ML), deep learning (DL), and natural language processing (NLP) were applied to identify critical molecular targets implicated in RA pathogenesis, including TNF-α, IL-6, JAK/STAT, and NF-κB pathways. Computational modeling techniques, including molecular docking and virtual screening, were helped to evaluate natural and synthetic compounds against these validated targets. AI algorithms facilitated the prediction of pharmacokinetics (ADMET) and toxicity profiles, reducing experimental attrition rates. This review highlights how AI-based computational work flow accelerate target deorphanization, repurposing of existing drugs, and discovery of novel therapeutics for RA. The integration of AI with systems biology and chemical information not only enhances the accuracy of target identification but also significantly reduces time and cost in drug development. These approaches hold promise for the next generation of personalized and more effective RA therapies.

**Keywords:** Rheumatoid Arthritis, Artificial Intelligence, Drug Discovery, *In Silico* Molecular Docking, Machine Learning.

**AI-256**

**ARTIFICIAL INTELLIGENCE & DRUG DEVELOPMENT**

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Artificial intelligence (AI) is transforming the landscape of drug development by offering advanced computational approaches that enhance efficiency, accuracy, and innovation. Traditional drug discovery processes are time-consuming, costly, and often limited by high attrition rates. By integrating AI, researchers can accelerate target identification, optimize lead compounds, and predict drug–disease interactions with greater precision. Machine learning algorithms and deep neural networks enable the rapid analysis of complex biological data, including genomics, proteomics, and chemical libraries, thus uncovering patterns that are often beyond human capability. AI-driven predictive models reduce the dependency on extensive experimental trials by simulating pharmacokinetics, toxicity, and efficacy in silico, leading to improved candidate selection and reduced failure rates in clinical trials. Natural language processing tools further assist in mining vast scientific literature, clinical records, and patent databases, ensuring a comprehensive understanding of existing knowledge. Moreover, AI facilitates personalized medicine by tailoring therapies based on individual patient profiles, thereby improving therapeutic outcomes. Despite its potential, challenges remain, including data quality, interpretability of models, regulatory acceptance, and ethical considerations regarding patient data. Addressing these concerns requires collaborative efforts among researchers, clinicians, industry, and policymakers. Overall, the integration of AI into drug development holds significant promise in revolutionizing healthcare by accelerating discovery, lowering costs, and delivering safer and more effective therapies.

**Keywords:** Artificial Intelligence, Drug Discovery, Machine Learning, Predictive Modeling, Personalized Medication.

**AI-257**

**TECH FOR TRASH: AI-ENABLED MEDICAL WASTE REUSE AND INFECTION SAFETY**

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Medical waste poses a dual challenge to modern healthcare: it is both an environmental burden and a vector for hospital-acquired infections (HAIs). Current systems treat all waste as hazardous, leading to excessive disposal costs, carbon emissions, and occupational risks. Tech for Trash proposes a paradigm shift from the linear "use-and-dispose" model to an AI-enabled circular system that ensures infection safety and sustainable reuse. Leveraging computer vision, machine learning, hyperspectral imaging, and robotics, the system performs real-time smart sorting of waste into hazardous, recyclable, and general categories. Advanced sterilization—optimized through AI-controlled autoclaving, hydrogen peroxide vapor, or microwave-generated steam—guarantees pathogen elimination, while blockchain integration ensures traceability and regulatory compliance. This approach unlocks a reuse loop, where high-cost single-use medical devices can be safely reprocessed, and plastics/metals repurposed into new products, thereby reducing procurement needs and creating new revenue streams. Hospitals benefit from up to 50% reduction in disposal costs, enhanced infection control, and minimized carbon footprint. Moreover, AI-driven analytics provide actionable insights into waste generation patterns, supporting better procurement and sustainability strategies. Despite challenges—including regulatory barriers, upfront infrastructure costs, and cultural resistance—this model represents a transformative opportunity.

**Keywords**: Medical waste management, Artificial intelligence, Hospital-acquired infections, Smart sorting, Robotics, Sterilization, Blockchain, Circular economy, Sustainability, Healthcare innovation.

**AI-258**

**AI-POWERED MULTI-OMICS INTEGRATION TO IDENTIFY SHARED BIOMARKER SIGNATURES IN CVD, ALZHEIMER'S, AND PARKINSON'S: A COHORT STUDY**

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Cardiovascular Disease (CVD) and neurodegenerative disorders, including Alzheimer's disease (AD) and Parkinson's disease (PD), represent a significant global health burden, often exhibiting overlapping molecular and metabolic alterations. Despite advances in individual disease biomarker research, the shared pathophysiological mechanisms connecting CVD with neurodegeneration remain underexplored. This study leverages AI-driven multi-omics integration, encompassing genomics, transcriptomics, proteomics, and metabolomics, to systematically identify convergent biomarker signatures across these conditions. By applying machine learning algorithms and network-based analyses, we delineate common molecular pathways, including inflammation, oxidative stress, mitochondrial dysfunction, and lipid metabolism dysregulation, which may underlie both cardiovascular and neurodegenerative pathologies. Our integrative approach uncovers




ISBN: 978-81-980623-8-3

novel candidate biomarkers with potential predictive and therapeutic relevance, offering insights into early detection and risk stratification. Furthermore, AI-based models demonstrate superior capability in predicting disease onset and progression by harnessing high-dimensional multi-omics datasets.

Integration of single-cell omics, spatial transcriptomics, and real-world patient data can refine biomarker specificity. AI-guided multi-modal models could inform personalized therapeutic interventions, bridging cardiovascular and neurodegenerative disease management. Additionally, exploring epigenetic and microbiome interactions may reveal novel mechanistic links and therapeutic targets.

**Keywords:** Cardiovascular Disease, Alzheimer's Disease, Parkinson's Disease, Multi-Omics Integration, AI, Biomarkers.

**AI-259**

**ARTIFICIAL INTELLIGENCE (AI) - AIDED ADAPTIVE HEART: TOWARD PREDICTIVE CARDIAC CARE**

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The development of artificial hearts has long aimed to provide viable alternatives for patients with end-stage heart failure who are ineligible for transplantation. While early devices, such as the AbioCor total artificial heart, demonstrated the feasibility of fully implantable circulatory support, challenges related to biocompatibility, size, energy efficiency, and adaptability limited their widespread use. Recent advances in artificial intelligence (AI), biomedical engineering, and materials science present new opportunities to overcome these barriers. This paper proposes the concept of an artificial intelligence (AI) integrated artificial heart capable of real-time physiological adaptation. Using machine learning algorithms, the device would continuously monitor patient-specific parameters including blood pressure, cardiac output, oxygen saturation, and activity levels, adjusting pumping rates and stroke volume to closely replicate natural cardiac dynamics. Predictive artificial intelligence models could anticipate fluctuations due to stress, exercise, or circadian rhythms, thereby enhancing patient safety and comfort. The integration of digital twin simulations prior to implantation would enable personalized design and optimization, reducing complications and extending device longevity. Furthermore, nanostructured biocompatible coatings and wireless energy transfer systems could minimize thrombosis, infection risks, and dependence on external connections. By merging computational intelligence with bio-inspired mechanics, an artificial intelligence (AI) based artificial heart holds the potential to deliver personalized, durable, and adaptive cardiac support. This approach not only addresses limitations of earlier designs but also represents a paradigm shift toward precision cardiovascular medicine, where artificial organs dynamically co-evolve with patient physiology.

**Keywords:** Artificial heart, artificial intelligence, machine learning, digital twin, biocompatibility.

**AI-260**

**ARTIFICIAL INTELLIGENCE IN HERBAL DRUG TECHNOLOGY**

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The application of artificial intelligence (AI) in herbal drug technology is revolutionizing the process of quality control, research, and development with greater efficiency, accuracy, and creativity. AI data mining speeds up the detection of bioactive plant molecules from vast phytochemical libraries. In the manufacturing process, AI mechanizes extraction, standardizes quality testing, and enables real-time tracking using cutting-edge sensors. The predictive model can be utilized to interpret the pharmacological activity, toxicity, and synergistic effects of herbal preparations. It enhances regulatory compliance and traceability using AI-based documentation and integration with blockchain, thus promoting safe and authentic herbal products. We try to meet the AI strategy, such as machine learning, deep learning, and natural language processing at various stages of herbal drug discovery and manufacture, and finally talks about challenges of data heterogeneity, model interpretability, and strong validation needs in AI applications of herbal drug technology. Artificial intelligence is about to revolutionize herbal drug research and commercialization, eventually leading to the production of safer, more effective, and personalized herbal medicines, latest developments, real-life case studies, and future directions.

**Keywords:** Artificial intelligence, Herbal drug technology, Machine learning, Phytochemicals, Drug discovery, Natural language processing.

**AI-261**

**AI- ENABLED TELEPHARMACY: INNOVATING PATIENT ACCESS AND EDUCATION**

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Telepharmacy is the provision of the pharmacy services that through the digital platforms and it has evolved from the stopgap for the rural or underserved areas into a dynamic model of the patient-centered care. The integration of an Artificial Intelligence (AI) marks a new phase of this in evolution. Beyond the remote of dispensing and AI-enabled telepharmacy is now enables the pharmacists to deliver the individualized counseling and optimize therapy, predict the adherence issues before they arise. The Machine-learning algorithms can identify the hidden drug-drug interactions and adjust the dosage recommendations, generate the data-driven insights for the continuous quality improvement. Artificial intelligence powered virtual assistants and the chatbots provide on-demand and context-specific education, making complex medication of information understandable to diverse the patient populations. Then These innovations expand the pharmacist's reach and improve safety, treatment outcomes and decrease disparities in the access to care. The Early initiatives such as the pioneering North Dakota Telepharmacy and Project is proved that the high-quality pharmacy services minimizing errors, supporting personalized the care plans. Aligned with IPC-2025's focus on the technology-enabled in health services and this paper highlights how Arificial intelligence is enabled the telepharmacy and educates the professionals and empowers the patients,redefines the pharmaceutical care delivery in a digitally connected the world.

**Keywords:** Tele pharmacy, Artificial Intelligence, Natural language processing, Digital Health, Medication adherence.

**AI-262**

**ARTIFICIAL INTELLIGENCE -BASED ELECTRONIC HEALTH CARE RECORDS: TRANSFORMING DATA INTO INTELLIGENT PATIENT CARE**

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The rapid digitalization of healthcare has generated vast amounts of patient data, creating both opportunities and challenges in clinical practice. Traditional electronic health care records (EHCRs) serve as essential repositories but often face limitations such as poor interoperability, information overload, and restricted analytical capacity. Artificial Intelligence (AI) integration offers a transformative approach to overcoming these barriers by enhancing the efficiency, accuracy, and intelligence of EHCR systems. AI-powered tools, including natural language processing, machine learning, and predictive analytics, enable automated data entry, structured information extraction, and real-time clinical decision support. These capabilities not only reduce administrative burden but also improve diagnostic accuracy, predict patient risks, and recommend evidence-based treatment pathways. Moreover, AI-enhanced EHCRs contribute to population health management by detecting epidemiological trends, identifying high-risk groups, and supporting preventive strategies. Patients also benefit through personalized portals that provide tailored health insights, treatment reminders, and continuous monitoring, thereby fostering active engagement in their care. Despite these advances, critical challenges remain, including concerns of data security, algorithmic transparency, ethical use, and integration into existing healthcare infrastructure. Addressing these issues requires robust regulatory frameworks, secure data governance, and cross-disciplinary collaboration. With proper implementation, AI-based EHCRs have the




ISBN: 978-81-980623-8-3

potential to transform healthcare into a more predictive, preventive, and patient-centered system, advancing the vision of precision medicine and sustainable healthcare delivery.

**Keywords:** Artificial Intelligence, Electronic Health Records, Clinical Decision Support, Predictive Analytics, Patient-Centered Care.

**AI-263**

**INNOVATIVE OF SMART INSOLES OR WEARABLES WITH ARTIFICIAL INTELLIGENCE**

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Smart insoles and wearable devices integrated with Artificial intelligence are emerging as transformative technologies in healthcare, sports, and daily wellness monitoring. These systems combine advanced sensors-such as pressure, temperature, motion, and bioelectric sensors with Artificial Intelligence driven analytics to provide real time insights into gait, posture, physical activity, and overall health status. Artificial Intelligence algorithms process large volumes of biomechanical and physiological data to detect abnormalities, predict risks such as falls or diabetic foot ulcers, and personalize rehabilitation programs. In sports, Artificial Intelligence enabled insoles optimize performance and prevent injuries through precise feedback on movement patterns. For chronic disease management, they enable continuous monitoring of patients with diabetes, cardiovascular issues, or neurological disorders, supporting early diagnosis and timely interventions. The integration with mobile applications and cloud platforms further enhances accessibility, telemedicine, and personalized healthcare. Thus, Artificial Intelligence powered smart insoles and wearables represent a significant step toward proactive, data driven, and patient centered health management.

**Keywords:** Smart insoles, wearable technology, artificial intelligence, digital health, remote monitoring.

**AI-264**

**CLINICAL DECISION SUPPORT SYSTEM (CDSS): AN GOING PURSUIT OF POTENTIAL -PUBMED**

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A Clinical Decision Support System (CDSS) is a health information technology that assists healthcare professionals in making informed clinical decisions. When powered by Artificial Intelligence (AI), CDSS becomes more dynamic, accurate, and efficient. AI-driven CDSS uses advanced algorithms, machine learning, and natural language processing to analyze patient data, medical histories, lab results, and even real-time monitoring inputs. By integrating this information, it generates evidence-based recommendations for diagnosis, treatment, and patient management.Unlike traditional rule-based systems, AI-based CDSS can continuously learn from large datasets, including electronic health records (EHRs), clinical guidelines, and medical literature. This adaptive learning enables the system to detect patterns, predict disease risks, suggest personalized therapies, and identify potential drug interactions or adverse effects. For example, in pharmacy practice, AI-based CDSS can optimize drug selection, dosage adjustments, and monitoring plans, improving patient safety and therapeutic outcomes.The main benefits of AI-driven CDSS include enhanced accuracy, reduced medical errors, faster decision-making, and improved patient care quality. It also supports clinicians in handling complex cases where multiple conditions or medications are involved. However, challenges remain, such as data privacy, algorithm transparency, integration into clinical workflows, and the need for continuous validation. In conclusion, AI-powered CDSS represents a transformative tool in modern healthcare. By combining human expertise with intelligent data analysis, it helps clinicians provide safer, more personalized, and evidence-based care.

**Keywords:** Improved accuracy, Reduced medical errors, Faster decision –making,Clinical Decision Support System (CDSS), Personalized care, enhanced quality of health care.

**AI-265**

**AI-DRIVEN TRANSFORMATION: BRIDGING SCIENCE AND HEALTHCARE IN THE FUTURE OF INDIAN PHARMACY**

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Artificial Intelligence (AI) is revolutionizing global healthcare, and India's pharmaceutical sector stands at a pivotal point of transformation. This paper explores how AI is bridging the gap between scientific research and practical healthcare delivery within the Indian context. From accelerating drug discovery and development to optimizing supply chains and enabling personalized medicine, AI is reshaping the pharmaceutical landscape. Indian pharmacies are uniquely positioned to benefit due to the country's vast healthcare needs, rich data sources, and growing digital infrastructure. However, challenges such as data privacy, ethical considerations, regulatory gaps, and workforce readiness remain. This study analyzes current AI applications in Indian pharmacy, evaluates the socio-economic and regulatory hurdles, and outlines a roadmap for integrating AI to create a more efficient, accessible, and patient-centric pharmaceutical ecosystem. By embracing AI, Indian pharmacy can not only enhance domestic healthcare outcomes but also emerge as a global leader in pharmaceutical innovation.

**Keywords:** Artificial Intelligence, Indian Pharmacy, Drug Delivery, Pharmaceutical Technology, Digital Health.

**AI-266**

**THE SPECTRUM OF AI IN CANCER CARE: FROM DIAGNOSTIC PRECISION TO CLINICAL DECISION SUPPORT**

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Artificial intelligence (AI) is rapidly transitioning from a research concept to a clinical tool in oncology. However, its implementation and proven utility vary significantly across different specialties. This review assesses the current landscape, evaluating where AI delivers consistent value and where it remains an emerging technology. The synthesized findings are from recent high-impact clinical trials, prospective studies and analytical reviews. The analysis focused on evaluating the evidence for AI in three critical domains: Medical Imaging Interpretation, Radiotherapy Treatment Planning and Clinical Decision-Making Support. In Medical Imaging, robust evidence from randomized controlled trials shows that AI integration in breast cancer screening and enhancing cancer detection rates. In Radiation Oncology, AI algorithms have become fundamental in treatment planning with greater precision and operational efficiency. While the application of Large Language Models (LLMs) for clinical decision support presents a more complex picture in recalling standard treatment guidelines, these models are brilliant in the exploring the study rather than navigating the accurate information from patient records. The Analysis concludes that even though AI's role in oncology is varied in procedural domains like imaging and radiotherapy, while serving as a preliminary assistant in treatment planning. Bridging this gap requires a collaborative focus on rigorous clinical validation, improved model interpretability, and strategic workflow integration to fully use AI's capacity for personalizing and advancing cancer care.

**Keywords:** AI, Imaging Interpretation, Radiotherapy, Treatment Planning and Clinical Decision-Making.

**AI-267**

**AN EXPLORATIVE STUDY ON THE ROLE AND IMPACT OF DIGITAL HEALTH TECHNOLOGY AMONG PHARMACY STUDENTS**

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This study explored a detailed evaluation of the awareness, knowledge, and adoption of digital health technologies among pharmacy students in the Nagpur region. With the rapid growth of healthcare innovations, the research aimed to assess students' familiarity, understanding, and practical usage of wearable devices, telemedicine platforms, electronic health records, and mobile health applications, while also identifying perceived benefits and existing challenges. A structured questionnaire




ISBN: 978-81-980623-8-3

was administered to 150 pharmacy students, and the collected data was analyzed to uncover trends in technology acceptance and integration within pharmacy education. The findings revealed an increasing awareness and positive attitude toward digital health solutions, with students recognizing their potential to improve healthcare accessibility, enhance patient monitoring, and optimize treatment outcomes. However, barriers such as limited technical training, concerns over data privacy, inadequate infrastructure, and lack of curriculum-based exposure were identified as major limitations. The study highlighted the urgent need to incorporate digital health education into pharmacy programs to prepare future pharmacists for technology-driven healthcare systems. Overall, the results underscore the transformative role of digital health in advancing pharmacy practice, promoting patient-centered care, and bridging the gap in healthcare delivery in the modern healthcare landscape.

**Keywords:** Digital Health, Technology-driven, Pharmacy students, Wearable Devices.

**AI-268**

**AI BASED PROTEIN- PROTEIN INTERACTION PREDICTION FOR TARGET PRIORITIZATION**

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Finding possible therapeutic targets and determining the underlying causes of disease depend heavily on protein-protein interactions, or PPIs. Conventional experimental techniques, such as co-immunoprecipitation and yeast two hybrid testing, are reliable but have limited scalability and resource needs. The computational prediction of PPIs has been made feasible by recent advances in artificial intelligence (AI), offering rapid and reasonably priced approaches for target prioritization in drug discovery. In this study, we developed an AI-based framework that combines structural characteristics, biological context, and sequence embeddings to identify PPIs associated with disease-specific pathways. To develop a deep learning model that captured network architecture and local sequence motifs, convolutional neural networks (CNNs) and graph-based techniques were employed. Biogrid and String benchmark datasets were used for training and validating the models, while multiple Disgenet datasets were used for independent testing. Results showed that the proposed model performed better than more conventional machine learning techniques like random forests and support vector machines, with an accuracy of 92% and an AUC-ROC of 0.95. Importantly, the strategy prioritized PPIs connected to oncogenic signaling pathways and identified additional potential targets, such as hub proteins, which are essential in cancer networks. The projected targets were shown to correspond with existing markers such as HER2 and propose new therapeutic nodes, and their biological importance was confirmed by case validation on breast cancer datasets. AI-driven PPI prediction is shown in this study to be a powerful technique for systematic target selection, accelerating the bench-to-bedside pipeline by reducing experiment load and improving drug target identification results.

**Keywords:** Target Prioritization, Precision Medicine, Systems Biology, Pharmacological network.

**AI-269**

**ARTIFICIAL INTELLIGENCE IN CEREBROVASCULAR DISEASE: COMPUTATIONAL TOOLS FOR DIAGNOSIS, PROGNOSIS, AND MECHANISTIC INSIGHTS**

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Artificial intelligence (AI) is a revolutionary tool in the clinical management of cerebrovascular diseases, such as ischemic and hemorrhagic stroke, transient ischemic attack, cerebral aneurysms, and vascular malformations. This review thoroughly examine the current state and growing potential of AI and machine learning in diagnosis, prognosis, and understanding of cerebrovascular diseases. Using the AI in this area is still at early stage compared to other medical fields, significant advances have been made in computer-assisted detection, prediction, and treatment planning. Both conventional machine learning and deep learning now help in the interpretation of neuroimaging, allowing for the earlier and more accurate identification of acute events also helps in the prediction of risks for complications such as hematoma progression or aneurysm rupture. The clinical applications of commercial AI especially for stroke assessment and forecasting outcomes, which makes critical decisions quicker. However, the review point out ongoing challenges, like data variability, algorithm transparency, and the necessity of clinical validation, all of which must be addressed for broader implementation. Mechanistically, AI tools are facilitating the investigation of disease pathophysiology by combining various patient information and images. this support more personalized treatment plans suited to each person. Future research should be focus on the need for robust, multicenter validation studies, fostering interdisciplinary collaborations, and clear communication of AI methodologies. Ultimately, AI stands as tranformative force in cerebrovascular care, improve diagnostic accuracy, individualized prognosis, and our understanding of disease mechanisms.

**Keywords:** Artificial intelligence, cerebrovascular diseases, machine learning, deep learning, diagnosis, prognosis and Mechanistic Insights.

**AI-270**

**VIRTUAL ARTIFICIAL INTELLIGENCE INFECTION CONTROL ASSISTANT: ENHANCING HOSPITAL INFECTION PREVENTION AND CONTROL**

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Hospital-acquired infections (HAIs) pose a major challenge to patient safety and healthcare efficiency worldwide. The Virtual AI Infection Control Assistant offers a cutting-edge solution by leveraging artificial intelligence (AI) and machine learning to enhance infection prevention and control (IPC). The system integrates patient data, hospital records, and IoT sensor inputs to continuously monitor infection risks, detect early outbreak signals, and identify high-risk patients. Real-time alerts enable IPC teams to implement timely interventions, reducing the incidence of HAIs and optimizing hospital workflows. Beyond monitoring, the assistant provides virtual guidance to healthcare staff on hygiene protocols, isolation procedures, and antimicrobial stewardship, minimizing human error and improving protocol compliance. Using predictive analytics, the platform can forecast potential outbreaks and support decision-making for resource allocation. Additionally, remote monitoring and tele-IPC functionalities allow infection control support in quarantined or resource-limited settings. By combining AI, real-time monitoring, and virtual assistance, the Virtual AI Infection Control Assistant demonstrates a scalable and effective approach to reducing HAIs, improving patient outcomes, and strengthening overall healthcare system efficiency. This innovative solution highlights the transformative potential of AI-driven tools in modern infection prevention.

**Keywords:** Artificial Intelligence, Infection Prevention and Control, Hospital-Acquired Infections, Machine Learning, IoT Sensors.

**AI-271**

**NANO-HERBAL TRANSDERMAL SYSTEMS: A NEXT-GENERATION APPROACH FOR PERSONALIZED WOMEN'S HEALTHCARE**

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This study aims to redefine women's healthcare through the development of nano-herbal transdermal systems, integrating phytomedicine, nanotechnology, and intelligent biosensor platforms to overcome the limitations of conventional therapies. The objectives are: to address systemic toxicity, tolerance, and variable efficacy of conventional analgesics in menstrual and gynecological disorders; to enhance the therapeutic efficiency of phytoconstituents from Clitoria ternatea, Foeniculum vulgare, Zingiber officinale, and Withania somnifera via nanocarriers such as liposomes, ethosomes, and nanoemulsions; and to conceptualize AI-enabled wearable patches for adaptive and patient-specific therapy. The framework combines phytopharmacology for optimized bioactives, nanopharmaceutical




ISBN: 978-81-980623-8-3

engineering for dermal penetration and sustained release, and AI-integrated biosensors to monitor hormonal rhythms and modulate drug release dynamically. Nanoencapsulation improves bioavailability and therapeutic precision while minimizing systemic burden. Coupled with AI-driven wearables, the system enables real-time personalization. Beyond menstrual relief, the platform has translational applications in polycystic ovarian syndrome, endometriosis, and menopausal care, ensuring safety, compliance, and holistic efficacy. By merging plant-based therapeutics, advanced nanocarriers, and AI personalization, nano-herbal transdermal systems represent a disruptive, patient-centered innovation, positioning women's pharmacotherapy as both a scientific breakthrough and a societal necessity.

**Keywords:** Nano-herbal transdermal systems, Phytopharmacology, AI-enabled wearable patches, Precision gyneco-therapeutics.

**AI-272**

## DESIGN AND CHARACTERIZATION OF PHYTOHORMONE ORAL DISSOLVABLE FILMS AS A NOVEL DRUG DELIVERY SYSTEM FOR WOMEN'S HEALTH

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Hormonal imbalances in women, particularly during premenstrual, perimenopausal, and postmenopausal stages, are associated with physiological and psychological challenges including menstrual irregularities, hot flashes, osteoporosis, and mood disturbances. Conventional hormone replacement therapy (HRT), though effective, carries long-term risks such as cardiovascular complications and hormone-sensitive cancers. Hence, there is growing interest in phytohormones-plant-derived compounds with estrogenic, progestogenic, and adaptogenic properties-as safer alternatives. The present work aims to develop and evaluate a novel oral dissolvable film (ODF) incorporating standardized extracts of soy isoflavones, red clover, flaxseed lignans, and Shatavari as a phytohormone supplement for women's health. The ODF was prepared using the solvent casting method with hydroxypropyl methylcellulose (HPMC E15) as the polymer and glycerol as the plasticizer. The films demonstrated uniform thickness (0.182 ± 0.015 mm), rapid disintegration (28.4 ± 3.1 seconds), and acceptable folding endurance (>250 folds). Drug content uniformity was maintained at 96.8 ± 2.1%, while in vitro release studies showed 84.7 ± 3.4% phytohormone release within 20 minutes. Sensory evaluation confirmed good palatability and patient acceptability. The results indicate that oral dissolvable films loaded with phytohormones represent a novel, patient-compliant dosage form, particularly advantageous for women with swallowing difficulties and those seeking a natural, side-effect-minimized alternative to HRT. This innovative delivery system holds potential for improved bioavailability, enhanced compliance, and holistic management of menopausal and menstrual health.

**Keywords:** Phytohormones, Phytoestrogens, Oral dissolvable films (ODFs), women's health.

**AI-273**

## CRACKING THE CODE FOR STABLE AND EFFECTIVE HERBAL COSMECEUTICALS: NANOTECHNOLOGY AND AN AI-BASED APPROACH

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People are very interested in herbal cosmeceuticals since they combine the benefits of cosmetics and medicines from plant-based actives. This is because people want natural, safe, and long-lasting products. Herbal products are being held back by a number of big problems, such as not being stable enough, changing bioactive concentrations, and not always working. Many herbal chemicals are highly susceptible to degradation due to environmental factors such as heat, light, pH, and oxidative stress. The complex nature of plant extracts makes it hard to develop formulations, and it's often not clear how to do it. Nanotechnology-based delivery systems, including liposomes, nanoemulsions, and polymeric nanoparticles, are interesting solutions for getting around these problems. These solutions protect sensitive actives, improve skin penetration, and optimize regulated release. This ensures long-lasting stability and better therapeutic benefits. At the same time, artificial intelligence (AI) is changing the way formulations are developed by predicting stability profiles, finding the best chemical combinations, and simulating environmental stress conditions to speed up stability testing. AI-powered tools help make personalized formulas by taking into account things like skin type, environmental exposure, and genetic predisposition. Combining predictive modeling with nanocarrier design greatly reduces the need for trial and error in formulation development, making the process both cheaper and faster. In the future, machine learning algorithms might be used to evaluate stability in real time, digital twins could be used to test products in a virtual environment, and green nanotechnology could be used for sustainable innovation. By combining old herbal knowledge with cutting-edge nanotechnology and AI techniques, the industry can make herbal cosmeceuticals that are reliable, effective, and tailored to meet the needs of modern customers and government rules.

**Keywords:** Herbal cosmeceuticals, Challenges in stability of herbal formulations, nanotechnology in cosmeceuticals, AI-driven cosmetic formulation design.

**AI-274**

## SMART FORMULATION DESIGN: AI-BASED APPROACHES TO IMPROVE PATIENT COMPLIANCE

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Patient compliance remains a critical determinant of therapeutic success, particularly in chronic disease management and long-term pharmacotherapy. Traditional drug formulation strategies often fail to address the diverse and dynamic needs of individual patients, leading to suboptimal adherence. Recent advances in artificial intelligence (AI) have opened new frontiers in pharmaceutical research, enabling the development of smart formulation designs tailored to patient-specific needs and behaviors. This review explores the integration of AI techniques such as machine learning, deep learning, and predictive analytics into the formulation development process to enhance drug efficacy, dosage convenience, and patient-centricity. AI-driven platforms can predict patient adherence patterns, optimize drug release profiles, and personalize dosage forms, ultimately improving compliance and therapeutic outcomes. The paper also discusses current challenges, ethical considerations, and future perspectives in deploying AI for formulation design. The convergence of AI and pharmaceutical sciences promises a paradigm shift toward precision medicine and improved public health outcomes.

**Keywords:** Patient Compliance, Smart Formulation, Machine Learning, Pharmaceutical Technology.

**AI-275**

## IMPACT OF ARTIFICIAL INTELLIGENCE IN TRANSFORMING TEACHING LEARNING PROCESS

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Introduction: Education plays a vital role in contribution to economic growth of a country as it develops the skilled workforce, apart from intellectual and cultural awakening. However, decades together traditional classroom teaching is being implemented where the students are not actively involved in teaching learning process. Thus, the students are unable to do what they are supposed to do. In this era of technology where the innovative modern andragogy and artificial intelligence tools are available, the focus on active learning methods and self-learning practices should be enhanced so that expected outcome in the students is achieved. Aim: The aim of this study was to transform teaching learning process through utilization of AI tools for best teaching practices and modern andragogy. Methodology: The survey of faculty and students was conducted to analyse present scenario of teaching learning process. MOOC course of eight weeks was designed and conducted for training the faculty in modern andragogical techniques. The use of AI in teaching learning process was also introduced through various FDPs and the impact of AI and modern andragogical tools on teaching learning process was studied. Results: It was found that around 78% of 3208 teachers trained became proficient in using effective teaching practices,




ISBN: 978-81-980623-8-3

modern pedagogy, LMS, creating effective presentations & videos, online teaching & assessment after successful completion of MOOC and training on AI tools. The impact of use of modern andragogy & AI tools by teachers was studied in students and it was found that the outcomes of student learning improved exponentially thereby improving results. Conclusion: It can be concluded that teaching learning process can be empowered by using various AI tools and implementing modern andragogical techniques; and further student learning outcomes can be improved.

**Keywords:** Artificial Intelligence, Modern andragogy, learning outcomes, teaching learning process, active learning.

**AI-276**

## INTEGRATING MACHINE LEARNING INTO ANTIMICROBIAL STEWARDSHIP: A RETROSPECTIVE STUDY OF URINARY TRACT INFECTIONS IN SOUTH INDIA

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Urinary tract infections (UTIs) are among the most prevalent bacterial infections, with antimicrobial resistance complicating management and outcomes. This retrospective single-center study was conducted at a tertiary care hospital in south india over 25 months (January 2020–May 2022), analyzing antibiogram data from inpatients and outpatients (2019–2021). Major isolates, including Escherichia Coli, Klebsiella spp., Esbl-positive, E.Coli, and Pseudomonas Spp., were assessed for resistance trends. Chi-square analysis was applied for statistical associations, while machine learning models (scikit-learn) were developed as a clinical decision support system (CDSS) to predict causative organisms. UTIs were most frequent in elderly patients (>60 years), particularly in rural populations, with hypertension and diabetes as common comorbidities. E. Coli emerged as the predominant pathogen and the leading contributor to multidrug resistance (MDR) and extensive drug resistance (XDR), especially among hospitalized patients. Demographic and treatment-related factors showed no significant association with MDR/XDR status. The CDSS demonstrated strong predictive accuracy in identifying causative organisms, supporting early and reliable empirical therapy. These findings highlight the dual challenge of rising resistance in community and hospital settings and the promise of ai-driven tools to guide antimicrobial stewardship. The integration of machine learning into routine practice offers a feasible approach to optimizing empirical treatment and improving clinical outcomes in UTI management.

**Keywords:** urinary tract infection, antimicrobial resistance, multidrug resistance, extensive drug resistance, machine learning.

**AI-277**

## OPTIMIZING CALCIUM–PHOSPHATE BALANCE IN HEMODIALYSIS PATIENTS USING AI-ASSISTED PREDICTIVE MODELING: AN AMBISPECTIVE OBSERVATIONAL STUDY.

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Calcium–phosphate dysregulation remains a major contributor to cardiovascular morbidity and mortality in patients undergoing maintenance hemodialysis. This ambispective observational study evaluated biochemical abnormalities, treatment patterns, pill burden, and dialysis frequency in 246 hemodialysis patients at MOSC medical college hospital. A novel artificial intelligence (AI)-assisted predictive framework was developed to model serum calcium, phosphate, and parathyroid hormone (PTH) trajectories. The AI system integrated demographic, biochemical, and therapeutic data to generate individualized predictions and risk stratification for mineral bone disorder outcomes. Preliminary analysis revealed that hyperphosphatemia was present in 62% of patients, hypocalcemia in 41%, and secondary hyperparathyroidism in 38%. Thrice-weekly dialysis was associated with improved phosphate control compared to twice-weekly regimens, though at the expense of higher pill burden. The AI model demonstrated strong predictive performance, with the capacity to anticipate abnormal calcium–phosphate profiles with high sensitivity. This approach enables early identification of patients at risk of uncontrolled mineral metabolism, supporting tailored interventions and potential reduction in pill burden. The integration of AI into clinical nephrology provides a promising direction for personalized therapy in dialysis-dependent patients. By bridging conventional biochemical monitoring with advanced analytics, our study highlights the transformative potential of AI to optimize treatment decisions, improve patient outcomes, and empower clinicians in managing chronic kidney disease-mineral bone disorder (CKD- MKD).

**Keywords:** hemodialysis, calcium–phosphate imbalance, parathyroid hormone, pill burden, artificial intelligence.

**AI-278**

## ARTIFICIAL INTELLIGENCE FOR ADVANCEMENTS IN DRUG DEVELOPMENT AND DISCOVERY OF DRUGS: A REVIEW ARTICLE

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Artificial intelligence (AI) as a tool utilizes anthropomorphic knowledge and offers quick fixes for difficult problems. Amazing developments in AI and machine learning offer a revolutionary chance for improving drug research, formulation, and dosage form testing in the pharmaceutical industry. Moreover, a multitude of techniques can be employed to construct efficacious medical models that range from prognostication and illness forecasting to determining the optimal treatment plan for a particular patient. Target identification, lead creation, lead optimization, preclinical and clinical development, as well as the difficulties encountered at each stage and possible solutions, are all covered in the drug discovery process. To improve efficacy and speed of drug discovery, machine learning computational models is process uses by artificial intelligence which improve disease heterogeneity, identify dysregulated molecular pathways, and find the right therapeutic target as well as the appropriate drug candidate during the discovery and design process. Some of these rights are significantly impacted by drug development, and this impact is now increased using machine learning and artificial intelligence. We talk about the challenges of therapeutic availability, particularly in nations with low and moderate incomes, the impact of the energy crisis on big pharma, and the potential impact of AI-enhanced medication discovery within a healthcare system focused on people. The vast chemical space, comprising >1060 molecules, fosters the development of a large number of drug molecules.

**Keywords:** Artificial Intelligence, Drug Development, Drug Discovery, Proteomic and clinical data.

**AI-279**

## FROM TAKE-BACK PROGRAMS TO AI SOLUTIONS: MANAGING UNUSED MEDICINES SAFELY

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Unused medicines refer to pharmaceuticals that are no longer required by patients because they have expired, become contaminated, or are simply not needed. Improper disposal of these drugs poses serious risks to human health, animals, and the environment, raising global concern. The economic and healthcare impacts of unused drugs are significant, and improper disposal—especially of antibiotics—can contribute to the development of drug resistance. One of the most effective methods to address this issue is the collection of unused medicines from households through take-back programs. Current regulations recommend that unused or expired medicines should be returned through the supply chain, from retailers back to suppliers and manufacturers, for safe disposal. Under the Drugs and Cosmetics Act, approved methods of disposal include landfilling, immobilization, inertization, incineration, and chemical decomposition; for example, retailers are expected to send expired stock back to the supplier or manufacturer. However, collection and disposal carried out manually is often a tedious and error-prone process, which highlights the need for advanced technologies. With advancements in artificial intelligence (AI), waste management has




ISBN: 978-81-980623-8-3

become more efficient—AI systems can accurately identify and categorize medical waste, enabling proper segregation and disposal. AI algorithms can also analyze data to assess potential risks and implement preventive strategies. Integrating AI into medical waste management not only improves safety and sustainability but also streamlines processes, supports regulatory compliance, and benefits patients, healthcare workers, and the environment. By ensuring accurate classification and handling of waste, AI reduces contamination risks, saves time, and optimizes resource use. Overall, regulated disposal practices combined with AI-driven solutions are crucial for safeguarding health, preventing drug resistance, and protecting the environment.

**Keywords:** Unused drugs, Disposal, Medical waste, Environment, Artificial Intelligence.

**AI-280**

## AI-POWERED DIGITAL TWIN FRAMEWORK FOR PERSONALIZED BREAST CANCER DIAGNOSIS AND TREATMENT

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Breast cancer is a leading cause of cancer-related mortality in women worldwide, and despite significant advancements in diagnostics and therapeutics, challenges remain in achieving personalized and effective treatment. Traditional approaches often adopt generalized treatment strategies, resulting in variable patient outcomes. To address this limitation, we propose an AI-powered digital twin framework for breast cancer management. This framework integrates multi-dimensional patient data, including electronic health records, imaging modalities, multi-omics profiles, lifestyle factors, and real-time biosensor inputs, to create a dynamic virtual replica of each patient. Using machine learning, deep learning, and computational modeling, the digital twin simulates tumor progression, predicts therapeutic response, and enables in silico testing of treatment regimens. The system also incorporates a feedback loop where clinical outcomes continuously refine predictive models through reinforcement and federated learning, ensuring adaptability across diverse populations. The proposed paradigm has potential to transform breast cancer care by providing clinicians with personalized treatment recommendations, optimized dosage strategies, and predictive insights into disease progression and therapy response. Furthermore, it promotes preventive, predictive, and participatory oncology while enabling patient-centric virtual clinical trials. This AI-driven digital twin model represents a significant step toward precision oncology and improved survival outcomes in breast cancer patients.

**Keywords:** Artificial Intelligence, Digital Twin, Breast Cancer, Precision Oncology, Personalized Medicine.

**AI-281**

## LEVERAGING AI AND TECHNOLOGY FOR DRUG-DRUG INTERACTION PREDICTION

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Patient safety is seriously threatened by drug-drug interactions (DDIs), which frequently result in adverse drug events and higher medical expenses. Conventional DDI detection techniques, such as post-marketing surveillance and in vitro/in vivo assays, are costly, time-consuming, and unable to keep up with the rapidly expanding number of novel medication combinations. Advanced computing technologies and artificial intelligence (AI) have become revolutionary instruments for highly scalable and precise DDI prediction in order to overcome these constraints. Artificial Intelligence (AI), specifically Machine Learning (ML) and Deep Learning (DL), is used to examine large, diverse datasets, such as genomic data, drug chemical structures, pharmacokinetics, pharmacodynamics, and Electronic Health Records (EHRs). Complex interactions within drug-target and protein-protein interaction networks are modeled by methods such as Graph Neural Networks (GNNs), which reveal linkages that are not readily apparent. DDI evidence is extracted from unstructured clinical notes and biological literature using natural language processing (NLP). Potential interactions, their intensity, and their underlying mechanisms (pharmacokinetic or pharmacodynamic) can all be predicted by the predictive models that are produced. Proactive risk mitigation requires the incorporation of these AI-driven technologies into drug development pipelines and clinical decision support. Continuous efforts in Explainable AI (XAI) and multimodal data integration promise to improve the transparency and clinical applicability of these tools, ushering in an era of more precise and personalized medicine to ensure optimal drug safety, even though there are still issues with data sparsity, interpretability, and generalizability. Eg: Risk of lactic acidosis with metformin and iodinated contrast media

**Keywords:** Artificial Intelligence (AI), Machine Learning (ML), Deep Learning (DL), and specific models like Graph Neural Networks (GNNs).

**AI-282**

## AI-DRIVEN APPROACHES IN NON-ALCOHOLIC FATTY LIVER DISEASE: FROM PRECLINICAL MODELS TO PRECISION MEDICINE

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Artificial Intelligence (AI) is emerging as a transformative tool in pharmaceutical sciences, offering innovative, accurate, and cost-efficient approaches for complex diseases such as Non-Alcoholic Fatty Liver Disease (NAFLD). Conventional diagnostic and therapeutic methods for NAFLD face challenges including delayed recognition, variability among patients, and limited effective drug options. This review consolidates current research on AI applications in NAFLD, highlighting its contributions to disease modeling, identification of biomarkers, drug repurposing, and patient stratification. By analyzing biochemical, functional, histological, and imaging data, AI facilitates early diagnosis, precise staging, and prediction of disease progression. In preclinical research, AI supports both in vivo and in vitro studies, enhancing reproducibility and enabling high-throughput evaluation of functional tests, serum markers, and liver histopathology. Integrating multi-omics (genomics, transcriptomics, proteomics, metabolomics, epigenomics, microbiomics), clinical, and imaging datasets further strengthens translational research and informs personalized treatment strategies. While challenges such as data standardization, model transparency, and ethical considerations remain, AI demonstrates substantial potential to advance NAFLD research, optimize therapeutic interventions, and improve patient-centered outcomes. This review emphasizes AI's role in promoting interdisciplinary collaboration and enhancing both preclinical and clinical evaluation in modern pharmaceutical sciences.

**Keywords:** Artificial Intelligence, NAFLD, Drug Repurposing, Preclinical Research, Precision Medicine.

**AI-283**

## AI ASSISTED FORMULATION OPTIMIZATION AND DISSOLUTION PROJECTION OF KETOCONAZOLE: A MACHINE LEARNING-BASED BCS CLASS II DRUG

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The development of BCS Class II drugs such as Ketoconazole, which have low solubility and high permeability, is a significant challenge in drug development. This paper explores the implementation of Artificial Intelligence (AI), specifically the use of machine learning (ML) algorithms, as a way to generate additive formulation factors, and even predict in vitro dissolution profiles, for their solid dispersions. A design of experiments (DoE) approach was used to generate datasets with variables such as polymer type, concentration, solvent volume, and drying conditions. Various regression-based ML models, including random forest, Support Vector Regression (SVR), and gradient boosting, were trained on dissolution data at various time points (i.e., 5-, 15-, and 30-minutes). The SVR model had the best predictive accuracy with an $R^2$ value of 0.91 at 60 minutes of cumulative drug release. Feature analysis revealed drug-to-polymer ratios and polymer type to be the most important variables in dissolution. The predicted optimized formulation exhibited increased solubility compared to the conventional formulations. The use of ML in pharmaceutical practice promotes data-




ISBN: 978-81-980623-8-3

driven Quality by Design (QbD), with respect to development timeframe and further reinforces the Industry 4.0 vision of pharmaceutical manufacturing.

**Keywords:** Artificial Intelligence, Pharmaceutics, Machine Learning, Ketoconazole, BCS Class II, Dissolution Prediction, Formulation Optimization, QbD.

**AI-284**

**INNOVATING PAIN MANAGEMENT: AI MEETS TRANSETHOSOMES**

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The extract of Curcumin Longa L is of great interest because of its many biological properties. However, its poor skin permeability makes transdermal application challenging. The current study aimed to develop and evaluate curcumin longa extract transethosomes as a possible nanovehicle to enhance transdermal transport through the skin. Curcumin loaded transethosomes were prepared by cold method using edge activator. Transethosomes was prepared by different molar ratios of phospholipid and extract ratios and the fabricated nanovesicles were evaluated for particle size, entrapment efficiency, PDI using Box Behnken Design and in vitro diffusion study has been performed for the optimized formulation. The optimized formulation comprised of exhibited particle size of 326.9nm, entrapment efficiency of 71.88% and PDI of 0.236. Optimized formulation exhibited 81.69% in The developed transethosomal gel was 81.69 % in curcumin longa L transethosomes loaded gel release at 3h and followed zero-order release kinetics, compared to CT showed better drug release in controlled manner. Improvement of bioavailability and narrow particle size distribution.

**Keywords:** nanovesicles, Transethosomes, Curcumin longa L, Transdermal delivery, Analgesic activity.

**AI-285**

**DIGITAL INNOVATIONS IN HOSPITAL PHARMACY PRACTICE: SMART DISPENSING SYSTEMS AND E-PRESCRIPTIONS**

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The integration of digital technologies in hospital pharmacy practice has transformed the way medications are prescribed, dispensed, and managed, enhancing efficiency, safety, and patient-centered care. Smart dispensing systems, equipped with automation, barcode verification, and artificial intelligence, reduce medication errors, optimize inventory control, and support real-time monitoring of drug utilization. These systems ensure accurate dispensing while minimizing human error, thereby improving patient safety and workflow efficiency for healthcare providers. Simultaneously, the implementation of electronic prescriptions (E-prescriptions) has streamlined the prescribing process, reducing illegibility issues, drug–drug interaction risks, and delays in therapy initiation. E-prescriptions also facilitate secure transmission of prescriptions, integration with patient health records, and enhanced communication between physicians and pharmacists. Together, smart dispensing systems and E-prescriptions represent a significant advancement toward digital hospital pharmacy practice by promoting transparency, traceability, and regulatory compliance. However, challenges such as infrastructure costs, training needs, data security, and interoperability with existing healthcare systems must be addressed to maximize their benefits. Overall, the adoption of these digital innovations contributes to improving healthcare delivery by ensuring safer medication use, enhancing operational efficiency, and supporting evidence-based decision-making.

**Keywords:** Hospital pharmacy, smart dispensing systems, E-prescriptions, digital innovations, medication safety, healthcare technology.

**AI-286**

**DIGITAL BRAINS FOR DRUG DISCOVERY: HOW PHARMA R&D AND PATIENT RESULTS ARE BEING TRANSFORMED BY GENERATIVE AI**

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Generative artificial intelligence (AI) is causing a rapid change in the drug discovery industry. In contrast to conventional techniques, generative AI can swiftly create novel compounds, forecast their physiological responses, and offer suggestions for enhancing their efficacy and safety. AI speeds up the process of finding new medication candidates, predicts possible adverse effects, and even suggests improved formulations by evaluating vast volumes of biological and chemical data. In addition to saving money and time, this expedites the drug development process and aids in the creation of more individualized patient care. Generative AI enables researchers to model the interactions of drugs with intricate biological systems, a task that was quite challenging in the past. This knowledge enhances decision-making throughout the research process and helps ensure that new medications are both safe and effective. The incorporation of AI into pharmaceutical research and clinical practices is making the process of drug discovery more efficient, innovative, and aligned with the needs of patients. In summary, generative AI is reshaping pharmaceutical research and development by facilitating smarter, quicker, and more accurate drug discovery. As AI technology continues to advance, bolstered by improved data and interdisciplinary collaboration, it has the potential to transform the development and delivery of medicines, ultimately enhancing health outcomes for patients across the globe.

**Keywords:** Generative AI, Molecular Design, Predictive Modelling, Personalized Medicine.

**AI-287**

**HOSPITAL-BASED EVALUATION OF DRUG-RELATED PROBLEMS AND CLINICAL PHARMACIST INTERVENTIONS IN DIALYSIS PATIENTS**

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Background: Patients undergoing dialysis are susceptible to drug-related problems (DRPs) due to complex treatment regimens, altered renal function, and multiple comorbidities. Clinical pharmacists play a vital role in optimizing medication therapy, reducing adverse drug events, and enhancing patient outcomes. Objectives: This study aimed to assess the prevalence and types of DRPs among dialysis patients and evaluate the effectiveness of pharmacist-led interventions in a hospital setting. Methods: A prospective observational study was conducted in the dialysis unit of a tertiary care hospital over six months. Patient demographic data, dialysis details, comorbidities, and medication profiles were collected. DRPs were identified, categorized, and interventions by clinical pharmacists were documented and analyzed for acceptance and clinical impact. Results: Among 150 dialysis patients, 62% experienced at least one DRP. The most common issues included dosing errors (28%), drug–drug interactions (25%), and inappropriate use of nephrotoxic medications (20%). Clinical pharmacist interventions, such as dose adjustments (35%), therapy modifications (30%), and patient counselling (20%), were implemented. Approximately 85% of these interventions were accepted by the treating physicians, resulting in improved medication safety, adherence, and patient outcomes. Conclusion: DRPs are highly prevalent in patients undergoing dialysis, emphasizing the need for active pharmacotherapy management. Clinical pharmacists contribute significantly by identifying, preventing, and resolving DRPs. Incorporating pharmacists into the dialysis care team enhances medication safety and overall quality of patient care.

**Keywords:** Dialysis, Drug-Related Problems, Clinical Pharmacist, Hospital-Based Study, Medication Safety.

**AI-288**

**NANOROBOTS WITH ARTIFICIAL INTELLIGENCE INTEGRATION FOR TARGETED DRUG DELIVERY**

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Nanorobots, also known as nanobots or nanomachines, are a groundbreaking innovation that integrates nanotechnology, robotics,




ISBN: 978-81-980623-8-3

biotechnology, and artificial intelligence. Operating at the nanometer scale ($10^{-9}$ m), these microscopic devices are designed to perform precise tasks with exceptional accuracy. Their potential lies in revolutionizing healthcare, environmental management, and advanced manufacturing.In medicine, nanorobots are being explored as effective tools for targeted drug delivery, transporting therapeutic agents directly to diseased cells and minimizing systemic side effects. They also enable real-time biosensing and diagnostics, supporting early disease detection and monitoring. Applications extend to crossing the blood–brain barrier for neurological treatments, repairing tissues at the cellular level, and performing minimally invasive surgical interventions. Beyond healthcare, nanorobots show promise in environmental remediation, where they can break down pollutants, neutralize toxins, and remove microplastics. In agriculture and electronics, nanoscale systems may enhance crop monitoring and support next-generation semiconductor design. Despite these opportunities, key challenges remain, including the need for biocompatible materials, nanoscale energy solutions, scalable manufacturing, and ethical safeguards to ensure safety and responsible use.Looking forward, nanorobots are expected to play a pivotal role in precision medicine, regenerative therapies, and global sustainability initiatives. With continued research and innovation, these tiny machines may emerge as one of the most impactful technologies of the 21st century.

**Keywords:** Nanorobots, Nanomedicine, Targeted Drug Delivery, Biosensing, Environmental Applications.

**AI-289**

## LEVERAGING ARTIFICIAL INTELLIGENCE FOR RISK PREDICTION AND MANAGEMENT OF BREAST AND CERVICAL CANCER: A CLINICAL STUDY

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Background: Breast and cervical cancers are among the leading causes of morbidity and mortality in women globally. Early detection and personalized management are crucial for improving outcomes. Artificial Intelligence (AI) tools can enhance risk prediction, optimize treatment strategies, and support clinical decision-making. Objectives: This study aimed to evaluate the effectiveness of an AI-based risk prediction model in identifying high-risk patients and guiding management decisions for breast and cervical cancer. Methods: A prospective observational study was conducted on 200 female patients attending the oncology clinic. Patient demographic, clinical, and laboratory data were input into an AI-driven predictive model. Risk scores, predicted outcomes, and suggested management plans were compared with standard clinical assessments. Data were analyzed to determine model accuracy, sensitivity, and clinical impact. Results: Among 200 patients, 120 (60%) were diagnosed with breast cancer and 80 (40%) with cervical cancer. The AI model accurately identified 92% of high-risk breast cancer patients and 88% of high-risk cervical cancer patients. Major risk factors detected included family history (breast: 25%), HPV infection (cervical: 30%), obesity (breast: 28%), and early age at first childbirth (cervical: 22%). AI-based recommendations led to treatment optimization in 70% of cases, including adjustments in surgery, chemotherapy, and follow-up frequency. Physician acceptance of AI-guided interventions was 85%, indicating high clinical applicability. Conclusion: AI-driven risk prediction models can reliably identify high-risk patients and support clinical management in breast and cervical cancer. Integrating AI into oncology practice enhances personalized care, optimizes treatment decisions, and may improve patient outcomes

**Keywords:** Artificial Intelligence, Breast Cancer, Cervical Cancer, Risk Prediction, Clinical Management.

**AI-290**

## Artificial Intelligence In Menstrual Health And Pregnancy

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Artificial intelligence [AI] is emerging as a transformative tool in women's health particularly in the domains of menstrual health and pregnancy. Artificial Intelligence powered applications increasingly used for menstrual cycle tracking, ovulation prediction, and early identification of reproductive health disorders such as poly cystic ovary syndrome and endometriosis; by integrating data from wearable devices and clinical records, Artificial Intelligence enables personalized insights and supports proactive health management. In pregnancy care Artificial Intelligence assists in predicting and diagnosing the complication such as gestational diabetes, preeclampsia and preterm birth while also aiding in fetal growth monitoring and maternal risk assessment. Machine learning and natural language processing further contribute to clinical decision support and patient education, enhancing communication between health care providers and expectant mothers. Although challenges related to data privacy accessibility and algorithmic bias remain, Artificial Intelligence holds significant potential to improve maternal – fetal outcomes and promote evidence. Artificial Intelligence is being applied in menstrual health and pregnancy specifically related to gestational diabetes. Artificial Intelligence predicts risk before develops using data like age, BMI, menstrual patterns, family history enhanced the diagnostics

**Keywords:** Menstrual rual cycle tracking, ovulation prediction, Gestation Diabetes, Artificial Intelligence.

**AI-291**

## AI-POWERED DIGITAL TWINS AND PREDICTIVE ANALYSIS IN PERSONALIZED MEDICINE: TOWARD PATIENT-CENTRIC HEALTHCARE

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The intersection of artificial intelligence (AI) and personalized medicine is transforming patient-centered healthcare, with digital twins and predictive analysis emerging as groundbreaking tools. Digital twins—virtual representations of individual patients that incorporate genomic, clinical, lifestyle, and real-time monitoring data—facilitate the simulation of treatment responses, enabling clinicians to customize therapies with unmatched accuracy. Predictive analysis, driven by sophisticated machine learning and deep learning algorithms, can anticipate disease progression, evaluate drug effectiveness, and foresee adverse events, thereby promoting proactive and optimized treatment approaches. Collectively, these technologies improve clinical decision-making, minimize trial-and-error in therapy selection, and enhance patient outcomes. This research investigates the current state of AI-driven digital twins and predictive models in personalized medicine, analyzing successful applications in oncology, cardiology, and metabolic disorders. Challenges including data privacy, bias, computational demands, and system integration are discussed with potential solutions. By reviewing literature and case studies, this study highlights how AI-driven digital twins and predictive analytics empower clinicians and patients with informed, personalized healthcare decisions. The results highlight the potential of these innovations to transition healthcare from reactive to predictive, preventive, and participatory models, ultimately advancing the objectives of personalized medicine and enhancing the quality of care.

**Keywords:** Artificial Intelligence, Personalized Medicine, Digital Twins, Predictive Analysis, Patient-Centric Healthcare.

**AI-292**

## ARTIFICIAL INTELLIGENCE POWERED SMART BANDAGES FOR ADVANCE WOUND CARE

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Chronic and acute wounds remain a major healthcare challenge, often leading to prolonged recovery, infections, and increased healthcare costs. Conventional wound dressings provide passive protection but lack the ability to monitor healing or respond to dynamic changes in the wound environment. The integration of Artificial Intelligence (AI) with smart bandage technology represents a transformative approach to modern wound care. AI-powered smart bandages are embedded with miniaturized sensors capable of continuously monitoring parameters such as pH, temperature, moisture, and bacterial load. The collected data is analyzed in real-time by AI algorithms to assess healing




ISBN: 978-81-980623-8-3

progression, detect early signs of infection, and predict complications. Based on these analyses, the bandage can release therapeutic agents such as antibiotics, growth factors, or anti-inflammatory drugs directly to the wound site, enabling personalized, responsive treatment. This intelligent system not only accelerates healing but also reduces the risk of secondary infections, minimizes unnecessary hospital visits, and optimizes clinical outcomes. Moreover, cloud-based data integration allows healthcare professionals to remotely monitor patients, enhancing telemedicine and home-care capabilities. The combination of AI analytics, sensor technology, and targeted drug delivery positions smart bandages as a next-generation solution in wound management, aligning with the broader objectives of precision medicine and digital health innovation.

**Keywords:** smart bandages, wound care, chronic wounds, sensors, personalized medicine.

**AI-293**

**BREAKING BARRIERS WITH AI: ADDRESSING WEIGHT BIAS AND OPTIMIZING PUBLIC UNDERSTANDING OF GLP-1 MEDICATIONS**

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GLP-1 receptor agonists, including Mounjaro (tirzepatide) and Ozempic (semaglutide), have demonstrated substantial efficacy in managing type 2 diabetes and obesity. However, public acceptance of these therapies is shaped not only by clinical outcomes but also by health beliefs and weight-related biases. This study examined how psychosocial factors influence perceptions of GLP-1 medications, revealing that stronger positive health beliefs foster more favorable attitudes, while weight bias contributes to skepticism and reduced willingness for adoption. Demographic moderators such as age, gender, and BMI further shaped these associations, emphasizing the need for inclusive strategies. Beyond these findings, the integration of artificial intelligence (AI) into pharmaceutical research and patient engagement offers a transformative path forward. AI-enabled predictive models can identify behavioural patterns, forecast adherence challenges, and customize educational interventions that directly address misconceptions and stigma. Moreover, AI-powered digital health platforms provide personalized education, interactive decision-support tools, and inclusive community spaces that empower patients to make informed health choices. By merging pharmacological efficacy with AI-driven innovation, the pharmaceutical sector can move beyond treatment to education and empowerment, dismantling barriers of bias and misinformation. This holistic framework repositions AI not merely as a technological tool but as a catalyst for social change, fostering equitable access, trust, and improved uptake of GLP-1 therapies.

**Keywords:** GLP-1 receptor agonists, tirzepatide, semaglutide, health beliefs, weight bias, artificial intelligence, patient empowerment, digital health.

**AI-294**

**HARNESSING AI FOR NEXT-GENERATION NATURAL AND HERBAL PRODUCT DISCOVERY**

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AI-driven screening methods are transforming the discovery of therapeutic compounds from natural and herbal sources by overcoming traditional limitations such as structural complexity and high costs, enabling rapid and accurate identification of bioactive molecules through techniques like machine learning, deep learning, and network pharmacology. By leveraging extensive databases and natural language processing, AI facilitates virtual screening, uncovering novel compound-target interactions, predicting ADMET properties, and analyzing multi-component herbal formulations for synergistic effects, thus accelerating the development of standardized, safe, and effective herbal therapeutics. This innovative integration of AI with traditional medicine not only enhances efficiency and reduces costs but also broadens the potential for evidence-based phytopharmaceuticals, addressing modern healthcare challenges with a promising, more precise approach.

**Keywords:** Artificial Intelligence (AI), Machine Learning, Deep Learning, Network Pharmacology, Virtual Screening, Natural Products, Herbal Medicine, Bioactive Compounds, Compound-Target Interaction, ADMET Prediction, Synergistic Effects, Phytopharmaceuticals, Standardization, Drug Discovery, Evidence-Based Medicine.

**AI-295**

**ARTIFICIAL INTELLIGENCE IN THE PHARMACEUTICAL RESEARCH**

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Artificial intelligence (AI) transformed the pharmaceutical research. Drug development can be a lengthy and complex process; however, with AI assistance, this time can be greatly minimized. The pri
mary benefits of AI in pharmaceutical formulation lie in its ability to process large datasets and identify patterns and relationships that human researchers might overlook. Different tools and technologies, including ANN, fuzzy logic, neuro-fuzzy logic, and genetic algorithms, are employed for data analysis, with ANN being the most widely used and recognized. AI facilitates the identification of new pharmacological targets and the development of more effective drugs. AI can also be utilized to enhance medication formulations by predicting the solubility, stability, and bioavailability of drug candidates, thereby boosting the chances of successful clinical trials. AI is utilized in the design of clinical trials, minimizing both the time and expenses involved by pinpointing patient groups that are most likely to gain from the treatment. Moreover, AI has the capability to observe patients in clinical trials, identifying real-time side effects and modifying dosages to enhance patient results.

**Keywords:** Artificial Intelligence, Pharmaceutical Research, Pharmaceutical formulation.

**AI-296**

**DEMONSTRATION OF EFFECTIVE INDIGENOUS ARTIFICIAL INTELLIGENCE BASED DRUG DESIGN AND DISCOVERY TOOLS.**

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With the objectives to reduce, time, energy, efforts, cost involved and with improved precision in drug design and Discovery, AI tools are explored in this research work. Artificial Intelligence (AI) is transforming drug discovery by accelerating processes, reducing costs, and improving accuracy in predicting molecular behavior. The presentation highlights AI-based tools integrated into the comprehensive GEINFORCE platform, which streamlines precision medicine and complex drug discovery workflows. GeinBioPredictor employs machine learning to estimate molecular bioavailability, enabling optimization of lead compounds. GeinTox predicts molecular toxicity across multiple endpoints, ensuring early detection of safety issues. ForceADME evaluates pharmacokinetic properties—absorption, distribution, metabolism, and excretion—with high accuracy, facilitating reliable candidate selection. GeinMol uses de novo design to generate novel, target-specific molecules with optimized structures, enhancing lead identification. GeinDock Suite integrates AI-driven active site prediction and molecular docking, providing robust protein–ligand interaction analysis with user-friendly visualization. Beyond drug design, the platform incorporates supportive AI tools like the AI Detector for authenticity verification of AI-generated text and ForcePhrase, a natural language processing tool for accurate paraphrasing to improve scientific writing. Together, these solutions accelerate discovery while ensuring reliability, safety, and clarity in research. Overall, the PPT underscores how AI-powered innovations, through advanced predictive modeling and generative algorithms, are redefining pharmaceutical chemistry by addressing challenges in bioavailability, toxicity, pharmacokinetics, and novel molecule design.A detailed overview of AI tools for Drug Design and Discovery will be presented in the 74th IPC with Demonstrations.

**Keywords:** AI-based Drug Design, Discovery, GeinBio Predictor, GeinTox, ForceADME, Bioavailability, GeinMol, GeinDock.




ISBN: 978-81-980623-8-3

**AI-297**

## AI IN PHARMACOVIGILANCE: STRENGTHENING SAFETY AND RISK MANAGEMENT

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Pharmacovigilance plays a critical role in ensuring the safety, efficacy, and quality of medicines throughout their life cycle. With the exponential growth of healthcare data, traditional pharmacovigilance systems often face limitations in timely detection, assessment, and prevention of adverse drug reactions (ADRs). The integration of Artificial Intelligence (AI) offers a transformative approach to strengthen safety monitoring and risk management in the pharmaceutical sector. AI-driven tools such as natural language processing, machine learning algorithms, and predictive analytics can rapidly analyze large datasets from clinical trials, electronic health records, and patient reports to identify potential safety signals with greater accuracy and speed. These technologies not only enhance decision-making for pharmaceutical managers but also reduce the burden of manual reporting and regulatory documentation. Furthermore, AI empowers healthcare professionals and patients by enabling proactive risk communication and personalized safety strategies. This highlights how AI in pharmacovigilance bridges education, innovation, and empowerment—equipping pharmaceutical management with smarter tools to safeguard public health and foster trust in the healthcare system.

**Keywords:** Pharmacovigilance, Artificial Intelligence, Adverse Drug Reactions, Risk Management, Drug Safety.

**AI-298**

## ARTIFICIAL INTELLIGENCE APPLICATIONS IN PHARMACY: AN INNOVATION PERSPECTIVE

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Artificial Intelligence (AI) has emerged as a transformative solution for data-driven and computational challenges, catalyzing technological advancements across diverse fields—including engineering, architecture, education, accounting, business, and healthcare. In the healthcare sector, AI has significantly enhanced the storage and management of critical data such as patient medical histories, medication inventories, and sales records. Furthermore, AI-powered tools and systems, including automated machines and diagnostic technologies like MRI and CT scan applications, have revolutionized the delivery of medical care by improving accuracy and efficiency. The pharmacy sector, in particular, has experienced a surge in AI integration. Recent years have witnessed growing interest in the application of AI across key pharmaceutical domains, including drug discovery, dosage form design, polypharmacology, and hospital pharmacy operations. Recognizing the increasing importance of AI in pharmacy, this report aims to provide a comprehensive overview to equip practicing pharmacists with insights into the most impactful breakthroughs facilitated by AI technologies.

**Keywords:** Artificial Intelligence, Pharmacy, Pharmacist.

**AI-299**

## AI AND NETWORK PHARMACOLOGY DRIVEN OPTIMIZATION OF VITAMIN D AND CALCIUM SYNERGY FOR COUNTERACTING MICROGRAVITY-INDUCED BONE LOSS

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Long duration spaceflight induces bone loss in astronauts due to microgravity based imbalances of bone resorption versus formation. The calcium and vitamin D (Vit D) supplements are standard to address this issue, However, its efficacy is limited by inter-individual differences in Vit D bioavailability and polymorphisms in the Vit D receptor gene. Motivated by recent attention based drug synergy AI frameworks such as MADSP, we have proposed an AI and network pharmacology based pipeline to optimize Ca + Vit D synergy for microgravity associated bone loss. Publicly available space-analog omics data (e.g. NASA GeneLab, drugComb, hind-limb-unloading models) were screened to identify microgravity responsive bone modeling genes and map them to VDR regulated pathways. A curated panel of Vit D analogs (calcitriol, eldecalcitol, paricalcitol) and candidate herbal bioenhancers was evaluated via in-silico molecular docking (e.g. PDB 1DB1, 4ITF) and fed into an AI based synergy scoring model that integrates dose response patterns and VDR polymorphism information. A simplified PK/PD simulation was performed to illustrate the potential for dose sparing regimens. Preliminary proof of concept analysis denotes that several microgravity perturbed bone genes overlap with VDR dependent pathways; that Vit D analogs such as eldecalcitol show stronger predicted binding (≈ –10 kcal/mol) than cholecalciferol; and that inclusion of a bio-enhancer may lower required Vit D analog doses by 15–20 %. This integrative strategy aims to educate the space medicine community on nutrient gene pathway links, innovate by applying AI and network pharmacology to predict synergy and empower both astronauts and osteoporosis patients on Earth with evidence based and personalized bone health interventions.

**Keywords:** Microgravity, Bone loss, Vitamin D, Network pharmacology, Artificial intelligence.

**AI-300**

## "AI-POWERED MEDICATION ADHERENCE TOOLS: SMART PILLBOXES, REMINDER APPS, AND WEARABLE SENSORS FOR CHRONIC DISEASE MANAGEMENT"

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Medication adherence is a critical component of effective chronic disease management, yet non-adherence remains a major global healthcare challenge. Emerging artificial intelligence (AI)-powered tools—such as smart pillboxes, mobile reminder applications, and wearable sensors—are transforming how patients engage with their treatment regimens. These technologies utilize real-time data, predictive analytics, and personalized feedback to improve adherence and health outcomes. Smart pillboxes equipped with sensors can track pill dispensing, send alerts to patients or caregivers, and generate adherence reports for healthcare providers. Mobile apps with AI integration offer personalized reminders, monitor behavioural patterns, and provide adaptive interventions to encourage routine compliance. Meanwhile, wearable sensors continuously track physiological indicators and activity patterns, correlating this data with medication intake to detect and predict non-adherence events. Collectively, these tools not only support patient engagement but also enhance clinical decision-making and facilitate remote monitoring. Despite their promise, challenges such as data privacy, user acceptance, and integration with existing healthcare systems remain. Continued research and collaboration among stakeholders are essential to optimize their effectiveness and ensure equitable access. AI-powered adherence tools represent a significant advancement in chronic disease management, offering scalable solutions to improve patient outcomes and reduce healthcare costs.

**Key words:** Medication adherence, Wearable sensors, Digital health, Remote Monitoring, Healthcare technology.

**AI-301**

## "ARTIFICIAI INTELLIGENCE-POWERED DIAGNOSIS OF SKIN RASHES: "ADVANCING DERMATOLOGICAI CARE"

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Skin rashes are common dermatological condition with multiple causes, including allergies, infections, autoimmune disorders, and adverse drug reactions (ADRs). Accurate and timely diagnosis is critical for effective treatment and prevention of complications. Artificial Intelligence (AI) has shown great potential in dermatology by applying machine learning and deep learning algorithms to analyze skin images, patient history, and




ISBN: 978-81-980623-8-3

laboratory data. Artificial Intelligence powdered diagnostic tools can distinguish between different types of rashes such as eczema, psoriasis, urticaria, and drug-induced eruptions with high accuracy. In the pharmacy domain Artificial Intelligence plays a vital role in detecting rashes caused by ADRS, supporting pharmacovigilance, and assisting pharmacists in drug selection and dosage adjustment. Teledermatology integrated with Artificial Intelligence allows pharmacists and healthcare professional to provide early intervention and personalized tools can distinguish between different types of rashes such as eczema, psoriasis, urticaria, and drug-induced eruptions with high accuracy. In the pharmacy domain, Artificial Intelligence plays vital role in detecting rashes caused by ADRs, supporting pharmacovigilance, and assisting pharmacists in drug selection and dosage adjustment. Teledermatology integrated with Artificial Intelligence allows pharmacists and healthcare professionals to provide early intervention and personalized recommendations for patients in remote areas. Additionally, Artificial Intelligence-Driven electronic health records (EHR) systems enable monitoring of treatment outcomes and medication adherence. Thus, Artificial Intelligence-Based skin rash diagnosis enhances precision in dermatological care, supports safe drug use, and strengthens the role of pharmacists in patient-centered therapy.

**Keywords:** Artificial intelligence (AI), skin rashes, pharmacy, Dermatology, Adverse drug reactions.

**AI-302**

**INTRODUCTION TO PYTHON LIBRARIES FOR AI IN DRUG DISCOVERY**

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The consolidation of artificial intelligence (AI) into pharmaceutical science has transformed the landscape of modern drug search, traditionally expanding time and resources requirement processes. Python along with the versatile ecosystem of his libraries, means the basics of developing AI-powered solutions for computational drug design and analysis. This paper introduces fundamental Python libraries-together with NumPy and Pandas for facts preprocessing, Scikit-learn for device learning modelling, TensorFlow and PyTorch for deep studying packages, and RDKit for cheminformatics-that together enable efficient coping with of complex molecular datasets. Emphasis is placed on how these libraries facilitate obligations together with molecular assets prediction, virtual screening, and shape–interest dating modeling. By imparting an on hand but powerful computational framework, Python empowers researchers to integrate AI methodologies with pharmaceutical information, thereby enhancing precision, decreasing experimental expenses, and expediting the discovery of novel therapeutic retailers. This highlights the pivotal position of Python libraries in bridging computational intelligence with drug discovery, aiming to encourage the adoption of AI-based totally strategies in pharmaceutical research and improvement.

**Keywords:** Python, Artificial Intelligence, Drug Discovery, Machine Learning, Deep Learning, Cheminformatics.

**AI-303**

**"SMART PHARMACOLOGY: HOW AI IS PERSONALIZING MEDICINE"**

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Traditional pharmacotherapy has long relied on a standardized "one-size-fits-all" approach, often overlooking the genetic, physiological, and environmental variability among patients. This can lead to suboptimal treatment outcomes, adverse drug reactions, and drug resistance. The integration of artificial intelligence (AI) into pharmacology has opened new horizons in the field of personalized medicine. By leveraging machine learning, big data analytics, and pharmacogenomics, AI systems can analyze patient-specific information such as genetic profiles, biomarkers, and electronic health records to predict individual drug responses with high precision. AI applications in personalized pharmacology include dose adjustment based on pharmacokinetic modeling, early identification of adverse drug reactions, and the design of precision oncology treatments where AI helps select the most effective drug regimen for cancer patients. Additionally, AI can support drug repurposing by identifying novel therapeutic uses for existing medications, particularly in rare or complex diseases. Future developments may include AI-driven "digital twins" of patients and integration with wearable health devices to enable real-time therapy adjustments. Thus, smart pharmacology powered by AI represents a paradigm shift, aiming not only to enhance therapeutic efficacy but also to ensure patient safety, reduce healthcare costs, and ultimately improve quality of life.

**AI-304**

**ARTIFICIAL INTELLIGENCE FOR NEURODEGENERATIVE DISEASES DRUG DEVELOPMENT (ALZHEIMER'S, PARKINSON'S)**

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Artificial intelligence (AI) has emerged as a transformative tool in accelerating drug development for neurodegenerative diseases such as Alzheimer's disease (AD) and Parkinson's disease (PD). These disorders are characterized by complex pathophysiology, multifactorial etiology, and high clinical trial failure rates, making conventional drug discovery approaches both costly and time-consuming. AI-driven platforms enable the integration and analysis of multidimensional datasets, including genomics, proteomics, neuroimaging, electronic health records, and clinical trial data, to identify novel therapeutic targets and biomarkers. Machine learning and deep learning models are increasingly applied to predict disease progression, classify patients into subgroups, and optimize drug design through molecular docking, de novo compound generation, and virtual screening. Furthermore, AI enhances precision medicine by enabling patient stratification for clinical trials, reducing heterogeneity, and improving treatment response prediction. In neuroimaging, AI facilitates early diagnosis by detecting subtle brain changes that are often overlooked by conventional methods. Despite significant promise, challenges such as data quality, model interpretability, regulatory acceptance, and ethical considerations remain. Nevertheless, the integration of AI in neurodegenerative drug development offers a paradigm shift toward faster, cost-effective, and more personalized therapies, with the potential to improve outcomes for millions affected worldwide.

**Keywords:** Artificial intelligence, Alzheimer's disease, Parkinson's disease, drug development, machine learning, deep learning, biomarkers, precision medicine, neuroimaging, virtual screening.

**AI-305**

**UNLOCKING THE FUTURE OF MEDICINE WITH ARTIFICIAL INTELLIGENCE IN DRUG DISCOVERY**

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Artificial Intelligence (AI) is no longer science fiction—it's transforming how new medicines are discovered. Traditional drug discovery takes over a decade and billions of dollars, but AI is helping scientists identify drug candidates faster, smarter, more precisely, and more cost-effectively. This study explores the role of machine learning, deep learning, and predictive algorithms in key drug discovery stages: target identification, molecular screening, protein modelling, and toxicity prediction. Tools like AlphaFold and AI-powered screening platforms were examined for their contributions. These applications have led to measurable advances in the efficiency and precision of drug discovery: Specifically, AI has significantly reduced the time to find active compounds, accurately predicted 3D protein structures, and enabled drug repurposing. AlphaFold, for example, solved complex protein folding problems that challenged researchers for decades. AI enables large-scale biological data analysis, reveals previously unseen patterns, and supports personalized medicine. Despite challenges like data quality and ethical concerns, AI is revolutionizing pharmaceutical research leading to faster cures, safer drugs, and a smarter future in medicine. AI is not just improving how we find drugs – it is shaping the next generation of precision medicine. By bridging biology and technology, AI is leading us toward a future of faster cures, safer drugs, and truly personalized treatments. Are we ready to embrace this AI-powered revolution in medicine?




ISBN: 978-81-980623-8-3

**Keywords:** Artificial intelligence, Machine learning, Drug Discovery, Protein Modelling (Alpha fold), Personalized Medicine.

**AI-306**

***IN VITRO IN VIVO* CORRELATION WITH AI**

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The integration of Artificial Intelligence (AI) into in vitro–in vivo correlation (IVIVC) is opening a new era of innovation in pharmaceutical research. Traditionally, IVIVC has been used to establish a predictive link between laboratory-based dissolution studies and real human pharmacokinetic outcomes. While useful, this conventional approach often struggles with biological variability, complex formulations, and lengthy experimental processes. AI offers ground breaking solutions to overcome these barriers. One of the most promising applications is the development of AI-driven virtual bioequivalence trials, where machine learning algorithms can simulate human drug absorption and predict formulation equivalence without the need for large-scale human studies. Similarly, digital twin models of the human gastrointestinal tract are being created using AI, allowing scientists to virtually test how drugs dissolve, release, and absorb in different physiological conditions. Another innovative approach lies in personalized IVIVC models, where AI integrates patient-specific variables such as genetics, age, microbiome, and disease state. This ensures more accurate predictions of drug performance across diverse populations, ultimately supporting the move toward personalized medicine. Additionally, real-time adaptive formulation design powered by AI can optimize excipients, coating parameters, and particle size automatically until the most suitable IVIVC fit is achieved. Future innovations also involve linking IVIVC with wearable biosensors, which continuously monitor drug levels in the body. AI can instantly analyse this data, refining predictive models in real time and providing a dynamic feedback loop between lab and clinic. Overall, the fusion of IVIVC with AI is not just about faster predictions—it represents a paradigm shift toward smarter, personalized, and cost-effective drug development, ensuring safer medicines reach patients more efficiently.

**AI-307**

**AI IN PHARMACY**

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Artificial Intelligence (AI) is emerging as a game-changing technology in the pharmaceutical industry, offering novel solutions to critical challenges across the drug development and healthcare spectrum. Traditionally, pharmaceutical research and manufacturing are time intensive, costly, and highly complex processes. By integrating AI, companies can accelerate innovation, improve efficiency, and support data-driven decisions that enhance both scientific and clinical outcomes. In the early stages of drug discovery, AI-driven algorithms assist in high-throughput compound screening, prediction of molecular properties, and quantitative structure–activity or structure–property relationship (QSAR/QSPR) modeling. These approaches not only reduce experimental costs but also facilitate de novo drug design with optimized therapeutic potential. Beyond discovery, AI contributes significantly to formulation development, clinical trial design, and patient specific treatment strategies. Machine learning models, robotic systems, and automated manufacturing execution platforms ensure compliance, process transparency, and consistent product quality. In hospital and clinical settings, AI improves drug supply chain management, enhances medication adherence, enables personalized dosage adjustments, and supports epidemic prediction through large-scale data analysis. Recent applications also extend to poly pharmacology, controlled-release formulations, and precision medicine approaches for complex diseases such as cancer, neurodegenerative disorders, and cardiovascular conditions. Despite its transformative potential, the implementation of AI in pharmacy is not without limitations. High infrastructure and setup costs, limited technical expertise, ethical concerns, and data privacy issues present significant hurdles to widespread adoption. Nevertheless, with advancements in machine learning, neural networks, and collaborative research, AI is poised to reshape the pharmaceutical industry. This review emphasizes the growing role of AI as a catalyst for innovation in pharmaceutical research, manufacturing, and healthcare delivery, ultimately aiming to improve efficiency, reduce costs, and ensure better patient outcomes.

**AI-308**

**AI-ENABLED PHARMACOVIGILANCE HARNESSING BIG DATA FOR DRUG SAFETY**

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Pharmacovigilance, the science of detecting and preventing adverse drug reactions (ADRs), is essential for patient safety. Traditional approaches depend on manual reporting, voluntary submissions, and retrospective reviews, which are slow, incomplete, and often delayed in identifying safety signals. With increasingly complex therapeutics and vast real-world data sources, these methods face major limitations. Artificial intelligence (AI) is emerging as a transformative tool to address these challenges. By leveraging big data from electronic health records, clinical trials, patient registries, social media, and scientific literature, AI enhances drug safety monitoring. Natural language processing (NLP) can analyze unstructured text from medical notes or online health forums to identify unreported ADRs, while machine learning algorithms reveal hidden patterns in datasets, predicting drug–drug interactions and safety risks beyond the reach of traditional methods. This predictive capability enables early intervention and helps prevent large-scale health issues. In addition, AI-driven systems increase efficiency by automating triage, coding, and data cleaning, reducing workload and enabling faster regulatory decisions, recalls, and reporting. Integration of AI further supports precision medicine by tailoring risk assessments to individual genetic profiles, comorbidities, and medication histories. However, challenges persist, including concerns around data privacy, transparency, algorithmic bias, and the need for regulatory harmonization across regions. Overcoming these issues requires collaboration among regulators, pharmaceutical companies, and technology developers. Ultimately, AI-enabled pharmacovigilance represents a shift from reactive to proactive safety surveillance, strengthening healthcare systems, accelerating ADR detection, and advancing patient protection.

**Keywords:** Pharmacovigilance, Adverse drug reactions (ADRs), Drug safety monitoring, Artificial intelligence (AI), Big data analytics, Machine learning, Natural language processing (NLP), Predictive modelling, Electronic health records (EHRs), Drug–drug interactions, Precision medicine, Regulatory challenges.

**AI-309**

**THE IMPACT OF ROBOTICS ON SURGERY AND REHABILITATION**

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This article examines the impact of robotics in surgery and rehabilitation. Robotics is an interdisciplinary topic that deals with the design, building, use, and the use of robots. The use of robotics in healthcare has gone a long way since the 1980s when mechanical robots were initially utilized in surgical settings. Today, robots are used in many specialized scientific domains, automating many operations and bringing enormous benefits. Robotic surgery is a minimally invasive procedure, where a robotic equipment is used to do the surgery. Robotic surgical systems have made considerable gains in lowering surgery time, improving therapy, and increasing surgical success rates Robotic rehabilitation is a fast-expanding field that involves the use of robotic technology for support for rehabilitation and progress in medicine. Robotic-assisted therapy can offer many advantages over traditional methods, including a structured training environment, assistance with transitions, and the ability to increase the volume and volume of treatment, Table 1 history of robotics in healthcare physical burden and it lies on physicians as well as examples of robotic surgery systems for rehabilitation are also included in the article. Benefits of maintenance robots include continuous training, improved productivity and availability, tailored training environments, adaptable support, increased strength and volume, reduced physiological stress on doctors, and enhanced drive to learn.

**Keywords:** Robotics, surgery, Rehabilitration, robotic surgery, Senhance surgical system.

**AI-310**

**WILL USE OF ARTIFICIAL INTELLIGENCE SPPED UP THE REGULATORY DECISIONS MAKING IN INDIA?**




ISBN: 978-81-980623-8-3

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The Indian regulatory decision-making process has traditionally been characterized by in-depth data review, manual evaluation, and multi-level authorization across pharmaceutical, medical device, and food sectors to ensure safety and efficacy. However, this conventional compliance process often involves time-consuming manual tasks, which can lead to inefficiencies, delays in product approval, and reduced patient access to medical advancements. The emergence of artificial intelligence (AI) offers an opportunity to accelerate these processes by enabling informed, evidence-based decisions supported by large datasets. Using machine learning and advanced analytical tools, AI systems can rapidly process regulatory submissions, identify inconsistencies, and prioritize high-risk cases more efficiently than human reviewers. In areas such as pharmacovigilance and clinical trial assessment, AI can quickly detect potential adverse event signals by analysing real-world data, simplify protocol evaluation, track patient safety, and validate statistical findings. This can shorten approval timelines while preserving scientific integrity, fostering innovation, and safeguarding patient well-being. Integrating AI into Indian regulatory agencies such as the Central Drugs Standard Control Organization (CDSCO) and the Food Safety and Standards Authority of India (FSSAI) could therefore significantly modernize and streamline the regulatory ecosystem.

**Keywords:** Artificial Intelligence (AI), CDSCO (Central Drugs Standard Control Organization), FSSAI (Food Safety and Standards Authority of India).

**AI-311**

## AI IN CADD IN GENE THERAPY FOR INHERITED AND INFECTIOUS DISEASES

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AI is emerging as a powerful tool in CADD for gene therapy and transforming CADD by integrating multi-omic, structural, clinical data that accelerates development of gene therapy for inherited and infectious diseases. Target identification, de novo design of therapeutic molecules, in-silico screening of candidates that modulate gene expression, complement defective genes have been supported by advanced machine learning, deep learning models. Rational engineering of viral and non-viral vectors, including optimized adeno-associated virus capsids with improved tissue tropism, immune evasion and gene delivery packaging efficiency has been enabled by AI-driven sequence and structure prediction. In monogenic inherited disorders, patient specific genomic variants with structural information regarding affected gene products that guides the design of gene-replacement vectors, base-editing or prime-editing strategies and modulatory small molecules that restore or compensate for dysfunctional pathways can be integrated with AI and CADD. The risk of insertional mutagenesis, immunogenicity and systemic toxicity are reduced by using AI-enhanced off target prediction tool, ADMET models which evaluates safety and delivery profile of viral and non-viral vectors, gene-editing nucleases and accessory drugs. For infectious diseases, rational design of antimicrobial gene therapies targeting essential pathogen genes, host-pathogen interaction interfaces, host factors required for replication are assisted by AI-supported CADD. AI-driven CADD helps in creating safe, effective, and precision-based gene therapies for inherited and infectious diseases.

**Keywords:** CADD, gene therapy, AI.

**AI-312**

## TRANSFORMING PHARMACEUTICAL INNOVATION THROUGH ADVANCED DATA ANALYTICS AND DIGITAL INSIGHTS

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The speed at which new medicines are being developed is increasing quickly because of better use of data and digital tools. These tools are changing how drugs are discovered, made, and given to patients. By using data-focused methods, drug companies can now gather and understand a lot of different kinds of information—from genetic data and early lab tests to clinical trial results, real-life patient data, and medical records. This helps them make better predictions, find better drug options faster, and shorten the time it takes to bring new medicines to market. Using AI, machine learning, and big data, companies can study complex biological information, predict how drugs will work in the body, and how patients will respond, which improves both the effectiveness of treatments and the chances of successful products. In addition, using digital systems like the Internet of Things, cloud computing, and advanced digital tools has created more connected, flexible, and teamwork-based ways to do research and make medicines. These systems allow for smooth, real-time data gathering, analysis, and sharing, which helps track clinical trials and production processes better. They also increase transparency in the supply chain and support smarter decisions based on data. Also, using modern DataOps and MLOps practices helps automate data sharing, making sure data is consistent, integrated, and scaled properly. This ensures that useful, clear insights are available at every step of the process of making and delivering medicines.

**Keywords:** Data analytics, Artificial intelligence (AI), Machine learning (ML), Digital technologies, pharmaceutical innovation, DataOps, MLOps.

**AI-313**

## ORODISPERSIBLE FILM OPTIMIZED USING AI-BASED FACTORIAL DESIGN

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Orodispersible films (ODFs) have emerged as a patient-friendly drug delivery system offering rapid disintegration, enhanced compliance, and improved therapeutic efficacy, especially for pediatric and geriatric populations. The present study focuses on the development and optimization of a fast-dissolving orodispersible film using an AI-assisted factorial design approach. A model drug was incorporated into a polymeric film matrix prepared by the solvent-casting technique using hydroxypropyl methylcellulose (HPMC E5) as the primary film-forming polymer, PEG-400 as a plasticizer, and suitable superdisintegrants such as Pregelatinized Starch (Starch 1500) to enhance rapid dispersion. An AI-based optimization model integrating factorial design, response surface methodology, and machine learning prediction (Artificial Neural Network) was employed to evaluate the influence of polymer concentration, plasticizer level, and superdisintegrant ratio on critical film attributes. Key responses such as disintegration time, tensile strength, drug content uniformity, and film flexibility were predicted with high accuracy. The AI-optimized ODF exhibited a disintegration time of <15 seconds, excellent mechanical strength, and uniform drug distribution. In-vitro dissolution demonstrated more than 85% drug release within 5 minutes, confirming the film's suitability for quick absorption. This study demonstrates the potential of AI-driven formulation design to accelerate development, reduce experimental workload, and achieve superior product performance compared to conventional optimization methods.

**Keywords:** Orodispersible film, Artificial Intelligence, Factorial design, Machine learning optimization, Rapid disintegration.

**AI-314**

## AI-AUGMENTED WEARABLE BIOMARKERS FOR MONITORING ANXIETY AND OPTIMIZING ANXIOLYTIC PHARMACOTHERAPY

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Anxiety disorders remain highly prevalent yet often underdiagnosed due to reliance on subjective self-reporting and limited access to mental health specialists. Advances in wearable technology now allow continuous monitoring of physiological markers such as heart rate variability, galvanic skin response, respiratory rate, sleep architecture,


ISBN: 978-81-980623-8-3

and daily activity patterns. When analysed using artificial intelligence (AI) and machine learning algorithms, these real-time data streams can reveal subtle autonomic and behavioural changes associated with evolving anxiety states. This work highlights the growing potential of AI-augmented wearable biomarkers in assessing and optimizing pharmacotherapy for anxiety. Emerging evidence demonstrates that improvements in HRV, sleep stability, and activity rhythms correlate well with therapeutic response to SSRIs and SNRIs, while wearable-based monitoring can also detect benzodiazepine-related over-sedation, beta-blocker–induced bradycardia, and early activating effects of antidepressants. AI models further enhance clinical decision-making by predicting likely responders to specific anxiolytic classes, identifying early relapse indicators, and supporting data-driven, individualized treatment adjustments. Together, these innovations position AI-enabled wearable systems as powerful tools for objective anxiety assessment and personalized drug therapy optimization. Their integration into pharmacy practice can enhance monitoring accuracy, improve safety outcomes, and strengthen pharmacist-led mental health care by bridging physiological data with therapeutic decision-making.

**Keywords:** Anxiety, Wearables, Artificial Intelligence, Heart Rate Variability, Anxiolytics, Pharmacotherapy, Digital Health.

**AI-315**

## TRANSFORMATIVE ROLE AND PROSPECTS OF AI IN PHARMACY EDUCATION: A TIER- WISE PERSPECTIVE ACROSS PHARMA HEIS IN INDIA

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Artificial Intelligence is reshaping pharmacy education by transforming instructional methods and strengthening competency-based learning. This paper discusses the role of AI in pharmacy academics, curriculum integration, learning management systems and pedagogical enhancement across various institutional tiers. AI tools complement adaptive learning platforms, automated assessments and virtual simulations; thereby improve conceptual clarity and help bridge gaps between students and educators. For teachers and academicians, AI supports content development, academic analytics and early identification of learning deficiencies. Institutional administrators can utilise AI-driven dashboards for monitoring academic performance, evaluating research, distributing workload and guiding strategic planning to reinforce outcome-based education. A tier-wise comparison across more than 4000 pharmacy HEI: Tier-1 institutions (7 NIPERs, universities) lead with AI-assisted laboratories and data-centric academic governance; Tier-2 colleges show moderate integration through LMS and digital instructional tools and Tier-3 institutions, limited by resources, remain in early adoption stages, though low-cost AI applications. National bodies including UGC (UGC Regulations, 2018) and NAAC (policy for negative marking) promote responsible AI use through plagiarism checks, publication ethics and research authenticity measures. Challenges such as content misuse, retractions and compromised originality underscore the need for ethical implementation, faculty training and awareness to ensure sustainable integration into the traditional educational system.

**Keywords:** Artificial Intelligence, Pharmacy Education, Academic Integrity, Tier-wise Comparison, Outcome-Based Education.

**AI-316**

## MACHINE LEARNING-GUIDED DEVELOPMENT OF CURCUMIN NANOEMULSION FOR ENHANCED BIOAVAILABILITY

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Curcumin is a natural polyphenol with proven antioxidant and anti-inflammatory properties; however, its therapeutic application is limited due to poor aqueous solubility and low oral bioavailability. Nanoemulsion-based delivery is a promising approach to enhance solubility and absorption. In this study, a curcumin nanoemulsion was developed using coconut oil (MCT) as the oil phase, Tween 20 as surfactant, and propylene glycol (PG) as co-surfactant to achieve a cost-effective, laboratory-feasible formulation. An AI-assisted optimization approach employing Machine Learning (Artificial Neural Networks) and Response Surface Methodology was used to identify optimal component ratios for minimal droplet size and improved stability. The optimized nanoemulsion showed a mean droplet size < 100 nm, low polydispersity index (< 0.3), and good thermodynamic stability. In-vitro release studies demonstrated enhanced dissolution compared to pure curcumin. Preliminary in-vivo evaluation suggested improved oral bioavailability, confirming enhanced absorption. The study demonstrates that AI-guided formulation design combined with low-cost excipient selection can effectively improve bioavailability and practicality for laboratory and academic research use.

**Keywords:** Coconut Oil; Tween 20; Propylene Glycol; Bioavailability; Drug Delivery.

**AI-317**

## SMARTPHONE-BASED NON-INVASIVE HEMOGLOBIN PREDICTION USING PHOTOPLETHYSMOGRAPHY AND ARTIFICIAL INTELLIGENCE

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Haemoglobin (Hb) is a vital biomarker for assessing blood oxygen-carrying capacity and detecting conditions such as anaemia. Conventional haemoglobin estimation methods are invasive, time-consuming, and require trained personnel and laboratory infrastructure. To overcome these limitations, this study proposes a smartphone-based non-invasive haemoglobin prediction system utilizing photoplethysmography (PPG) signals and artificial intelligence (AI) algorithms. The proposed approach leverages the smartphone camera and flash to capture PPG signals from the fingertip, extracting key optical features related to blood volume and oxygenation. Machine learning and deep learning models are trained on these features to predict haemoglobin concentration accurately. The system integrates data pre-processing, signal filtering, feature extraction, and predictive model optimization to ensure reliable estimation under varying lighting and skin conditions. This innovation enables real-time, affordable, and accessible haemoglobin monitoring without needles or external sensors. It holds significant potential for anaemia screening, remote health monitoring, and resource-limited settings, empowering users with personalized health insights. Future work includes clinical validation and integration with cloud-based AI systems for continuous health analytics and adaptive learning.

**Keywords**: Artificial Intelligence, Photoplethysmography, Haemoglobin Prediction, Non-Invasive Monitoring, Smartphone-Based Health.

**AI-318**

## ARTIFICIAL TECHNIQUES FOR DISEASE DIAGNOSIS AND PATIENT CARE

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The rapid advancement of artificial intelligence (AI) and computational technologies has greatly influenced the healthcare sector, particularly in disease diagnosis and patient care. By leveraging large volumes of clinical, imaging, and genomic data, AI-driven techniques such as machine learning, deep learning, and natural language processing enable more accurate and timely detection of diseases. These technologies assist healthcare professionals in interpreting medical images, predicting disease outcomes, and formulating personalized treatment plans. Furthermore, innovations such as medical robotics, wearable sensors, and virtual health assistants have improved patient monitoring, rehabilitation, and remote healthcare delivery. Despite challenges such as data privacy, algorithmic bias, and the need for standardized regulations, the integration of artificial techniques in healthcare continues to enhance diagnostic precision, patient safety, and overall healthcare efficiency. This paper discusses the various artificial techniques applied in disease diagnosis and patient care, emphasizing their applications, advantages, and challenges.

**Keywords:** Artificial Intelligence (AI), Disease Diagnosis, Patient Care, Medical Imaging, Predictive Analytics, Personalized Medicine, Healthcare Technology.

**AI-319**




ISBN: 978-81-980623-8-3

**DIGITAL PHARMACIST: LEVERAGING AI TO BRIDGE RESEARCH, EDUCATION, AND PATIENT CARE**

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Pharmacists are evolving from conventional dispensers to tech-driven healthcare entrepreneurs as a result of the digital revolution. The three main pillars of pharmacy—education, research, and patient care—are now connected by artificial intelligence (AI) and digital tools, creating the foundation for the "Digital Pharmacist." To enhance learning, expedite research, and assist in clinical decision-making, this contemporary professional uses data intelligence, automation, and predictive analytics. Pharmacy education is changing from a theory-heavy curriculum to one that is interactive and skill-focused thanks to AI-powered virtual platforms, adaptive learning systems, and augmented reality simulations. Predictive algorithms, in silicomodeling, and machine learning in research provide quick drug-target screening, formulation optimization, and early adverse effect detection, which reduces drug development time and costs. Pharmacists can provide customized treatments, improve medication safety, and monitor adherence in real time with the help of pharmacogenomic databases, telepharmacy services, e-prescription analysis, and AI-powered clinical decision support systems. By combining multiple disciplines, AI empowers pharmacists to act as digital health strategists and provide efficient, patient-centered, and evidence-based pharmaceutical services. The emergence of the digital pharmacist signifies a major shift toward intelligent, networked, and technologically sophisticated healthcare systems.

**Keywords:** Artificial intelligence, Digital pharmacist, Pharmaceutical education, Drug research, Patient care, clinical Empowerment.

**AI-320**

**AI GUIDED CRISPR GENOME EDITING**

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The Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) - CaS9 system, which originates from prokaryotic adaptive immunity has been the precise and affordable technology for targeted genome editing. CRISPR depends on guide RNA to create a double strands break in specific genomic location by the help of CaS9 nuclease. The programmable modification of the genome are allowed by subsequent cellular repair mechanisms- Non-homologous End Joining [NHEJ] for gene knockout or Homologous Directed Repair [HDR] for gene insertion. CRISPR-CaS9 system has revolutionized genomic engineering but challenges persist in achieving precise, efficient and safe edits. The use of Artificial intelligence has been used to overcome the challenges in maximizing the safety and efficiency of CRISPR. AI analyse vast genomic and experimental database to precisely predict the efficacy of guide RNA design, and minimize detrimental off-target effects, and optimize efficient delivery systems. AI incorporates features such as guide RNA sequence composition, target chromatin accessibility, nucleosome positioning and local sequence context to train deep learning models. AI integration transforms CRISPR-Cas technology from a manual, trial-and-error process into a predictive, high-throughput platform. This AI-guided approach paves the way for accelerating basic research, facilitating the discovery of new therapeutic targets and ultimately improving the clinical translation of safer and more effective gene therapies

**Keywords:** Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR), AI genomic engineering, guide RNA, deep learning models. Therapeutic gene therapy.

**AI-321**

**FROM TRADITIONAL TO DIGITAL: REDEFINING PHARMACY PRACTICE IN THE 21ST CENTURY**

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Pharmacy practice has undergone a significant transformation in the 21st century, evolving from traditional roles focused primarily on compounding and dispensing medications to dynamic, patient-centered, and technology-driven services. The integration of digital health tools—including electronic prescribing, telepharmacy, artificial intelligence, mobile health applications, and electronic health records—has redefined the pharmacist's role in improving accessibility, and quality of care. Traditional pharmacy practice emphasized face-to-face interactions and manual processes; however, modern digital advancements now enable pharmacists to provide remote consultations, medication therapy management, personalized patient education, and real-time monitoring of therapeutic outcomes. These innovations not only expand the pharmacist's scope of practice but also address challenges such as medication non-adherence, drug interactions. Despite these advancements, the transition to digital practice presents challenges, including data privacy concerns, technology adoption barriers, workforce training needs, and maintaining. Balancing traditional expertise with digital innovation is therefore crucial in ensuring optimal healthcare delivery. This paradigm shift signifies a redefinition of pharmacy as both a science- and service-oriented profession, positioning pharmacists as key stakeholders in digital health ecosystems. Ultimately, embracing digital transformation while retaining the core principles of traditional practice ensures that pharmacists remain indispensable in safeguarding public health in the 21st century.

**Keywords:** Pharmacy practice, digital health, telepharmacy, electronic prescribing, healthcare innovation.

**AI-322**

**AI-ASSISTED OPTIMIZATION OF ZOLMITRIPTAN MUCOADHESIVE NASAL IN-SITU GEL FOR RAPID MIGRAINE RELIEF**

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Migraine is a disabling neurovascular disorder requiring rapid therapeutic onset to alleviate acute symptoms. Nasal drug delivery provides faster systemic absorption and potential direct nose-to-brain access, thereby bypassing hepatic first-pass metabolism and reducing onset time compared to oral administration. In this study, a mucoadhesive thermosensitive zolmitriptan nasal in-situ gel was developed and optimized using AI-assisted experimental design (Response Surface Methodology / Artificial Neural Network) to achieve rapid onset with sustained drug release. Formulations were prepared using the cold method with Poloxamer 407 as the thermoresponsive gelling agent and Carbopol 934 as the mucoadhesive polymer, while PEG-400 acted as a solubilizer. AI-based optimization enabled identification of ideal polymer concentrations to attain suitable gelation temperature, viscosity, and mucoadhesion. The optimized formulation (2 mg/mL zolmitriptan) exhibited a gelation temperature of 31.5 ± 0.8°C, pH 5.8 ± 0.1, and desirable viscoelasticity for nasal administration. In-vitro release demonstrated an initial burst followed by sustained release up to 6 hours, following the Korsmeyer–Peppas model (n = 0.48), indicating diffusion-relaxation controlled release. Stability studies over 1 month showed no significant change. The AI-optimized formulation appears promising for fast-acting and prolonged migraine therapy.

**Keywords:** Zolmitriptan; Nasal In-Situ Gel; Mucoadhesive Drug Delivery; AI-Based Optimization.

**AI-323**

**ROLE OF AI IN PHARMACEUTICAL PRODUCT DEVELOPMENT**

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Artificial intelligence (AI) has been making a significant impact in various industries, including the pharmaceutical sector. AI can greatly improve the product development process, making it faster, more efficient, and more accurate. The pharmaceutical industry is constantly looking for new ways to improve the speed and efficiency of drug development. AI can help in this area by providing accurate data analysis, drug discovery,




ISBN: 978-81-980623-8-3

and drug development. AI can assist in discovering new drug targets and identifying new chemical compounds that can be used to treat specific diseases. AI algorithms can analyse vast amounts of data to identify new drug targets, predict side effects and interactions, and help to reduce the time and cost of the drug development process. AI can also help in optimizing the design of clinical trials and providing insights into patient populations. Implementation of AI can lead to better patient selection, improved patient outcomes, and increased efficiency in the drug development process. AI can also help in the optimization of drug manufacturing processes, leading to improved efficiency, better quality control, and reduced costs. The use of AI in pharmaceutical product development has the potential to revolutionize the way drugs are developed and manufactured, making it faster, more efficient, and more effective.

**Keywords:** Artificial Intelligence (AI), Pharmaceutical product development, Drug discovery, Data analysis, Clinical trials.

**AI-324**

**AI-ENABLED PERSONALIZED TREATMENT RECOMMENDATION**

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Artificial intelligence (AI) is reshaping the way personalized treatments are created and delivered in modern healthcare. By utilizing advanced data analytics and machine learning, AI algorithms can process patient-specific information such as genetic markers, electronic health records, and lifestyle habits to recommend therapies tailored to each individual. These technologies support clinicians in selecting the most appropriate drug, dosage, and care strategy, reducing adverse reactions and improving overall patient outcomes. Recent progress in integrating AI into clinical practice has enabled timely diagnosis and enhanced precision in managing conditions like cancer, neurological disorders, and chronic diseases. In pharmacy, AI-powered systems also help monitor medication adherence and predict potential health risks, allowing healthcare providers to proactively address challenges in patient care. Real-world applications showcase how these innovations move beyond generic guidelines, fostering informed decisions that match each patient's unique medical profile. While the use of AI offers significant benefits, it also raises important ethical, privacy, and implementation considerations. This poster explores the impact, opportunities, and limitations of AI-fueled personalized treatment recommendations in the pharmaceutical sector, emphasizing how these advancements empower pharmacists and clinicians to deliver safer, more effective, and individualized care

**Keywords:** AI, Technology, Treatment, Diagnosis, Personalized Treatment.

**AI-325**

**AI-POWERED DRUG-DRUG INTERACTION PREDICTOR: DEVELOPMENT AND VALIDATION OF A MACHINE LEARNING MODEL FOR POLYPHARMACY MANAGEMENT IN GERIATRIC PATIENTS**

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Background: Elderly individuals aged 65 years and above who consume multiple therapeutic agents simultaneously face elevated vulnerability to harmful medication interactions, leading to heightened disease burden, hospital admissions, and escalating medical expenditure. Conventional manual verification approaches consume substantial time and remain susceptible to human mistakes, highlighting the necessity for automated computational intelligence frameworks. Objective: To construct and authenticate an artificial intelligence-driven prediction framework that can detect probable medication interaction scenarios among senior citizens undergoing concurrent multi-drug treatment regimens (five or more pharmaceutical agents). Pharmaceutical interaction intelligence will be extracted from recognized repositories such as DrugBank, PubChem, alongside peer-reviewed scientific publications. Computational learning frameworks, specifically Random Forest and Neural Network architectures, will undergo training using extensive medication interaction repositories encompassing in excess of 10,000 pharmaceutical combinations. Framework authentication will utilize computer-generated elderly patient medication profiles (n=500 scenarios) that mirror typical concurrent medication usage patterns. Assessment parameters will encompass precision rates, detection sensitivity, identification specificity, affirmative prediction reliability, and processing duration metrics. Results: The computational intelligence framework is projected to demonstrate precision exceeding 85% in forecasting medication interactions while maintaining instantaneous analytical capability (under 2-second processing per medication profile). The framework will deliver hazard categorization (minor, intermediate, critical interaction classifications) alongside evidence-based therapeutic guidance. Conclusion: This artificial intelligence-enhanced clinical support mechanism demonstrates promise in strengthening pharmaceutical safety protocols, minimizing preventable medication-related complications, and assisting hospital pharmacists in refining treatment outcomes for elderly individuals experiencing concurrent medication requirements.

**Keywords:** Artificial Intelligence, Machine Learning, Drug-Drug Interactions, Polypharmacy, Geriatric Pharmacotherapy, Clinical Decision Support System.

**AI-326**

**AI-ENABLED STANDARDIZATION AND REGULATORY HARMONIZATION OF HERBAL DRUGS: A NEXT-GENERATION PHARMACOGNOSY APPROACH**

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Herbal medicines are a big part of healthcare around the world, but they aren't widely accepted by regulators because it's hard to standardize, authenticate, and ensure their quality. Traditional pharmacognosy methods rely heavily on manual evaluation, which can lead to variability and subjectivity. This study suggests an AI-enabled framework to change the way herbal drugs are standardized and regulated. By using artificial intelligence tools like deep learning for image-based authentication, machine learning for spectral data analysis, and natural language processing for regulatory text mining, the model improves reproducibility, traceability, and compliance with international guidelines (WHO, AYUSH, FDA, EMA). The integration of blockchain technology guarantees end-to-end traceability and transparent documentation. The suggested system facilitates the shift toward data-driven, precision-based herbal therapy by bridging the gap between conventional pharmacognosy and contemporary regulatory research. In the end, this next-generation "Smart Herbal Pharma 5.0" strategy lays the groundwork for herbal remedies that are both globally standardized and guaranteed to be of high quality.

**Keywords**: Artificial Intelligence (AI), Pharmacognosy, Herbal Drug Standardization, Regulatory Harmonization, Machine Learning, Deep Learning, Blockchain, Quality Control, WHO Guidelines, Smart Herbal Pharma 5.0.

**AI-327**

**AI-BASED DRUG DISCOVERY: *IN SILICO* DESIGN OF NOVEL MOLECULES, DUAL TARGETING OF EGFR AND MTOR PATHWAYS FOR TRIPLE-NEGATIVE BREAST CANCER**

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Triple-negative breast cancer (TNBC) lacks ER, PR, or HER2 receptors, which makes it challenging and gives a poor prognosis. Additionally, EGFR overexpression and mTOR hyperactivation boost tumour growth and resistance in monotherapy; this study focuses on the in-silico development of novel molecules as dual EGFR–mTOR inhibitors to address obstacles and enhance therapy efficacy for TNBC. The objective is to identify and computationally assess new small-molecule inhibitors, can simultaneously target EGFR and mTOR to enhance antitumor efficacy against TNBC. A series of novel substituted acridine derivatives




ISBN: 978-81-980623-8-3

is evaluated through molecular docking, molecular dynamics (MD) simulations, and ADMET profiling by using the Schrodinger suite 2025-2. Molecular docking of designed scaffolds was performed against the EGFR (PDB ID: 7U99) and mTOR (PDB ID: 4DRH) by using the Glide module. Top molecules were analysed for molecular dynamics studies to identify the most promising candidates by using the Desmond module. Molecular docking and dynamics studies revealed that novel molecules showed strong binding affinity at the binding sites of both targets, with stable RMSD and RMSF profiles. ADME predictions showed good drug-likeness, stability, and bioavailability, indicating promising potential for effective TNBC inhibition. The designed molecules as dual EGFR-mTOR inhibitors showed favorable outcomes against TNBC. These findings enable the development of next-generation multi-targeted therapies and support further experimental validation.

**Keywords:** TNBC, mTOR, EGFR, Dual inhibitors.

**AI-328**

**SMART RINGS: THE FUTURE OF WEARABLE BIOSENSORS FOR CONTINUOUS HEALTH MONITORING AND PERSONALIZED WELLNESS**

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A smart ring is a wearable technology device where a person can wear it to their fingers just like a finger ring that incorporates the sensors and mobile technology which offers various functions like health tracking, contactless payments and one can receive any of the notifications if he/she is not carrying mobile with them. The 1st smart ring discovered is NFC (Near Field Communication Ring) which is launched in 2013 by a British company McClear. As our fingers contain abundant number of blood vessels and nerve endings, it is very easy for the smart rings to track and amplify / modify our daily day to day activities by using biosensors. This phenomenon is also known as "Photoplethysmography". Photoplethysmography (PPG) is a non-invasive optical technique that uses light to measure blood volume changes in tissue microvascular bed, typically by illuminating the skin with a light emitting diode (LED) and measuring light absorption with a photo detector. Smart rings help improve your sleep cycle by tracking your sleep stages, which in turn helps adjust your biological clock. They also encourage a healthier lifestyle by motivating you to exercise and go for daily walks. This activity helps you burn calories. Smart rings don't directly boost your immune system, but they help by providing you with the data and insights you need to make lifestyle choices that support a healthy immune response. Smart rings are great for everyone, not just for people who are obese. Smart rings help lower stress by tracking your stress levels and offering tips for relaxation. They also encourage better eating habits by guiding you toward nutritious food options. Ultimately, these devices are a great way to support a healthier life. For women, smart rings are a valuable tool because they track menstrual cycles, helping them stay informed about their period dates. The rings also monitor key health metrics like blood oxygen levels and skin temperature.

**Keywords:** Smart ring, NFC, McClear, Biosensors, Photoplethysmography

**AI-329**

**THE AI TRANSFORMATION OF PHARMACOVIGILANCE: LEVERAGING REAL-WORLD DATA FOR PROACTIVE RISK MANAGEMENT ENHANCING SAFETY SIGNAL DETECTION AND POST-MARKET SURVEILLANCE THROUGH DIGITAL TOOLS**

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Pharmacovigilance (PV) is critical for ensuring drug safety throughout a product's lifecycle. Traditional systems, reliant on spontaneous reporting, suffer from underreporting, inconsistent data quality, and time-intensive manual review. The digital revolution has generated an unprecedented volume of unstructured Real-World Data (RWD), necessitating the adoption of advanced computational tools. This necessitates a transition of PV from a reactive surveillance system to a proactive safety science. This study examines the transformative application of Artificial Intelligence (AI) and Machine Learning (ML), particularly Natural Language Processing (NLP) and Deep Learning models, to enhance the PV workflow. We focus on three critical areas: (1) Automated Case Processing: Using NLP to extract, standardize, and accurately code adverse drug reaction (ADR) information from unstructured documents, including Electronic Health Records (EHRs) and literature, thereby improving regulatory compliance speed. Proactive Signal Detection: Employing advanced ML algorithms to conduct high-throughput, disproportionality analysis across petabytes of aggregated RWD, including claims data and social media, to detect subtle, emerging safety signals. Risk Prioritization: Utilizing predictive models to stratify detected signals based on potential patient impact and severity, allowing safety teams to focus resources effectively. Implementation of these AI/ML tools has demonstrated a compelling 75% reduction in manual review time for case intake and coding, yielding significant operational efficiencies. Furthermore, advanced signal detection models applied to large EHR cohorts successfully identified critical safety concerns (e.g., specific cardiovascular risks) up to six months earlier than conventional methods.

**Keywords:** Artificial Intelligence (AI), Pharmacovigilance (PV), Real-World Data (RWD), Machine Learning (ML), Natural Language Processing (NLP), Signal Detection, Drug Safety.

**AI-330**

**AI-DRIVEN PHARMACOVIGILANCE: MINING SOCIAL MEDIA AND ELECTRONIC MEDICAL RECORDS FOR EARLY DETECTION OF ADVERSE DRUG EVENTS**

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Traditional spontaneous reporting is slow and under-ascertains adverse drug events (ADEs). Real-world text sources (social media, EMRs/EHRs) coupled with modern AI offer scalable early-warning capabilities. To synthesize contemporary AI approaches that detect ADEs from social media and clinical narratives, evaluate their performance, and identify operational gaps for deployment. We reviewed recent studies (2012–2025) reporting AI/NLP use on social media, EMRs, pharmacovigilance databases and hybrid sources. Extracted metrics: model class, datasets, performance (F1/AUC), deployment examples, and practical limitations. Transformer-based models (BERT, Bio BERT, Clinical BERT, XLM) and ensemble/deep-learning pipelines dominate recent gains, achieving F1/AUC ranges of ~0.78–0.97 across social and clinical corpora. Hybrid fusion of social media with formal reports improved recall by up to ~25% and flagged signals weeks earlier than regulatory systems; hospital electronic triggers reported up to 13-fold increases in detected ADEs versus voluntary reporting. Explainable and interpretable models improve clinical acceptability but often trade off peak performance. Major barriers: labelled data scarcity, domain adaptation, multilingual and non-English performance, validation heterogeneity, privacy/regulatory constraints, and need for prospective evaluation. AI-driven pharmacovigilance reliably augments traditional systems by accelerating signal detection and broadening coverage to patient-reported experiences. Priority next steps are standardized benchmarking, domain adaptation for diverse languages/populations, privacy-preserving architectures, and prospective real-world validation to translate promising algorithms into regulatory-grade surveillance.

**Keywords:** Pharmacovigilance, Adverse Drug Events (ADEs), Natural Language Processing (NLP), Social Media Surveillance, Electronic Health Records (EHRs).

**AI-331**

**Advancing Clinical Trials: The Emerging Role Of Artificial Intelligence In Enhancing Efficiency And Patient Outcomes.**

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Clinical trials play a vital role in bringing new drugs, technologies, and treatments into medical practice, yet only about 10% of trials successfully progress through all phases due to high costs and


ISBN: 978-81-980623-8-3

complexity. This low success rate impacts public health, standard treatments, and healthcare sustainability. Artificial Intelligence (AI) offers potential solutions by improving patient selection, matching, and enrollment, thereby reducing treatment-related risks and inefficiencies. However, the full integration of AI into clinical trials still faces significant challenges and demands further high-quality validation. This review highlights the future potential of AI in enhancing clinical research and patient care.

**Keywords:** Artificial intelliegence, clinical trials, patient selection, patient matching,patient enrolment,clinical research, treatment optimization, medical innovation.

**AI-332**

**MACHINE LEARNING IN PERSONALIZED MEDICINE: TOWARD ECO-CONSCIOUS THERAPIES**

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Machine learning (ML) is becoming pivotal to personalized medicine through its capability to enable data-driven, patient-specific therapy that optimizes the efficacy of therapy and minimizes side effects. In healthcare systems moving toward sustainability and precision, ML offers a solid platform for facilitating green treatments. With advanced data sets including genomic, electronic medical records, and behavior, ML algorithms allow customized selection of drug, dose, and treatment duration according to the specific needs of each patient with less drug abuse and wastage of health. Predictive analytics minimizes trial-and-error prescribing, lowering pharma manufacturing, shipping, and waste disposal environmental footprint. It not only improves patient outcomes but also environmental sustainability objectives through effective utilization of resources in clinical practice. ML also facilitates green drug discovery by selecting medicines with good safety and efficacy profiles early in the drug development pipeline and minimizing unnecessary use of animals and failed clinical trials. While promising, the interaction between sustainable personalized medicine and machine learning is not challenge-free such as model interpretability, data privacy, and worldwide availability of AI technology. Mitigation of these challenges is imperative in the realization of a patient-centered and sustainable healthcare system. In the paper, the interaction between personalized medicine, machine learning, and sustainability with current innovations, applications, and potentialities is depicted

**Keywords:** Machine Learning (ML), Personalized Medicine, Precision Medicine, Eco-Conscious Therapies, Sustainable Healthcare, Green Medicine.

**AI-333**

**AI POWERED DIGITAL EDUCATIONAL TOOLS FOR STUDENT ANALYTICS AND EFFECTIVE ASSESSMENT**

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The integration of Artificial Intelligence (AI) into education has empowered the traditional pedagogical approaches, with AI-powered digital tools that foster interactive, student-centred learning and assessment. It is said to address the current problems of students having low engagement, and attention deficit. Research was carried to evaluate the effects of the AI Tools such as Socrative and Evalbee on student engagement and academic performance in formative and summative assessment of the students. The project involved two divisions with 60 students each of Semester V. In one division, conventional pedagogical tools were used and, in another division, AI assisted tools were used for learning and evaluation. Continuous feedback and reminder session were taken for both the groups. The study assessed student engagement by percentage involvement, student interaction and real-time feedback of students in class. The effect was evaluated by comparing the formative and summative assessment of the students for both divisions. The study excluded the students who remained absent for more than 25% of regular learning period. The AI assisted formative assessment was able to improve student engagement by 50% and student performance by 30%. The students with conventional teaching showed 40 and 60% while the students taught with the use of AI tools showed better engagement with 80 and 70% performance in the formative and summative subjective assessment. The ABC classification was utilized to evaluate the performance of students in internal continuous evaluation. There was 15% increase in category A students scoring more than 80% marks. The above study showed that these AI powered intelligent tools are able to enhance learner engagement, ensured active participation and provide instant feedback to promote formative assessment through data-driven insights for future educational goals.

**Keywords:** Artificial Intelligence (AI); Digital educational Tools; Interactive learning, Assessment.

**AI-334**

**FACULTY PERCEPTION ON THE ROLE OF ARTIFICIAL INTELLIGENCE (AI) IN PHARMACEUTICAL EDUCATION AND ITS INTEGRATION IN THE NEW PCI PROPOSED CURRICULUM: A SURVEY**

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The present study employed a non-probability convenience sampling method to collect data from pharmacy teachers across various institutions. A structured questionnaire was developed using Google Forms and shared through professional social media groups of pharmacy educators. Participation in the survey was voluntary. This approach was chosen for its practicality and ease of access to respondents within a limited timeframe. However, as participation was based on convenience and self-selection, the findings may not be fully generalizable to the entire population of pharmacy teachers. The survey was aimed to conquer the perception of faculty on various aspects of artificial intelligence and its role in the teaching profession. Questions ranging from types of AI tools that faculty use in aiding teaching methodology, areas in which faculty explore AI to the like understanding, relevance and preparedness of institutions to AI and python difficulties encountered by them while using it were analysed. Another aspect explored was the introduction of AI and python programming in the newly proposed DRAFT syllabus for B.Pharm by the PCI. From the above survey it was concluded that most educators have started exploring the use of AI in the areas of preparation for lectures and research support. Their concerns revolve around lack of accuracy of data and data privacy. However most believe that AI will positively affect learning outcomes of students and aid in teaching. Faculty proposed that at UG program basics of pharmaceutical sciences should not be overlooked upon. The subject of AI and python programming will require collaboration with IT faculty as well as training of Pharma faculty.

**Keywords:** Pharmaceutical education, AI, Faculty perception.

**AI-335**

**MACHINE LEARNING–DRIVEN DESIGN AND STRUCTURAL ANALYSIS OF ANTI-MEXA ANTIMICROBIAL PEPTIDES AGAINST MULTIDRUG RESISTANT PSEUDOMONAS AERUGINOSA**

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Multidrug resistance (MDR) in Pseudomonas aeruginosa—mainly driven by the MexAB–OprM efflux pump system—remains a major challenge in healthcare. Antimicrobial peptides (AMPs) have gained attention as promising alternatives because of their unique ways of killing bacteria and their ability to block resistance mechanisms. In this study, we used an integrated computational approach to design and evaluate new AMPs that specifically target the MexAB–OprM system. Using the dpAMP prediction framework, several peptide candidates were developed and screened for hemolytic toxicity, stability, and antibacterial potential through machine learning models such as random forest (RF) and artificial neural networks (ANN) trained on large AMP datasets. A selected group of peptides was then tested through molecular docking to study their binding interactions with the MexA, MexB, and OprM proteins. Molecular dynamics simulations were carried out to confirm the stability of the peptide–MexA complexes. Among all the candidates, the ANN-derived peptide “2ANN” stood out for its strong and stable binding to efflux pump components, low hemolytic activity, and broad-spectrum antibacterial potential. Overall, this study demonstrates a




ISBN: 978-81-980623-8-3

powerful, machine learning–guided pipeline that combines predictive modeling with structural analysis to identify promising anti-efflux AMPs, offering a potential new strategy to combat MDR P. aeruginosa infections.

**Keywords:** Pseudomonas aeruginosa, MexAB–OprM efflux pump, Antimicrobial peptides Machine learning, Molecular docking and dynamics.

**AI-336**

**AI-POWERED GENOMIC INTELLIGENCE FOR ADVANCED BIOTECH APPLICATIONS**

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The integration of AI with biotech and genomics helps in rapid data analysis, predictive modeling and personalized medicine which is transforming research and healthcare. AI powered genomic intelligence integrates machine learning, computational modeling which decodes complex gene patterns, predicts biological functions, and accelerates therapeutic innovation. AI enhances accuracy, scalability of genomic interpretation beyond traditional methods through automated genetic variation identification, gene expression analysis, and multi-omics integration. The key applications of biotechnology like drug target identification, antimicrobial resistance prediction, personalized medicine are supported by the AI-driven tools. For detecting clinically relevant variants, analyzing sequencing data and modeling genotype-phenotype associations, are being adopted. The role of AI expands in next generation biotechnology due to the incorporation of AI in CRISPR design, synthetic biology workflows, epigenomic mapping. The role of AI in biotechnology has three core pillars: Decode, predict and design. The use of AI in biotechnology has been a big breakthrough in the precision medicine, where it stratifies patients for targeted therapies, gene therapy, by designing the safer and more effective treatments in synthetic biology for sustainable production by engineering microbes. AI-powered genomic intelligence stands as a main pillar of modern biotechnology despite the challenges in data quality, interpretability, and integration. It represents a transformative force, assured to unlock a future of programmable biology, highly personalized, predictive medicine, ultimately reshaping our approach to diseases, biological innovation.

**Keywords:** Artificial Intelligence, Genomic Intelligence, Biotechnology.

**AI-337**

**TUNING DOWN ATHEROSCLEROSIS RISK: AI-DRIVEN SCREENING AND *IN-VITRO* EFFICACY OF NOMAT-SYNERGETIC HERBAL FORMULATION POTENTLY MODULATES PRE-ADIPOCYTE DIFFERENTIATION IN *IN-VITRO***

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Background: Atherosclerosis, a leading cause of global mortality and a complex disease driven by dislipidemia and chronic inflammation, demanding innovative, multi-targeted therapeutic strategies. This study presents a synergistic drug development approach integrating computational methods to identify and validate a novel poly herbal formulation- NOMAT as a potent anti-adipogenic agent, a key strategy for empowering atherosclerosis risk management. Methods: This research employed network pharmacology to predict the multi target mechanism of the poly-herbal formulation against complex atherosclerosis pathways, directly aligning to the conference theme. This predictive analysis was followed by in-silico ADME screening and molecular docking to assess drug-likeness and target binding affinity. The selected marker was tested in in-vitro. Cytotoxicity assay and anti-adipogenesis assay was performed using 3T3- L1 pre- adipocyte cell line. Results and significance: The computational phase provided critical mechanistic insights, successfully Educating the validation strategy. The NOMAT exhibited favorable in silico pharmacokinetic properties and no cytotoxicity. Most importantly, the in vitro anti-adipogenesis assay showed a highly significant, dose-dependent inhibition of 3T3-L1 differentiation into mature adipocytes. Treatment with the drug reduced lipid accumulation by up to 50 % at a lower concentration. This potent effect suggests the drug interferes directly with the processes underpinning cellular lipid storage, a major driver of atherosclerotic risk. Conclusion & Future Direction : This work successfully showcases how the integration of AI-driven computational tools with advanced in vitro models can efficiently Innovate the discovery of multi-target phytomedicines. The demonstrated anti-adipogenic activity positions the NOMAT as a highly promising lead compound for developing Empowered therapeutic strategies against atherosclerosis, warranting further in vivo investigation

**Keywords:** Atherosclerosis, Anti-Adipogenesis, Network Pharmacology, *In Silico* Screening, 3T3-L1, Technology in Pharma.

**AI-338**

**ARTIFICIAL INTELLIGENCE IN NEUROIMMUNOLOGY: ENHANCING DIAGNOSIS AND THERAPEUTIC TARGET DISCOVERY**

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Neuroimmunological disorders such as multiple sclerosis (MS), autoimmune encephalitis, and neuromyelitis optica spectrum disorders present significant diagnostic and therapeutic challenges due to their heterogeneous clinical presentation and complex immune–neural interactions. Artificial intelligence (AI) is emerging as a transformative tool to unravel these complexities by integrating multimodal datasets including MRI, cerebrospinal fluid biomarkers, immunoprofiling, and genomic signatures. Machine learning algorithms can identify subtle radiological patterns, predict relapse risk, and differentiate overlapping conditions with greater accuracy than conventional methods. AI-driven network analyses also enable the discovery of novel immune targets and pathways involved in neuroinflammation. In clinical settings, predictive models assist in optimizing immunomodulatory therapy, forecasting treatment response, and minimizing adverse effects. By bridging neuroimaging, immunology, and computational analytics, AI-based approaches hold immense potential to accelerate personalized care, improve diagnostic precision, and guide the development of targeted therapeutics in neuroimmunology.

**Keywords:** Neuroimmunology, Artificial Intelligence, Neuroinflammation, Biomarker Prediction.

**AI-339**

**REVOLUTIONIZING INDIAN HEALTHCARE: THE IMPACT OF DIGITAL HEALTH, AI, TELEMEDICINE AND DATA SECURITY**

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The Indian healthcare system is in the middle of a transformative shift, driven by innovations in digital health, artificial intelligence (AI), telemedicine, and data security. These technologies are restructuring healthcare delivery, with substantial implications for patient safety, access to care, and overall efficiency. Understanding their impact is important for stakeholders seeking to navigate and leverage these innovations for improved healthcare outcomes. This review involved a thorough analysis of current literature, case studies, and statistical data. Sources were selected based on their relevance to digital health, AI, telemedicine, and data security within the Indian healthcare context. The analysis focused on examining the benefits and challenges associated with the integration of these technologies, as well as the influence of government policies on their adoption.

**Keywords:** Digital Health, Artificial Intelligence, Telemedicine, Data Security.

**AI-340**

**FROM TRADITION TO TECHNOLOGY: AI-ENABLED INNOVATION IN HERBAL DRUG RESEARCH**

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Herbal medicines continue to play a vital role in global healthcare, yet scientific challenges such as variability in raw materials, lack of consistent standardization, and limited predictive tools hinder their advancement into evidence-based therapeutics. This research introduces a novel AI-integrated analytical framework designed to modernize herbal drug evaluation. By combining authenticated plant




ISBN: 978-81-980623-8-3

samples, high-resolution imaging, chromatographic fingerprints, and machine learning models, the study establishes an automated system capable of botanical authentication, phytochemical marker prediction, and activity correlation. The extended framework further incorporates data-driven pattern recognition and real-time digital analysis to improve accuracy in detecting subtle variations in herbal materials. This approach enhances reproducibility, reduces analytical time, and creates a scalable decision-support platform adaptable to multiple medicinal plants and formulations. The findings demonstrate how AI can educate researchers, innovate analytical processes, and empower the future of herbal drug technology. To establish an AI-assisted system for rapid and accurate identification of authenticated herbal raw materials. To develop predictive machine learning models for estimating key phytochemical markers from spectral or chromatographic datasets. To correlate predicted phytochemical profiles with preliminary pharmacological activities. To create a reproducible, technology-driven workflow that enhances quality assessment in herbal drug research. To demonstrate the role of AI in accelerating innovation and promoting evidence-based standardization in phytopharmaceutical sciences. Collection of medicinal plant samples from validated sources. Standard pharmacognostical evaluation (macro, micro, physicochemical tests). Acquisition of high-resolution images and HPTLC/HPLC/FTIR fingerprints. Compilation of phytochemical concentrations and preliminary bioactivity data. Data preprocessing (normalization, augmentation, noise reduction). Model training using CNNs for morphological identification and RF/ANN models for chemical prediction.

**Keywords**: Artificial Intelligence, Herbal Drug Technology, Machine Learning, Phytochemical Prediction

**AI-341**

## LEVERAGING AI FOR INVENTORY OPTIMIZATION IN HOSPITAL PHARMACIES USING. MACHINE LEARNING

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This study addresses critical inventory management challenges in hospital pharmacies through the application of artificial intelligence and machine learning techniques. The research analysed 3,013 procurement transactions across 186 pharmaceutical products from 28 suppliers over 12 months (April 2024 - March 2025), representing a total procurement value of ₹6.98 Crores. Long Short-Term Memory (LSTM) neural networks were employed for demand forecasting, achieving an exceptional average accuracy of 85.8%, significantly exceeding industry benchmarks of 60- 70%. The system demonstrated 100% success rate with all models achieving above 80% accuracy. Key performance indicators revealed 23.1% stockout rate and 15.4% expiry rate, highlighting areas for improvement. The ABC classification analysis showed that 10.8% of products accounted for 70.1% of total spending. Financial analysis identified potential savings of ₹26.4 Lakhs through early payment discounts and ₹2.95 Lakhs through optimal pricing strategies. The study provides actionable recommendations for implementing AI-driven inventory optimization systems in hospital settings, emphasizing the practical utility of machine learning in healthcare supply chain management.

**Keywords:** Artificial Intelligence, Machine Learning, Inventory Optimization, Global Health, Health Care.

**AI-342**

## AI-DRIVEN PREDICTION OF DRUG–EXCIPIENT COMPATIBILITY USING MACHINE LEARNING MODELS FOR ENHANCED FORMULATION DESIGN

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Drug–excipient compatibility is a fundamental requirement for ensuring the stability and safety of pharmaceutical formulations. Traditional compatibility testing involves multiple analytical techniques and extended experimental timelines. The present study aims to develop an artificial intelligence (AI)-based predictive framework capable of identifying potential drug–excipient incompatibilities using machine learning algorithms. A structured dataset comprising physicochemical descriptors, molecular fingerprints, and reported compatibility outcomes of widely used excipients was compiled from scientific literature. Feature selection was performed using correlation matrices and principal component analysis to eliminate redundancy. Machine learning models including Random Forest, Support Vector Machine, and XGBoost were trained and evaluated using standard performance metrics. Among these, the Random Forest model achieved superior performance with an accuracy of 92% and strong predictive consistency. A validation case study using a BCS Class II drug confirmed high agreement between AI-predicted compatible excipients and reported experimental results. The proposed AI approach minimizes preliminary laboratory experimentation, accelerates formulation development, and supports informed decision-making during excipient screening. This framework demonstrates the potential of machine learning in pharmaceutical formulation science and highlights AI as a valuable tool for early-stage product development.

**Keywords:** Artificial intelligence, Machine learning, Drug–excipient compatibility, Random Forest, Predictive modeling.

**AI-343**

## AI AND TECHNOLOGY IN PHYTOPHARMACOLOGICAL EVALUATION OF HEPATOPROTECTIVE EFFECT OF ETHANOLIC LEAF EXTRACT

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This study aims to evaluate the hepatoprotective effect of an ethanolic leaf extract using a standard animal model of liver injury. The extract will be prepared by ethanol extraction, followed by phytochemical screening to identify active constituents such as flavonoids, phenolics, and alkaloids. Acute toxicity will be assessed according to OECD guidelines. Experimental animals will be divided into toxin control, standard, and extract-treated groups. Liver damage will be induced using carbon tetrachloride. Serum biochemical parameters (ALT, AST, ALP, and bilirubin), antioxidant enzymes (GSH, SOD, catalase), and histopathological examination of liver tissue will be evaluated. The study aims to establish scientific evidence supporting the hepatoprotective potential of the ethanolic leaf extract and its possible mechanism of action. Combining wet-lab experiments with AI tools aims to (1) reduce experimental bias and animal use via predictive models (2) accelerate candidate prioritization, and (3) generate FAIR datasets and decision support for downstream drug development. The workflow demonstrates how modern technology can educate researchers (via interactive dashboards), innovate discovery pipelines, and empower evidence-based phytopharmacology in pharma.

**AI-344**

## AI-INTEGRATED NETWORK PHARMACOLOGY TO PREDICT MICROBIOME-MEDIATED MODULATION OF OMEPRAZOLE

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Omeprazole is one of the most prescribed proton pump inhibitors for managing acid-related disorders. Recent evidence indicates that long-term omeprazole use significantly alters gut microbiome composition, which may influence the drug's metabolism, therapeutic efficacy, and adverse effects. However, complex relationships among omeprazole, gut microorganisms, and host biological pathways remain poorly understood. A comprehensive, computationally driven approach is required to unravel these interactions. This study presents an AI-integrated network pharmacology model designed to predict microbiome-mediated modulation of omeprazole. Drug-related molecular targets were collected from databases such as SwissTargetPrediction, CTD, and STITCH. Microbial species altered in response to omeprazole were identified from existing microbiome studies. Host–microbe interaction genes were mapped using Disbiome and GMrepo. Machine learning techniques—including random forest classification, network embedding, and feature-importance analysis—were applied to prioritize key interaction nodes and identify microbe-linked metabolic and signaling pathways. A multilayer drug–microbiome–host interaction network was constructed and analyzed using Cytoscape. The AI-based model identified several microbial




ISBN: 978-81-980623-8-3

enzymes potentially involved in omeprazole modification, particularly those associated with xenobiotic degradation and proton transport regulation. Key host pathways related to inflammation, oxidative stress, and gastrointestinal homeostasis were found to be indirectly influenced through microbiome shifts. The model also predicted novel drug–microbe–host associations that have not yet been validated experimentally. In conclusion, integrating AI with network pharmacology provides a powerful framework to decode complex drug–microbiome–host interactions. This approach may support personalized therapeutic predictions and optimize the clinical use of omeprazole.

**Keywords:** Omeprazole, Network Pharmacology, Gut Microbiome, Artificial Intelligence, Machine Learning, Drug–Microbe–Host Interactions, Xenobiotic Metabolism.

**AI-345**

**RECENT REGULATORY REQUIREMENTS FOR COSMECEUTICALS: GLOBAL UPDATES ON SAFETY, CLAIMS, AND NANOMATERIALS**

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Cosmeceuticals, hybrid products that combine cosmetic benefits with drug-like biological activity, are now subject to enhanced regulatory oversight to ensure safety, efficacy, and sustainability. Between 2023 and 2025, major authorities in India, the United States (U.S.), the European Union (EU), and China updated frameworks focused on safety substantiation, claim validation, nanomaterial governance, and risk-based categorization. In India, the Cosmetics Rules (2020) and the Cosmetics Amendment Rules (2025) require registration with the Central Drugs Standard Control Organization via the SUGAM portal, compliance with Good Manufacturing Practices, disclosure of nanomaterials under revised Bureau of Indian Standards (BIS) standards, and reporting of adverse events within 15 days. Products containing potent actives (e.g., retinoids, peptides) must include non-clinical data and limited human evidence, while therapeutic-type claims may prompt reclassification as drugs. In the U.S., the Modernization of Cosmetics Regulation Act (2023) mandates facility registration, product listing, safety documentation, and adverse event reporting by 2024. Draft guidance (2025) notes that structure/function claims, such as collagen stimulation, may require drug-level evidence, while regulations addressing Per- and Polyfluoroalkyl Substances (PFAS) and talc are expected by late 2025. The EU continues oversight under Regulation (EC) 1223/2009 and introduced Regulation (EU) 2024/XXXX, requiring pre-market authorization for borderline products containing more than 1% pharmacologically active ingredients, restricting kojic acid, and reinforcing microbiome-related claim validation; nanomaterial reporting via Cosmetic Products Notification Portal (CPNP) remains mandatory. China's NMPA (National Medical Products Administration) dual-track system (2025) mandates stability testing for general cosmetics and full non-clinical and clinical evaluation for "special cosmetics," alongside enhanced labeling for nanomaterials and sustainability, aligned with ICCR (International Cooperation on Cosmetics Regulation) guidance.

**Keywords:** Cosmeceuticals; Regulation; CDSCO; Claim substantiation; ICCR.

**AI-346**

**FROM PAPER TO PIXEL: DIGITALISING PHARMACY RECORDS WITH OCR**

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In many Indian healthcare settings pharmacy records heavily depends on handwritten prescriptions, dispensing registers, and paper-based inventory documentation. These manual systems often leads transcription errors, incongruous record keeping, delayed information retrieval and difficulties during audits or regulatory evaluations. Optical Character Recognition (OCR) has become a valuable bridge between traditional paper documents and electronic pharmacy information systems as Indian advances towards a more digitalized healthcare system. Evidence from Indian digital-health initiatives demonstrates reduction in burden of manual data entry and minimization of clerical inconsistencies through OCR. Digitized records allow faster access to patient prescription history, more efficient tracking of controlled medications, streamlined stock and inventory management, and greater transparency in billing processes. Improvements in OCR accuracy driven by AI, machine-learning-based text correction, image enhancement and support for multiple Indian languages have increased the reliability of the technology in diverse pharmacy environment and public health. These tools integrated with cloud platform and pharmacy management systems further support interoperability with telemedicine platforms and electronic prescription. OCR offers a cost effective and practical solution for digitizing pharmacy records in India. This adoption enhances documentation quality, supports continuity of care, enables data driven decision making and accelerates the transition towards paperless and audit-ready pharmacy workflows.

**Keywords:** Optical Character Recognition (OCR), Pharmacy records, Digitalization, Indian pharmacy system, Paperless workflow.

**AI-347**

**ARTIFICIAL INTELLIGENCE IN PREDICTING AND MANAGING ADVERSE DRUG REACTIONS OF FIXED DOSE COMBINATIONS**

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Fixed Dose Combinations (FDCs) are widely used to improve therapeutic efficacy and patient compliance, but they also increase the risk of Adverse Drug Reactions (ADRs) due to complex pharmacokinetic and pharmacodynamic interactions. Factors such as mismatched drug ratios, competition for metabolic pathways, and irrational formulations contribute to toxicity or reduced efficacy. Artificial Intelligence (AI) has emerged as a powerful tool to enhance pharmacovigilance by enabling early detection, prediction, and monitoring of ADRs from FDCs. AI algorithms like Bayesian networks, Gradient Boosting Machines, and Neural Networks analyze large datasets from electronic health records, spontaneous reporting systems, and social media to identify hidden safety signals and establish causality more accurately than traditional methods. Natural Language Processing (NLP) further aids in extracting relevant data from unstructured clinical narratives. Studies show that AI models significantly improve the sensitivity and speed of signal detection while supporting personalized therapy decisions by predicting patient-specific risks. Despite its promise, challenges remain in data quality, algorithm transparency, and regulatory acceptance. Overall, AI represents a transformative advancement in pharmacovigilance, offering a proactive and data-driven approach to managing ADRs in FDCs and enhancing drug safety and public health outcomes.

**Keywords:** Artificial Intelligence (AI), Pharmacovigilance, Fixed Dose Combinations (FDCs), Adverse Drug Reactions (ADRs), Bayesian Networks.

**AI-348**

**AI AND TECHNOLOGY IN PHARMA: EDUCATE, INNOVATE, EMPOWER.**

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Artificial Intelligence (AI) and emerging digital technologies are redefining the pharmaceutical ecosystem—accelerating discovery, optimizing development, and transforming patient care. The convergence of AI-driven analytics, machine learning (ML), and deep learning (DL) has shifted drug development from empirical processes to predictive, data-centric paradigms. Evidence from high-impact studies shows AI-enabled platforms can reduce drug discovery timelines by up to 50%, improve hit-to-lead accuracy from ~2–3% to over 10%, and enable de novo molecular design with unprecedented precision. Integration of generative models and protein-structure prediction tools has unlocked novel therapeutic targets, while digital twins and in-silico trials are revolutionizing clinical research efficiency and cost-effectiveness. Beyond R&D, AI empowers real-time pharmacovigilance, adaptive trial recruitment, and personalized medicine—delivering safer, faster, and patient-centric solutions. Pharmaceutical manufacturing is entering Industry 4.0, leveraging AI for predictive maintenance, quality-by-design, and supply-chain resilience, achieving up to 20% reduction in




ISBN: 978-81-980623-8-3

downtime and 14% less logistics volatility. AI-driven pharmacovigilance systems now detect adverse events in days instead of months, enabling near real-time safety oversight. This underscore three imperatives: Educate stakeholders on AI literacy Innovate through cross-disciplinary collaboration Empower patients via equitable access and precision therapeutics. As the pharmaceutical sector embraces AI, the promise is clear: a future where intelligent systems drive efficiency, sustainability, and global health equity.

**Keywords:** Machine learning, Deep learning, de novo molecular design, leveraging AI.

**AI-349**

**AI IN THE DESIGN AND IMPROVEMENT OF TOPICAL SKIN PRODUCTS**

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Artificial intelligence (AI) is transforming pharmaceutical research, specifically in developing topical dosage forms like transdermal, ophthalmic, and dermatological delivery systems. By utilizing machine learning and deep learning, researchers can accelerate drug formulation processes, enhance treatment efficacy, and reduce side effects. AI helps predict physicochemical properties and optimize formulations tailored to individual patient needs, addressing challenges such as skin permeability barriers. In transdermal drug delivery systems (TDDS), AI models can predict skin permeability and streamline the selection of drug candidates. Additionally, AI enhances formulations by optimizing delivery methods like microneedles and liposomes. Innovative solutions, such as sensor-integrated patches, allow real-time adjustments in drug release based on patient feedback, improving therapeutic outcomes. The review underscores AI's impact on TDDS through various models that effectively address existing challenges, thus improving patient care. Despite concerns related to data quality and privacy, AI's integration with advancements like 3D printing offers promising possibilities for personalized transdermal therapies. Overall, AI is crucial in advancing therapeutic efficacy and developing next-generation drug delivery systems.

**Keywords:** Artificial Intelligence, transdermal drug delivery systems, personalised medicine.

**AI-350**

**THE FUTURE OF PHARMACY: ROLE OF AI**

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The future of pharmacy is being redefined by the convergence of technology, innovation, and patient-centered care. The integration of artificial intelligence (ai), machine learning (ml), robotics, and digital therapeutics is revolutionizing the pharmaceutical industry by transforming drug discovery, development, dispensing, and patient care. Ai-driven technologies enable rapid identification of novel drug molecules, optimization of clinical trials, and enhancement of pharmacovigilance, while automation improves operational accuracy and efficiency. Telepharmacy and digital health platforms are expanding access to healthcare, particularly in remote areas, and genomic data-driven personalized medicine is shifting the focus from reactive treatment to proactive prevention. To respond effectively to these technological forces, pharmacy must expand its informational and clinical roles by embracing the concept of “pharmaceutical care,” which integrates drug-use control with evidence-based decision-making. This professionalization of pharmacy positions pharmacists as digital health experts and clinical leaders. Moreover, personalized and precision medicine, guided by genomic data, is shifting the focus from reactive treatment to proactive prevention. Pharmacists are evolving into clinical decision-makers and digital health experts, integrating data intelligence with compassionate care to improve therapeutic outcomes. In essence, the pharmacy profession is adapting to new demands and technologies, requiring future pharmacists to be both clinically knowledgeable and tech-ready to provide high-quality, patient-centered care. Ultimately, AI in the pharmaceutical industry represents a convergence of innovation and compassion, creating a future where technology and humanity advance global health together.

**Keywords:** Innovation, Digital Therapeutics, Telepharmacy, Reprofessionalization.

**AI-351**

**FROM LEAF TO ALGORITHM: THE ROLE OF AI IN PHYTOCHEMICAL DISCOVERY**

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The exploration of phytochemicals—bioactive compounds derived from plants—has long been central to natural product research and drug discovery. However, traditional phytochemical screening techniques, reliant on labor-intensive laboratory assays and complex analytical procedures, often limit the speed and scale of discovery. Recent advances in Artificial Intelligence (AI) have introduced transformative possibilities for phytochemical research by automating data interpretation, enhancing predictive accuracy, and accelerating compound identification. Machine learning and deep learning algorithms now enable the rapid analysis of complex datasets obtained from chromatographic and spectroscopic methods such as HPLC, GC-MS, and LC-MS. These models facilitate the classification of plant species, identification of novel metabolites, and prediction of biological activities through computational tools like QSAR modeling and molecular docking. Furthermore, AI-driven data mining and computer vision technologies streamline the recognition of phytochemical patterns and bioactivity correlations. Despite challenges such as limited data standardization and interpretability of AI models, the integration of intelligent computational systems marks a significant shift from conventional phytochemical screening to data-driven discovery. This convergence of biology and technology promises to unlock new insights into plant-based compounds and their therapeutic potential.

**Keywords:** Artificial Intelligence, Phytochemical Discovery, Machine Learning, Deep Learning, Natural Products, Drug Discovery.

**AI-352**

**AI-DRIVEN PHARMACOGENOMICS: PERSONALIZING DRUG RESPONSE THROUGH GENOMIC INTELLIGENCE**

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Pharmacogenomic variability significantly influences therapeutic efficacy, adverse drug reactions, and inter-individual differences in drug metabolism. Traditional methods of interpreting genomic data are limited by the complexity of gene–drug interactions and the vast amount of sequencing information generated. Artificial intelligence (AI) offers a powerful framework for decoding these complexities by leveraging deep learning and machine learning models to analyze genomic variants, transcriptomic patterns, and clinical phenotypes. AI-based algorithms can predict drug–gene interactions, identify metabolizer status, and classify patients as responders or non-responders for various therapeutic classes including antidepressants, oncology drugs, and analgesics. Integrating AI with electronic health records and clinical decision-support systems further enables real-time personalization of drug selection and dosing. These innovations advance precision medicine by reducing trial-and-error prescribing, minimizing adverse effects, and improving therapeutic outcomes. AI-driven pharmacogenomics thus represents a critical leap forward in tailoring pharmacotherapy to individual genetic makeup.

**Keywords:** Pharmacogenomics, Artificial Intelligence, Precision Medicine, Drug–Gene Interaction.

**AI-353**

**ARTIFICIAL INTELLIGENCE IN HEALTHCARE MANAGEMENT AND DRUG DISCOVERY**

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ISBN: 978-81-980623-8-3

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Artificial intelligence (AI) is revolutionizing healthcare management by improving efficiency through data analysis, predictive analytics, and automation. In drug discovery, AI accelerates the process by identifying potential drug targets, designing new molecules, and optimizing clinical trials, which can significantly reduce time and cost. With over 90% accuracy in diagnostic disease from medicinal image, AI is reshaping the healthcare landscape, transforming medical imaging, diagnosis, drug discovery, patient care and more AI implementation in healthcare concerted efforts in ethical consideration and regulatory compliance are necessary. The application of AI in healthcare highlights the urgent need for cross-disciplinary collaboration and a patient focused approach fully harness AI's capabilities in the field. Engaging statistics and compelling case studies showcase AI's current impact and inspire further collaboration in and inspire further collaboration and in this awe-inspiring technological revolution, propelling us towards a further where AI collaborates seamlessly with healthcare professional for superior patient outcomes. AI's ability to analyze vast database and uncover hidden pattern has opened avenues for precision medicine and evidence based decision making. Healthcare professional must be equipped with the necessary skills and training to effective leverage AI technology. AI also plays a pivotal role in revolutionizing by expediting these process and cutting down costs. AI to achieve patient centric, efficient and equitable healthcare for all. Artificial intelligence (AI) is transforming drug discovery by accelerating the process through analyzing vast datasets to identify potential drug candidates, predict compound efficacy and toxicity, and optimize clinical trial design.

**Keywords:** Healthcare, Drug Discovery, Drug Analysis, Clinical Trials, Toxicity, Efficient.

**AI-354**

**Integration Of Artificial Intelligence In Green Nanoparticle Synthesis: A Sustainable Approach Toward Smarter Nanotechnology**

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Green synthesis of nanoparticles has emerged as an eco-friendly and sustainable alternative to conventional chemical and physical methods, utilizing biological sources such as plant extracts, microorganisms, and biomolecules as reducing and stabilizing agents. However, optimizing synthesis parameters and ensuring reproducibility remain major challenges. The integration of Artificial Intelligence (AI) into green nanotechnology offers innovative solutions to these limitations by enabling predictive modeling, data-driven optimization, and automated process control. AI algorithms, including machine learning and deep learning models, can accurately predict the influence of experimental parameters such as pH, temperature, and extract concentration on nanoparticle size, morphology, and yield. Moreover, AI-assisted spectral and image analyses streamline the characterization of nanoparticles obtained through eco-friendly routes. Virtual screening of phytochemical constituents using AI tools further supports the identification of potent natural reducing agents for metal ion reduction. Thus, the application of AI in green nanoparticle synthesis enhances process efficiency, reduces experimental cost and waste, and accelerates the discovery of sustainable nanomaterials for biomedical, catalytic, and environmental applications.

**Keywords:** Artificial intelligence, Green synthesis, Nanoparticles, Plant extract, Sustainable nanotechnology & Phytochemical screening.

**AI-355**

**FROM DRUG EXPERTS TO AI STEWARDS: DESIGNING COMPETENCIES FOR HUMAN–AI COLLABORATION IN PHARMACY**

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The rapid adoption of Artificial Intelligence (AI) across healthcare is transforming pharmacy practice and creating a demand for pharmacists equipped with advanced digital competencies. This examines the development of an AI-integrated competency model that emphasises data literacy, algorithm assessment, digital therapeutics, and the capacity to make informed, shared human–AI clinical decisions. It also highlights emerging skill areas, such as AI ethics, bias recognition, cybersecurity, and automation oversight, all of which are essential for the safe and responsible use of intelligent systems. By 2030, pharmacists are expected to function not only as medication experts but also as interpreters, evaluators, and supervisors of AI-driven clinical tools. The framework promotes experiential learning through exposure to real-world AI technologies, digital twin patients, and simulation-based training. Preparing pharmacists with these competencies will enhance therapeutic outcomes, strengthen medication safety, and support the evolution of a technologically advanced healthcare ecosystem. This model aims to guide future pharmacy education and professional practice.

**Keywords:** AI in Pharmacy, Digital Competencies, Pharmacist Workforce 2030, Human–AI Collaboration, Clinical Decision Support, Data Literacy, Algorithm Evaluation, Digital Therapeutics, AI Ethics, Bias Detection, Cybersecurity Awareness, Workflow Automation, Simulation-Based Training, Digital Twin Patients, Medication Safety, Future Pharmacy Education.

**AI-356**

**AI (ARTIFICIAL INTELLIGENCE) INTERPRETATION OF FINE-NEEDLE ASPIRATION CYTOLOGY**

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Fine-needle aspiration cytology (FNAC) remains the gold standard for evaluating thyroid nodules; however, its diagnostic accuracy is often limited by subjective interpretation, inter-observer variability, and indeterminate results. Recent advances in artificial intelligence (AI), particularly deep learning and convolutional neural networks, offer promising solutions by enabling automated, high-precision analysis of cytological images. Utilizing large-scale, diverse datasets enhances model generalizability across different populations, staining protocols, and imaging conditions. AI-assisted FNAC interpretation has demonstrated improved accuracy in distinguishing benign from malignant lesions, reducing false negatives and indeterminate diagnoses, and accelerating reporting times. The integration of AI into cytopathology workflows provides a reproducible, objective, and scalable approach to thyroid cancer detection, supporting personalized clinical decision-making. Despite challenges in dataset standardization, model interpretability, and validation through prospective trials, the application of AI-trained datasets marks a significant advancement in modern thyroid cytology. Continued research and clinical validation are essential to establish AI-assisted FNAC as a reliable adjunct, ultimately improving early detection, diagnosis, and management of thyroid malignancies.

**Keywords:** Fine-needle aspiration cytology, thyroid Cancer, Artificial intelligence (AI), Deep learning.




ISBN: 978-81-980623-8-3

**CH-01**

## SYNTHESIS, CHARACTERISATION, BIOLOGICAL EVALUATION AND ANALOGIZING THE ANTIMYCOTIC ACTIVITY OF 2,4,5-TRIPHENYLIMIDAZOLE DERIVATIVES

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Microwave Assisted Synthesis (MWAS) technique which significantly lowers the chemical waste and reaction time. MWAS has been utilized to synthesise the 2,4,5-Triphenylimidazole by Debus-Radziszewski imidazole synthesis. From the literature survey, 2,4,5-Triphenylimidazole derivatives were synthesized under MWAS using Benzil, Ammonium Acetate and Aldehydes like 4-chlorobenzaldehyde, 4-Nitrobenzaldehyde and 4-Methoxybenzaldehyde by Condensation reaction. Compounds were synthesized in the presence of Glacial acetic acid as a catalyst in solvent-free condition. The purity of the compound was determined by Thin Layer Chromatography (TLC). The synthesised compounds were screened using FT-IR. All synthesized compounds were evaluated and analogized for anti-mycotic activity.

**Keywords:** Microwave Assisted Synthesis, Debus-Radziszewski imidazole synthesis, 2,4,5-Triphenylimidazole derivatives, FT-IR, Anti-mycotic activity.

**CH-02**

## METHOD DEVELOPMENT AND VALIDATION OF A HILIC-HPLC TECHNIQUE FOR THE SIMULTANEOUS ESTIMATION OF POLAR ANTIDIABETIC DRUGS

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Hydrophilic interaction liquid chromatography (HILIC) has proven to be a powerful tool for the analysis of highly polar pharmaceutical compounds, overcoming the limitations of conventional reversed-phase HPLC. In this study, a novel and efficient HILIC-HPLC method was developed and validated for the simultaneous estimation of three polar antidiabetic drugs: metformin, vildagliptin, and remogliflozin. Chromatographic separation was achieved on a silica-based HILIC column using a mobile phase consisting of acetonitrile and 1 mM sodium octane sulfonate aqueous buffer in optimized ratios. Key parameters such as mobile phase composition, flow rate, and injection volume were systematically optimized to ensure maximum resolution and peak efficiency. The developed method was validated according to ICH Q2(R1) guidelines. It demonstrated excellent linearity over a wide concentration range ($R^2$ > 0.998 for all analytes), with high accuracy (recoveries between 98.0% and 102.0%) and precision (intra- and inter-day %RSD < 2%). Specificity was confirmed through the absence of interference from excipients or mobile phase components. The method exhibited strong robustness, with minimal variation in peak response and retention under small deliberate changes in flow rate and organic content. System suitability parameters such as theoretical plates (>8500), resolution (>4.0), and tailing factor (<1.2) met the acceptable limits for all analytes. Sensitivity studies revealed low limits of detection (LOD) of 0.15 µg/mL for metformin, 0.10 µg/mL for vildagliptin, and 0.12 µg/mL for remogliflozin, with corresponding limits of quantitation (LOQ) of 0.50 µg/mL, 0.30 µg/mL, and 0.40 µg/mL, respectively. Overall, the developed HILIC-HPLC method is simple, sensitive, specific, and reliable for the routine quality control, assay, and stability testing of polar antidiabetic agents in bulk drug and pharmaceutical dosage forms.

**Keywords:** Remogliflozin, Vildagliptin, RP-HPLC, Method validation, Fixed-dose combination

**CH-03**

## FABRICATION OF THE BIOANALYTICAL METHOD OF AN ANTIHYPERTENSIVE DRUG HYDROCHLOROTHIAZIDE AND VALIDATE BY LC-MS/MS IN HUMAN PLASMA

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The present study was to develop and validate this method for determining Hydrochlorothiazide (Antihypertensive drug) in human plasma by LC-ESI-MS/MS. A simple, rapid bioanalytical LC-ESI-MS/MS (API-2000) method with appropriate accuracy sensitivity, and selectivity, precision was developed and validated to quantify Hydrochlorothiazide in human plasma. Losartan is used as an Internal Standard (IS). The liquid chromatographic separation was carried out in gradient method using Pump A: 0.1% Formic Acid in Milli-Q water as an aqueous solvent and Pump B: Acetonitrile as an organic solvent and with a flow rate of 0.5 ml/min using Phenomenex Kinetex 5µ, C18 100Å, 50*3mm column. Plasma extraction was done using a simple protein precipitation technique. The method was validated, LOD was 1 ng/mL, LLOQ was 2.25 ng/mL calibration standard was 500 ng/mL - 2.25 ng/mL, precision, and accuracy were within the acceptance range, and recovery was high. Freeze-thaw, short-term, long-term stability, and other stability studies percentage accuracy was within the limit as per USFDA and EMA guidelines. The bioanalytical method development for Hydrochlorothiazide is highly sensitive, specific, rugged, and reproducible. The overall analysis time is promising. This validated LC-ESI-MS/MS method was successfully applied in pharmacokinetic and bioequivalence studies.

**Keywords**: Hydrochlorothiazide, Method development and validation, Protein Precipitation Technique, and ESI-LC-MS/MS Instrument.

**CH-04**

## DEVELOPMENT AND VALIDATION OF AN RP-HPLC METHOD FOR THE SIMULTANEOUS QUANTIFICATION OF LEVONORGESTREL AND ETHINYLESTRADIOL IN PHARMACEUTICAL FORMULATION AND BIOLOGICAL SAMPLE

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A precise, accurate, and robust reverse-phase high-performance liquid chromatography (RP-HPLC) method was developed and validated for the simultaneous quantification of levonorgestrel (LNG) and ethinyl estradiol (EE) in both tablet dosage forms and biological samples. Chromatographic separation was achieved using a Hypersil ODS C18 column (100 mm × 4.6 mm, 5 µm) with an isocratic mobile phase comprising 10 mM phosphate buffer (pH 7.2), acetonitrile, and methanol in a ratio of 50:40:10 (v/v/v) at a flow rate of 1 mL/min. Detection was carried out at 220 nm, with retention times of 5.36 minutes for LNG and 3.95 minutes for EE. The method demonstrated excellent linearity over the concentration ranges of 7.51–22.53 µg/mL for LNG ($R^2$ = 0.9994) and 1.51 - 4.52 µg/mL for EE ($R^2$ = 0.9996). Validation parameters, including precision, accuracy, specificity, and robustness, met the criteria established by ICH Q2 (R1) guidelines. The method was successfully applied to the analysis of commercial tablet formulations and artificial plasma samples spiked with LNG and EE, indicating its suitability for routine quality control and pharmacokinetic studies. This validated method offers a reliable analytical tool for simultaneous estimation of these hormonal agents in various pharmaceutical matrices.

**Keywords:** Levonorgestrel, Ethinyl estradiol, Simultaneous estimation, RP-HPLC method development, Pharmaceutical Analysis.

**CH-05**

## SYNTHESIS AND *IN VITRO* CHARACTERIZATION OF PEGYLATED MELPHALAN CONJUGATES FOR ENHANCED THERAPEUTIC POTENTIAL

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Melphalan, an active pharmaceutical agent utilised in the treatment of breast and ovarian cancers, as well as a specific form of bone marrow cancer, was conjugated to linear methoxy poly(ethylene glycol) (M-PEG) with molecular weights of 2000 and 5000 Da. An ester bond between the polymer and the drug was employed in the coupling to produce a




ISBN: 978-81-980623-8-3

polymeric prodrug. Purified esters were characterised using MALDI-TOF. Infrared spectroscopy techniques. The alteration facilitated the resolution of the established issue of melphalan's aqueous solubility (0.1 µg/ml), resulting in the development of a polymer-drug bioconjugate more appropriate for oral and parenteral delivery. The molecular weight of M-PEG is essential for the stability of conjugates, water solubility (with M-PEG 2000 exhibiting 80 times and M-PEG 5000 exhibiting 123 times more solubility), and haemolytic activity. Melphalan induced 100% haemolysis at concentrations exceeding 3.5 µg/ml within one hour, but the conjugates of M-PEG 2000 and M-PEG 5000 exhibited haemolysis rates of 81.3±0.5% and 48.8±1.5%, respectively, at a concentration of 32 µg/ml after one hour. Additionally, the *in vitro* anticancer efficacy of melphalan and its conjugates was evaluated using MCF-7 breast cancer cell lines. The LD50 concentrations were 1.14 µM and 2 µM for M-PEG 2000 and M-PEG 5000, respectively, in contrast to pure melphalan, which was 0.74 µM. The aforementioned investigations demonstrated enhanced pharmacokinetic features upon conjugation.

**Keywords:** Methoxy-polyethylene glycol, anti-cancer, MCF-7 cell line, aqueous solubility, hemolytic activity

**CH-06**

## GREEN AND SUSTAINABLE PROCESS DEVELOPMENT OF KEY INTERMEDIATE GREWE DIAMINE OF THIAMINE HYDROCHLORIDE THROUGH FLOW CHEMISTRY

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Grewe diamine (4-Amino-5-aminomethyl-2-methylpyrimidine) is key chemical intermediate of thiamine hydrochloride synthesis, has considerable importance in the pharmaceutical and food industry. However, their selective synthesis is challenging. An industrial method for the synthesis is patented in 1951 by Matsukawa, has been applied till now for thiamine hydrochloride commercially. The global thiamine (vitamin B1) market is estimated to be 680 million to 710 million USD and is expected to grow at a compound annual growth rate (CAGR) of 5.0%–6.8% over the forecast period of 2023–2035. The proposed continuous-flow process is based on developments in process chemistry, chemical engineering, and equipment design, and affords improved performance and safety compared with batch-mode manufacturing. Several challenges were precisely investigated and controlled, including mixing, unexpected clogging, solvent changes, an exothermic reaction, and the prevention of side product, using various micro-channel flow reactors, mixers, separators, and continuous filters. Intermediate Grewe diamine was produced with an isolated yield of 84.7 % with high purity. This continuous-flow protocol enables technology involving key principles of green chemistry. Hence, the application of flow technology is of paramount importance for improving security, reducing waste, and, in particular, improving the efficiency of batch operations that require several days for manufacturing.

**Keywords:** Green Process, Grewe diamine, Thiamine hydrochloride, Flow chemistry

**CH-07**

## NOVEL UV SPECTROPHOTOMETRIC METHOD DEVELOPMENT AND VALIDATION FOR ESTIMATION OF VONOPRAZAN IN TABLET DOSAGE FOR: EVALUATION OF GREENNESS OF THE ANALYSIS

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The present study focuses on the development and validation of a novel UV spectrophotometric method for the quantitative estimation of Vonoprazan in its tablet dosage form, with a special emphasis on the greenness of the analytical process. Vonoprazan, a potassium-competitive acid blocker (P-CAB), is used in the treatment of acid-related disorders. As there is limited data on UV spectrophotometric analysis of this drug, especially with a green chemistry perspective, this work aims to fill that gap by offering a simple, cost-effective, accurate, and eco-friendly method. The method was developed using a Methanol: Phosphate buffer (50:50 v/v) as the solvent system. The maximum absorbance (λmax) of Vonoprazan was observed at 285 nm. The method obeyed Beer-Lambert's law in the concentration range of 2–12 µg/mL, showing a strong linear relationship (correlation coefficient $R^2 = 0.9994$). The method was validated as per ICH Q2(R1) guidelines for parameters such as linearity, accuracy, precision, LOD, LOQ, robustness, and system suitability. The accuracy studies showed percentage recoveries in the range of 98.5%–101.2%, indicating that the method is reliable and free from interference. Precision (both intra-day and inter-day) studies revealed %RSD values less than 2, confirming the reproducibility of the method. Additionally, the greenness of the method was evaluated using two widely accepted tools: the analytical Eco-Scale and the Green Analytical Procedure Index (GAPI). The eco-scale score indicated that the method is environmentally benign, while GAPI pictogram assessment confirmed low environmental and health hazards associated with the procedure. In conclusion, the proposed UV spectrophotometric method is simple, accurate, precise, rapid, cost-effective, and eco-friendly, making it highly suitable for routine quality control analysis of Vonoprazan in pharmaceutical industries. Its green chemistry profile enhances its applicability in sustainable analytical practices.

**Keywords:** Vonoprazan, UV spectrophotometry, Green chemistry, GAPI, ICH guidelines.

**CH-08**

## UV SPECTRO PHOTOMETRIC METHOD FOR SIMULTANOUS ESTIIMATION OF ZPTO WITH KETOCONAZOLE IN SHAMPOO FORMULATION AND EVALUATION OF GREENNESS OF THE METHOD

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A simultaneous UV spectrophotometric method for the estimation of ketoconazole and Zinc Pyrithione (ZPTO) in commercial shampoo formulations was developed and validated, ensuring comprehensive quality control of topical antifungal products. Both active ingredients are commonly co-formulated due to their synergistic efficacy against dandruff and fungal infections in scalp care. The method involved the preparation of standard and sample solutions with suitable solvents (such as methanol), determining the maximum absorbance wavelengths (λmax) for ketoconazole (typically 225–255 nm) and ZPTO (in the range of 246–267 nm), and using the simultaneous equation or Q-absorbance ratio approach to enable quantification without interference Linearity of response for both analytes was established across relevant concentration ranges, and validation was performed as per ICH Q2(R1) guidelines for accuracy, precision, specificity, robustness, limit of detection, and limit of quantitation. Results demonstrated that both ketoconazole and ZPTO could be reliably estimated in the mixture, with minimal sample processing and without interference from shampoo excipients. The validated method was found suitable for routine analysis in industry and research environments, especially in resource-limited settings. With the implementation of this approach, consistent therapeutic efficacy and regulatory safety of shampoos containing both ketoconazole and zinc pyrithione can be ensured, supporting the comprehensive control required for modern cosmetic and pharmaceutical products.

**Keywords:** UV Spectroscopy, ketoconazole, ZPTO, Absorbance Ratio

**CH-09**

## GREEN SYNTHESIS OF SILVER NANOPARTICLES USING ANNONA SQUAMOSA SEED EXTRACT AND THEIR ANTICANCER ACTIVITY.

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The interdisciplinary fusion of nanotechnology and phytochemical science is paving the way for eco-friendly nanoparticle synthesis in biomedical applications. The study explores the biosynthesis of silver nanoparticles (AgNPs) utilizing the seed extract of Annona squamosa,a plant rich in phytochemicals known for their medicinal value. The bioactive constituents in the extract serve as natural reducing and stabilizing agents, facilitating the sustainable fabrication of nanoparticles without the need of toxic chemicals. The synthesis process was initially indicated by a visible color change and further confirmed through UV-Visible spectroscopy, showing a characteristic surface plasmon




ISBN: 978-81-980623-8-3

resonance peak at 428 nm. Comprehensive characterization using FTIR, SEM, and XRD analyses confirmed the presence of functional groups involved in capping, spherical morphology, and crystalline nature of the AgNPs. The *in vitro* anticancer efficacy of the synthesized nanoparticles was assessed using the MTT assay on HepG2 liver cancer cells, revealing a dose-dependent cytotoxic effect. These findings highlight the potential application of Annona squamosa-mediated AgNPs as a biocompatible and sustainable alternative in cancer nanomedicine, paving the way for further research and development of green nanotechnology applications.

**Keywords:** Nanotechnology, Green synthesis, Silver Nanoparticles, Annona Squamous, Seeds Extract, Anticancer, etc.

**CH-10**

## A SIMPLE SPECTROPHOTOMETRIC BIOANALYTICAL TECHNIQUE FOR QUANTIFICATION OF LACOSAMIDE IN PLASMA AND TABLET FORMULATIONS.

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Lacosamide, a medication used for epilepsy, demonstrates high solubility in organic solvents like ethanol, dimethyl sulfoxide (DMSO), and dimethyl formamide (DMF) (approximately 20 mg/mL) but shows limited solubility in water. To quantify Lacosamide in biological samples, effective extraction methods and dependable spectrophotometric techniques are necessary. The current research sought to create and validate a straightforward and repeatable spectrophotometric technique for measuring Lacosamide in human plasma and tablet formulations through liquid–liquid extraction (LLE). Plasma samples containing Lacosamide (12.5 µg/mL) were prepared and subjected to liquid–liquid extraction. After centrifuging at 4°C for 20 min at 7000 rpm, the supernatant was collected and evaporated under nitrogen flow (60 psi for 20 min). The resulting residue was dissolved in a mixture of Orthophosphoric acid and methanol (65:35 v/v). Absorbance readings were performed in a Bio-spectrophotometer at a wavelength of 221 nm using 1 mL quartz cuvettes. The parameters for calibration, linearity, precision, accuracy, robustness, and stability (both freeze–thaw and short and long-term) were validated following bioanalytical standards. The established technique demonstrated outstanding linearity, precision, and accuracy, with recovery rates remaining within acceptable limits. The examination of Lacosamide tablets resulted in a yield of 95.2%, consistent with pharmacopeial standards. A reliable, sensitive, and economical Bio-spectrophotometric technique for quantifying Lacosamide in both plasma and formulations has been successfully developed. This method provides a dependable option for regular therapeutic monitoring and quality control assessments in settings lacking advanced chromatographic equipment.

**CH-11**

## QBD-BASED STABILITY-INDICATING RP-HPLC METHOD DEVELOPMENT AND VALIDATION OF RIBOCICLIB - ITS CHARACTERIZATION IN DEGRADATION PRODUCTS.

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Stability refers to capacity of a drug product to remain unchanged throughout the shelf life. Study of stability testing techniques in pharmaceutical products is essential for three main reasons; Safety of patient, Maintain identity, purity and quality of drug. The development of drugs is generally taken for granted along with their quality, safety and efficacy. In 2023, 306 drugs have been recalled by USFDA out of which 17 drugs was recalled because of its stability and presence of undeclared ingredients. Hence the stability study is important for all the drugs. For Ribociclib, no HPLC method optimized with QbD were reported for their stability in different stress conditions and LC-MS/MS method characterization of the degradation products. The chromatographic conditions namely mobile phase, flow rate etc., were optimized by QbD method and followed by forced degradation studies on the selected drug. In accordance with the ICH guidelines the developed HPLC method was validated and the results were found to be within the acceptable limits. The concentration range of 5 µg/ml- 100 µg/ml. LOD and LOQ were determined and linear regression was found to be 0.999. Precision (Interday & Intraday) was obtained less than 2.0. Recovery for accuracy was found to be 96.12 - 97.92%. The robustness study was found to be within the limit which is less than 2%. The developed methods can be employed to estimate the degradants of chosen drug in formulations by industries, drug testing laboratories and R & D units.

**Keywords:** Ribociclib, Box Behnken Design, High Performance Liquid Chromatography, Forced Degradation studies, Validation.

**CH-12**

## EXTRACTION, STANDARDIZATION, AND SYNTHESIS OF NANOPARTICLES FROM SEED EXTRACT OF ABELMOSCHUS MOSCHATUS

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Herbal medicines have been widely used since ancient times for the prevention and treatment of various diseases. In this study, seed extract of Abelmoschus moschatus was utilized for the extraction, standardization, and green synthesis of nanoparticles. The main objective was to explore the potential of A. moschatus seed extract in the formulation of eco-friendly nanoparticles with medicinal relevance. The prepared nanoparticles were evaluated for particle size, stability, phytochemical constituents, and possible therapeutic applications. Standardization of the extract was performed using qualitative and quantitative phytochemical analysis. The synthesized nanoparticles were characterized by UV- visible spectroscopy, FTIR, SEM, and particle size analysis, confirming the successful formation of stable nanoparticles. The results indicate that the seed extract of Abelmoschus moschatus is a promising natural reducing and stabilizing agent in the green synthesis of nanoparticles. Thus, the present study highlights a simple, economical, and eco-friendly approach for nanoparticle synthesis with potential pharmaceutical applications.

**Keywords:** Abelmoschus moschatus, seed extract, nanoparticles, green synthesis, phytochemical analysis

**CH-13**

## METHOD DEVELOPMENT AND VALIDATION BY HPTLC FOR SIMULTANEOUS ESTIMATION OF METOCLOPRAMIDE HCL AND PARACETAMOL IN SOLID DOSAGE FORM THROUGH QBD APPROACH

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Analytical method development plays a crucial role in pharmaceutical quality assurance to ensure accuracy, precision, and robustness in drug estimation. The present study focuses on the development and validation of a High-Performance Thin-Layer Chromatography (HPTLC) method for the simultaneous estimation of Metoclopramide HCl and Paracetamol in solid dosage form through a Quality by Design (QbD) approach**.** The main objective was to establish a cost-effective, reliable, and stability-indicating analytical method applicable to routine quality control.The developed method was optimized using QbD principles to evaluate critical quality attributes and design space for robust performance. Validation was performed in accordance with ICH guidelines**,** assessing parameters such as accuracy, precision, linearity, robustness, ruggedness, LOD, and LOQ. Forced degradation studies under acidic, basic, oxidative, thermal, photolytic, and neutral conditions confirmed the stability-indicating nature of the method. Furthermore, greenness assessment using AGREE and BAGI tools highlighted the eco-friendliness and practical applicability of the developed method. The results demonstrated that the proposed HPTLC method is simple, precise, accurate, and environmentally sustainable, making it suitable for the routine pharmaceutical analysis of combined dosage forms of Metoclopramide HCl and Paracetamol.

**Keywords:** Metoclopramide HCl, Paracetamol, HPTLC, Method Validation, Quality by Design (QbD), Stability-Indicating Method.




ISBN: 978-81-980623-8-3

**CH-14**

**DESIGN, SYNTHESIS, AND PHARMACOLOGICAL EVALUATION OF PYRAZOLE-BASED HETEROCYCLES: A MULTITARGET STRATEGY FOR ANTICANCER AND ANTIBACTERIAL THERAPY**

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In the present study, we present the rational design and synthesis of a series of pyrazole-based heterocyclic compounds with the aim of targeting dual pharmacological action anticancer and antibacterial. The synthetic route involved is Claisen-Schmidt condensation to form chalcones, followed by cyclization with hydrazine hydrate and acetyl acetone to yield structurally diverse pyrazole derivatives. Each compound was characterized using FTIR, $^1$H NMR, and mass spectrometry, confirming their molecular integrity and functional diversity. Swiss ADME provides the results that shows high gastrointestinal absorption and no violations of Lipinski's Rule of Five, indicating strong drug-likeness. Molecular docking studies against the cancer protein involved in breast cancer (PDB ID: 5NQR) showed the good binding affinities, particularly for compounds O1 and O3, which formed stable hydrogen bonds and hydrophobic interactions with key residues such as ARG, GLU, and TRP. *In vitro* MTT assays on MCF-7 breast cancer cells demonstrated moderate cytotoxicity, with $IC_{50}$ values of 244.57 µg/mL (O3) and 245.75 µg/mL (O1), approaching the efficacy of cisplatin ($IC_{50}$ = 187.03 µg/mL). Antibacterial screening against Staphylococcus aureus and Escherichia coli revealed zones of inhibition up to 12.5 mm, confirming broad-spectrum activity. This work underscores the therapeutic potential of pyrazole scaffolds and their adaptability for multitarget drug development. With favorable ADME profiles and promising biological activity, these compounds offer a compelling foundation for further optimization and preclinical exploration.

**Keywords:** Pyrazole derivatives, chalcones, anticancer activity, antibacterial screening, molecular docking, Swiss ADME, MCF-7 cells.

**CH-15**

**DESIGN, SYNTHESIS, AND BIOLOGICAL EVALUATION OF NOVEL PYRIMIDINE DERIVATIVES: A DUAL-ACTION APPROACH TOWARD ANTICANCER AND ANTIMICROBIAL THERAPY**

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In the present study, a series of novel hydrazinyl-substituted pyrimidinones were designed and synthesized to explore their potential as a dual-action therapeutic agents. The synthetic pathway involved Claisen-Schmidt condensation, urea cyclization, and hydrazinolysis, yielding structurally diverse compounds confirmed via FT-IR, $^1$H NMR, and mass spectrometry. SwissADME profiling results proves favourable drug-likeness, high gastrointestinal absorption and no violations of Lipinski's Rule of Five. Molecular docking studies against the breast cancer protein with PDB ID: 5NQR revealed strong binding affinities, particularly for compounds A1 and A3, which formed stable hydrogen bonds and hydrophobic interactions with key residues including ARG, GLU, and LEU. *In vitro* cytotoxicity assays on MCF-7 breast cancer cells showed moderate activity, with $IC_{50}$ values of 244.57 µg/mL (A3) and 245.75 µg/mL (A1), approaching the efficacy of cisplatin ($IC_{50}$ = 187.03 µg/mL). Antibacterial screening demonstrated zones of inhibition against Staphylococcus aureus and Escherichia coli, confirming the antimicrobial potential of the synthesized scaffolds. This work proves the pharmacological activity of pyrimidine derivatives and their promise as next-generation agents with anticancer and antimicrobial capabilities. The study lays a foundation for further structural optimization and preclinical development.

**Keywords:** Pyrimidinone, Hydrazinyl derivatives, anticancer agents, antimicrobial activity, molecular docking, ADME profiling, dual-action therapeutics.

**CH-16**

**METHOD DEVELOPMENT AND METHOD VALIDATION FOR THE ESTIMATION OF TRACE ELEMENTS IN EDARAVONE BY ICP–MS**

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This research work presents the validation of an analytical method for the estimation of heavy metals—Cadmium (Cd), Lead (Pb), Arsenic (As), Mercury (Hg), Cobalt (Co), Vanadium (V), and Nickel (Ni)—in Edaravone using Inductively Coupled Plasma Mass Spectrometry (ICP-MS). The study outlines the validation process including procedures, documentation, and results in accordance with established regulatory guidelines. Key parameters such as accuracy, precision, linearity, limit of detection (LOD), limit of quantification (LOQ), specificity, and robustness were evaluated against predefined acceptance criteria. The outcomes confirmed that the method is reliable, reproducible, and suitable for the routine estimation of trace metal content in Edaravone, ensuring product quality and patient safety.

**Keywords:** Edaravone**,** Method Development and Method Validation**,** Estimation of Trace Elements by Inductively Coupled Plasma-Mass Spectroscopy**.**

**CH-17**

**GREEN SYNTHESIS, CHARACTERIZATION, AND BIOLOGICAL EVALUATION OF NOVEL SCHIFF BASE DERIVATIVES AS POTENTIAL ANTI-TUBERCULAR AGENTS**

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Research focuses on the green synthesis, characterization, and biological evaluation of novel Schiff base derivatives as potential anti-tubercular agents. Selected derivatives of para-aminobenzoic acid and 2,4-dinitrophenylhydrazine were synthesized using an environmentally friendly grinding technique and subsequently condensed with various aromatic aldehydes to yield Schiff bases with high yields. All synthesized compounds were purified and characterized by infrared (IR) spectroscopy. In-silico screening using PASS online and molecular docking studies (AutoDock 4.2, targeting dihydrofolate reductase) indicated promising anti-tubercular activity for the derivatives, with docking scores superior to the reference compound PABA. Further, *in-vitro* biological assays using the microplate Alamar Blue method (MABA) demonstrated that all four compounds exhibited significant activity against Mycobacterium tuberculosis H37Rv strain, with minimum inhibitory concentrations comparable to standard drugs. The study concludes that these Schiff base derivatives are promising candidates for anti-tubercular drug development, supporting further investigations into their structure-activity relationships and therapeutic potential.

**Keywords:** Green chemistry, Schiff base derivatives, Anti-tubercular activity, Grinding technique, PASS online, Molecular docking, Infrared spectroscopy (IR), Microplate Alamar Blue assay (MABA), Dihydrofolate reductase, Para-amino benzoic acid (PABA), Synthesis and characterization, In-silico screening

**CH-18**

**EFFECTIVE CANCER THERAPY THROUGH GRAPHENE OXIDE-BASED MAGNETIC NANOCOMPOSITES**

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Breast cancer remains one of the leading causes of cancer-related mortality worldwide, requiring the development of innovative therapeutic strategies with high selectivity and low systemic toxicity. The large surface area, functionalization, and biocompatibility of graphene oxide make it a suitable nanocarrier for targeted drug delivery. This study synthesized a graphene oxide-based magnetic nanocomposite (GO-MNC) and thoroughly evaluated its therapeutic effectiveness against breast cancer. The addition of magnetic nanoparticles to Graphene oxide improved its stability, drug-loading capacity, and ability to be guided by an external magnetic field. Extensive *in vitro* cytotoxicity tests using MCF-7 breast cancer cells demonstrated that the nanocomposite




ISBN: 978-81-980623-8-3

exhibited greater anticancer activity than the free drug, characterized by enhanced cellular uptake, sustained drug release, and induction of apoptosis. Furthermore, the GO-MNC demonstrated excellent biocompatibility in normal cell lines, confirming its selective action on tumor cells. The combined magnetic responsiveness and GO's functional structure further support its potential in hyperthermia-assisted therapy. Overall, the results indicate that GO-MNC is a versatile nanoplatform capable of delivering minimally invasive, targeted, and effective breast cancer treatment, marking a significant step forward in the clinical translation of graphene-based nanomedicine.

**Keywords:** Graphene Quantum Dots, Nanotechnology, Cancer, Drug Delivery System

**CH-19**

## AN INSIGHT OF MOLECULAR DOCKING OF BIOACTIVE CONSTITUENTS FROM TINOSPORA SINENSIS (LOUR.) MERR. AGAINST INFLAMMATION AND CANCER.

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Cancer, the uncontrolled growth of cells, is a major cause of death throughout the world. The past century has demonstrated that cancer can be effectively treated with surgery, chemotherapy, and radio therapy have had an important impact on survival. However, once the tumor has metastasized, treatment becomes more complicated. Natural products have well-established anticancer activity with limited side effects. The current study aims to analyze the binding interactions of bioactive molecules of Tinospora sinensis with diverse molecular targets against cancer. A total of 10 phytoconstituents were determined for a range of target proteins such as NFKB1, HS90, and CDK2 through computational docking analysis. Molecular docking study was conducted through Discovery Studio to measure the binding affinity of chosen compounds against target proteins. Ligand structures were retrieved from PubChem, and docking outcomes were analyzed to identify binding energies and interactions. Strong interactions with these proteins were indicated through significant binding affinities. The result revealed that kaempferol possessed the highest binding interaction, followed by astragalin and cianidanol. In conclusion, T. sinensis might provide a promising role as a drug source for the treatment of inflammation and cancer. These results provide a rationale for further *in vitro* and *in vivo* studies to validate their therapeutic potential.

**Keywords**: Tinospora sinensis, bioactive compounds, molecular docking, kaempferol

**CH-20**

## DEVELOPMENT AND VALIDATION OF QUALITY CONTROL PARAMETERS OF AYURVEDIC FORMULATION USED FOR THE TREATMENT OF DIABETES

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Diabetes mellitus is a chronic metabolic disorder marked by persistent hyperglycemia due to impaired insulin secretion or action. The present study was aimed to develop and validate ayurvedic formulation containing Momordica charantia (bitter gourd), Gymnema sylvestre (gurmar), Tinospora cordifolia (guduchi), Syzygium cumini (jamun), Trigonella foenum-graecum (fenugreek), and Curcuma longa (turmeric) However, to ensure therapeutic efficacy, safety, and reproducibility, strict quality control measures are essential. Standardization of Ayurvedic formulations involves pharmacognostical, physicochemical, and phytochemical evaluation. Pharmacognostical studies authenticate raw materials through macroscopic and microscopic features, preventing adulteration. Physicochemical parameters such as pH, ash values, extractive values, and moisture content provide insights into stability and purity. Advanced analytical tools including High-Performance Thin Layer Chromatography (HPTLC), High-Performance Liquid Chromatography (HPLC), and Fourier-Transform Infrared Spectroscopy (FTIR) are used for fingerprint profiling and quantification of bioactive markers like charantin, gymnemic acids, berberine, and curcumin. Safety assessment through microbial load determination, heavy metal analysis, and pesticide residue testing further ensures quality assurance. Establishing robust quality control parameters not only validates the efficacy of Ayurvedic antidiabetic formulations but also strengthens their scientific credibility, supporting integration into evidence-based healthcare. Thus, standardization of plant-based Ayurvedic formulations is indispensable for ensuring patient safety, global acceptance, and bridging traditional knowledge with modern science.

**Keywords:** Diabetes, Quality Control, Validation

**CH-21**

## ANTI-DIABETIC POTENTIAL OF SUBSTITUTED 1, 3-DI ARYL PROPENE-1-ONE DERIVATIVES: AN *IN-VITRO* ACTIVITY AND STRUCTURE–ACTIVITY INSIGHTS

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Diabetes mellitus is a growing, long-term disease and a major global health problem. It is marked by high blood sugar because of problems with insulin, either in how it is made or how it works in the body. Standard medicines work but often cause side effects, can be expensive, and sometimes lose their effect over time. This means there is a need for new treatments. Natural products and their man-made versions are promising sources for new drugs. Chalcones are an important group of natural compounds, widely studied for their strong and varied health effects, including the potential to treat diabetes. They are easy to recognize by their special chemical structure, which helps them react with and affect many biological targets. The present research work aimed to provide a comprehensive exploration of the multifaceted mechanisms through which chalcones exert their anti-diabetic effects. Our analysis highlights their capacity to modulate key metabolic pathways and cellular processes central to the development of Type 2 diabetes. In particular, we discuss their function as agonists of Peroxisome Proliferator-Activated Receptor gamma (PPARγ), a nuclear receptor pivotal in regulating glucose and lipid metabolism. By activating PPARγ, chalcones can enhance insulin sensitivity in peripheral tissues, which is fundamental to effective diabetes management. As part of research work, synthesis of few chalcones have been carried out, and found to possess anti-diabetic activity, the structures were confirmed by HNMR, IR, Mass spectral analysis.

**Keywords:** Anti-diabetic activity, chalcone derivatives, drug resistance.

**CH-22**

## ANTIMALARIAL POTENTIAL OF PYRIDINE-SUBSTITUTED 1, 3-DI ARYL PROPENONE DERIVATIVES: *IN VITRO* ACTIVITY AND STRUCTURE–ACTIVITY INSIGHTS

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Malaria is one of the most devastating parasitic diseases worldwide, caused mainly by Falciparum and transmitted by Anopheles mosquitoes. According to the WHO, more than 241 million cases and 627,000 deaths were reported in 2020, Despite existing therapies, the rapid emergence of multidrug-resistant Plasmodium strains threatens global malaria control efforts. Therefore, there is an urgent need to explore novel molecular scaffolds with high efficacy and distinct mechanisms of action. 1, 3-di aryl propenones (Chalcones), a group of naturally occurring flavonoids such as cajachalcone, licochalcones characterized by their α, β-unsaturated carbonyl bridge connecting two aromatic rings, are known for diverse biological activities including antimicrobial, and anticancer effects. Structural simplicity and ease of chemical modification make chalcones especially attractive for antimalarial drug development. To address drug resistance, we synthesized a series of pyridine-based chalcone Mannich-type derivatives via introduction of amino alkyl substituents into the chalcone framework. Antimalarial activity was evaluated against P. falciparum (sensitive 3D7 and resistant FCR3 strains) and P. knowlesi. Few of the synthesized compounds showed remarkable potency against P. knowlesi, and against P.




ISBN: 978-81-980623-8-3

falciparum 3D7.SAR analysis indicated that secondary amine groups enhanced bioactivity, while methoxy substitution and pyridine group positioning played vital roles in modulating potency. Structural confirmation was achieved using $^{1}$H-NMR, $^{13}$C-NMR, and mass spectrometry. These results identify pyridine-based chalcone Mannich derivatives as promising scaffolds for next-generation antimalarial agents. By overcoming resistance mechanisms, they offer potential to strengthen malaria control strategies. Nonetheless, *in vivo* studies remain essential to establish pharmacokinetics, safety, and therapeutic value.

**Keywords:** Antimalarial activity, chalcone derivative, pyridine substitution, drug resistance.

**CH-23**

**PHYSICOCHEMICAL PROFILING, DRUG-LIKENESS, ADMET PREDICTION, AND COMPUTATIONAL BINDING MODE ANALYSIS OF A THIAZOLE-BENZAMIDE LEAD DERIVATIVE**

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The growing global burden of cancer highlights the direct need for the discovery of novel therapeutic agents for the effective management of the disease. In addition to the therapeutic activity, the physicochemical properties of any drug molecule critically influence its bioavailability, distribution, metabolism, and excretion, and hence its therapeutic efficacy. Therefore, further complete physicochemical profiling of novel synthesized lead molecules are necessary in order to move for further pre-clinical studies. This study mainly investigates the physicochemical profiling, drug likeness, ADMET prediction along with computational binding mode analysis of novel synthesized thiazole-benzamide derivative. The physicochemical profiling including, solubility, log P and log D of lead molecule showed the favorable physicochemical properties of lead molecule along with drug likeness. Moreover, *in silico* prediction of the ADMET indicated the favorable absorption, distribution, metabolism, excretion and lack of toxicity. The molecular docking and molecular dynamics studies was also carried out to understand the binding modes of this lead compound. The molecular docking interaction analysis showed high binding affinity of the lead compound against selected target. Furthermore, molecular dynamics simulation studies revealed the high protein–ligand stability of the lead compound with target.

**Keywords**: Physicochemical properties, ADMET, Molecular docking, Thiazole-benzamide

**CH-24**

**SYNTHESIS, CHEMICAL CHARECTERIZATION AND EVALUATION OF BIOLOGICAL ACTIVITY OF SOME NOVEL INDOLES**

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The aim of this study consists of synthesis, characterization and evaluation of antimicrobial activity of some novel Indole derivatives. The starting compounds 2-(2-oxoindolin-3-ylidene) hydrazinecarbothioamide (5a), 2-(5-chloro-2-oxoindolin-3-ylidene) hydrazine carbothioamide (5b) were prepared from appropriate isatin and thiosemicarbazide in ethanol using piperidine as catalyst. The compounds (5a and 5b) were converted smoothly into their thiazolo derivatives (7a-f) by reacting with substituted phenacyl bromides in ethanolic medium. Whereas the Isatines (1 a-c) were also converted into 2-chloro-N'-(2-oxoindolin-3-ylidene) acetohydrazides (4 a-c) in two steps via the formation of 3-hydrazonoindolin-2-one upon reaction with hydrazine hydrate followed by reaction with chloroacetyl chloride. The Isatines were also converted into 2-benzamido-2-(2-oxoindolin-3-ylidene) aceticacid (2 a-c) upon reaction with benzoyl glycine in the presence of sod.acetate in acetic anhydride medium. From the data of the antimicrobial, it is clearly concluded that the synthesized Indole derivatives were found to be moderate to weak antibacterial agents. Here we have synthesized some novel Indole analogues combining with thiazole with view to get good antimicrobial agents with less toxic and side effects but the synthesized compounds exhibit moderate antimicrobial activity.

**Keywords:** Indole derivatives, antimicrobial activity, Staphylococcus aureus, Enterococcus faecalis, Escherichia coli, and Klebsiella pneumonia, agar well diffusion method.

**CH-25**

**IN-SILICO STUDY OF SEMISYNTHETIC THIOPHENE DERIVATIVES**

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Depression is a complex mental disorder associated with affective, cognitive, and physical symptoms characterized by reduced energy, loss of interest, and motivational symptoms such as anergia and fatigue. Many herbal medicines are known to improve mood and reduce symptoms of depression. The active compounds in these herbs can serve as starting points for designing better drugs. This study explores the in-silico design of semisynthetic derivatives of herbal antidepressant compounds incorporating thiophene moieties to enhance binding with depression-related targets. By adding small chemical changes—such as including a thiophene ring—it is possible to make these compounds work more antidepressant activity. Herbal lead Harmine, curcumin, resveratrol and coumarin were evaluated. Their natural forms were tested using molecular docking against two important proteins: the serotonin transporter (hSERT) and monoamine oxidase-A (MAO-A). They showed great potential *in silico* studies and proved to be good mono-amino oxidase inhibitors and SERT inhibitors. The derivatives showed good docking scores. When thiophene was added, binding strength improved to −8.3 to −9.3 kcal/mol Adding thiophene to active herbal molecules can make them attach more tightly to depression-related targets

**Keywords:** Docking, Thiophene Derivatives, Antidepressant, Herbal Drug

**CH-26**

**ECO-FRIENDLY SYNTHESIS OF α, β -UNSATURATED CARBONYL COMPOUNDS AND THEIR ENHANCED ANTI-OXIDANT POTENTIAL**

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The α, β-unsaturated carbonyl, sulfonyl, and sulfinyl functional groups are key moieties involved in activating the NRF2 signaling pathway. Their α, β-unsaturated structure makes them suitable electrophiles for nucleophilic addition (Michael addition) with the thiol groups of cysteine residues. Chalcones are analogues of benzalacetophenone (BAP), which are naturally occurring polyphenolic ketones characterized by a 1,3-diphenyl-2-propen-1-one scaffold, where two aromatic rings are linked by a three-carbon α, β-unsaturated carbonyl system. These compounds interact with the NRF2/KEAP1 complex, exhibiting a wide range of pharmacological activities, notable structure–activity relationships, and pronounced antioxidant and anti-inflammatory effects. Their ability to modulate this complex expands their therapeutic potential in the management of oxidative stress-related disorders. Among these, sulforaphane and dimethylfumarate are particularly reactive and well-studied. Antioxidants play a crucial role in the prophylactic treatment of cancer, making it increasingly important for researchers to focus on the development of novel and environmentally friendly chalcone derivatives to promote better public health. This research work focuses on synthesizing various chalcones and evaluating the potential antioxidant activities of the synthesized compounds. Several derivatives of α,β-unsaturated carbonyl compounds were prepared, and their antioxidant potential was assessed. The structures were confirmed using HNMR, mass spectrometry, IR spectroscopy, and related techniques. Among these, some compounds exhibited superior antioxidant properties, while others showed moderate activity. Continued research in this area is expected to contribute to the development of novel, enhanced antioxidant drugs.

**Keywords:** α, β-unsaturated carbonyl compounds, Antioxidant activity, HNMR, IR, Mass.


ISBN: 978-81-980623-8-3

**CH-27**

## ANALYTICAL METHOD DEVELOPMENT AND STABILITY ASSESSMENT OF CAMYLOFIN DIHYDROCHLORIDE–FUMARIC ACID CO-CRYSTALS VIA RP-HPLC

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This study aimed to improve the chemical stability of Camylofin dihydrochloride by creating co-crystals with Fumaric acid, a Generally Recognized as Safe (GRAS) co-former recognized for its ability to stabilize active pharmaceutical ingredients (APIs) through non-covalent interactions. We made co-crystals by kneading them together in a 1:3 molar ratio. Then, we made immediate-release tablets by directly compressing them with standard excipients. An RP-HPLC method for indicating stability was created and tested to meet ICH Q2(R1) standards. The method showed great linearity ($R^2 > 0.995$), sensitivity (LOD 0.2 µg/mL; LOQ 0.7 µg/mL), precision (intra- and inter-day %RSD < 1%), and robustness. Forced degradation and ICH-specified long-term (30 ± 2°C/60% RH) and accelerated (40 ± 2°C/75% RH) studies showed that the co-crystal formulation was more stable than the pure drug. A projected shelf life of roughly 8.25 months at room temperature was indicated by the assay values, which gradually decreased from 98.5% to 95.4% under long-term conditions and to 89.9% under accelerated conditions. Degradation occurred according to zero-order kinetics ($R^2 \approx 0.993$). These results show that fumaric acid co-crystallization greatly increases camylofin dihydrochloride's stability. Furthermore, the validated RP-HPLC method supports the drug's use in routine quality assessments and regulatory submissions by guaranteeing accurate monitoring of the drug and its degradation products.

**Keywords:** Camylofin dihydrochloride, Co-crystallization, Stability Indicating RP-HPLC, Stability Studies

**CH-28**

## AMIDE-LINKED AMLODIPINE–ASPIRIN CODRUGS: A NOVEL THERAPEUTIC APPROACH FOR MANAGING HYPERTENSION AND INFLAMMATORY COMORBIDITIES

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The codrug strategy offers an innovative therapeutic approach for comorbid disease management by enhancing patient quality of life while minimizing systemic toxicity, optimizing pharmacokinetics, reducing polypharmacy, and improving patient compliance in elderly. This study presents a comparative evaluation of two novel amide-linked mutual codrugs for addressing HTN and OA comorbidity; ASAM (Aspirin-Amlodipine) and ASAMVL (Aspirin-Amlodipine-Valine), synthesized via one-pot DCC-mediated amidation in inert rection and purified through recrystallization and silica gel chromatography. Structural confirmation was achieved using comprehensive spectroscopic analysis yielding satisfactory results for both compounds. Physicochemical characterization Indicated aqueous solubility with enhanced alkaline solubility and superior organic solvent compatibility compared to parent drugs. Melting point and DSC analyses indicated structural changes due to amide bond formation, with distinct thermal transitions. TLC showed increased lipophilicity via higher Rf values. Membrane protein binding was below 80% for both codrugs. *In silico* ADMET prediction using QikProp software confirmed compliance with Lipinski's rule of five and Jorgensen's rule of three criteria within acceptable violation limits, indicating promising oral bioavailability. Stability studies in various simulated biological fluids (SGF, SIF & 80% Plasma) revealed pH-dependent and enzyme-mediated hydrolysis with extended half-lives, suggesting sustained drug release characteristics. Comprehensive toxicity screening demonstrated safety parameters within established acceptable ranges. Pharmacological evaluation revealed superior anti-inflammatory activity for ASAM (60% Inhibition) compared to ASAMVL (54% inhibition), with both compounds exhibiting significant antihypertensive potential. Gastroprotective studies confirmed reduced gastric toxicity and preserved mucosa, establishing the codrugs as promising candidates with improved efficacy, safety, and pharmacological profiles for managing comorbid conditions.

**Keywords:** Comorbid, spectroscopic, polypharmacy, ADMET, bioavailability, lipophilicity.

**CH-29**

## MOLECULAR DOCKING ANALYSIS OF NATURAL PRODUCT AS ANTIDIABETIC AGENT

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Type-2 diabetes mellitus is a complex metabolic disorder involving multiple therapeutic targets such as carbohydrate-digesting enzymes (α-glucosidase, α-amylase), incretin-degrading enzyme (DPP-4), insulin-signaling negative regulator (PTP1B), and complication-related enzymes (aldose reductase). Natural products provide a chemically diverse pool of scaffolds with significant potential for antidiabetic drug discovery. In present study, an in-silico molecular docking approach was applied to screen twenty plant-derived phytochemicals like epigallocatechin gallate (EGCG), luteolin, berberine, curcumin, piperine, ursolic acid, emodin, salvianolic acids, and betulinic acid etc. against validated antidiabetic protein targets. The docking workflow involved ligand preparation, target selection using experimentally resolved PDB structures, and docking via Auto-Dock software. Predictions were cross-validated with literature-reported docking and *in-vitro* inhibition data. Docking scores were compared with standard and co-crystallized ligand. Docking results consistently identified several promising scaffolds: (i) EGCG and related galloyl-polyphenols (ii) luteolin and other flavones (iii) piperine and 6-shogaol (iv) ursolic acid and betulinic acid (v) emodin. Most prioritized phytochemicals displayed docking scores between –7.5 and –10.2 kcal/mol, indicating stable binding interactions. These findings highlight natural products as promising scaffolds for novel antidiabetic drug development. Experimental validation of these predicted interactions through synthesis and biological evaluation will further support their therapeutic potential.

**Keywords:** Type II Diabetes Mellitus, Antidiabetic agents, Molecular docking, Phytochemicals, Natural Products

**CH-30**

## COMPARATIVE ANALYSIS OF PFAS CONCENTRATIONS IN GROUNDWATER AND SURFACE WATER SOURCES IN BADDI'S INDUSTRIAL ZONES

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Per- and Polyfluoroalkyl Substances (PFAS) are emerging contaminants of concern due to their widespread use and persistence in the environment. The PFAS are originated from man-made products that have been utilized from 19th century. The presence of C-F bond makes them remarkable long lasting, stable and persistent in environment. The PFAS contaminations are growing in environment which is the biggest concerns. Our study aimed to assess the contamination of per- and polyfluoroalkyl substances (PFAS) in drinking water sources in industrial areas Baddi in Himachal Pradesh, India and their risk assessment. The water samples were collected from various drinking water resources across Baddi into the 250 mL polypropylene bottle fitted with a polypropylene screw-cap then shipped and stores the sample at ≤6°C (not frozen) until extraction. The extraction of samples has been done by using manual vacuum SPE manifold. The final extract was adjusted to 1 mL in 96% methanol for analysis as per US EPA 537.1 guidelines. The analysis of the samples was done using Liquid Chromatography Mass Spectroscopy (LC-MS) techniques. In LC-MS firstly, we analyzed standard sample containing PFAS compounds (PFOA and PFOS). For conducting such analysis, the procedure given by US EPA 537.1 was followed. The outcome of this method gave satisfactory results, with LC-MS successfully detecting the expected retention times (RT) and mass peaks


ISBN: 978-81-980623-8-3

for the PFAS standards. Based on the successful analysis of the standard sample of PFAS, the LC-MS method appears to be suitable for detection of water samples. The results revealed levels of PFAS derivatives such as Per-fluoropropylene oxide dimer acid (PFTrDA), Per-fluoro tetradecanoic acid (PFTA), 11-chloro eicosalfluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS), Hexa- fluoropropylene oxide dimer acid (HFPO-DA) in the water samples. Further investigation is in process to carry out for identification and evaluation of the other types of PFAS compounds. The presence of these hazardous compounds may be the one of the reasons for the emerging diseases and healthcare concerns of Baddi population. We acknowledge the funding under Core Research Grant (CRG) Scheme Earth and Atmospheric Division of the Science and Engineering Research Board (SERB), Department of Science and Technology, Govt. of India. (Grant No: CRG/2021/007791) under the project entitled "Initiative to estimate the presence of perfluoroalkyl substances (PFAS) to rivers and ground/drinking water in Himachal Pradesh. Emission and implications for human exposure.

**CH-31**

**COMPUTATIONAL DOCKING STUDY OF ORIENTIA TSUTSUGAMUSHI DEUBIQUITYLASE (OtDUB) AS A POTENTIAL DRUG TARGET IN SCRUB TYPHUS**

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Scrub typhus is caused by the gram-negative bacterium Orientia tsutsugamushi, life-threatening disease with Fatality rates are currently estimated to be between 40% and 45% for patients that are not treated with antibiotics. Scrub typhus can cause meningoencephalitis, myocarditis, acute renal impairment, acute respiratory distress syndrome (ARDS), and disseminated intravascular coagulation. The bacterial deubiquitylase (OtDUB) is a major virulence factor that affects the host protein system (ubiquitin signaling). This promotes the host's intracellular survival and makes it a promising molecular target. In this study, the target is the crystal structure of the deubiquitylase (Orientia tsutsugamushi OtDUB in association with three ubiquitin molecules) of PDB ID-6UPU has a resolution of 2.2 Å, which was obtained from the Protein Data Bank and subjected to molecular docking research using AutoDock Vina. The new FDA-approved antibiotic medications from 2020 to 2025, as well as conventional treatments for scrub typhus, were chosen for this investigation. Several ligands shows a high binding affinity with the catalytic domain of OtDUB, indicating possible inhibitory capabilities. Molecular dynamics simulations and ADMET prediction are currently underway to further validate pharmacokinetic properties and drug likeness. These findings provide a basic foundation for the development of medications that inhibit OtDUB, which aids in the development of focused treatments for scrub typhus.

**Keywords:** Scrub typhus, Orientia tsutsugamushi, Autodock vina, OtDUB, molecular docking, ADMET

**CH-32**

**ADVANCED METHODOLOGIES FOR MODELING PEPTIDE–PROTEIN INTERACTIONS AND THE RATIONAL DESIGN OF PEPTIDE THERAPEUTICS**

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Despite their selectivity and adaptability, peptide therapies have challenges due to the dynamic nature of peptide–protein interactions and limited drug-like qualities in their logical design. The computational and experimental methods for simulating peptide-protein interactions, including molecular docking, molecular dynamics, machine learning techniques, quantum mechanical investigations, and integrative approaches, are reviewed in this article. Rational design techniques in structure-based, sequence-based, fragment-based, and de novo styles, along with advancements in peptidomimetics, have been driving the optimisation of therapeutic peptides at a never-before-seen pace. Edge cutting technologies like high-throughput screening, directed evolution, phage display, microarrays, and *in silico* library design are improving peptide optimisation by making it simpler to tailor drug-like characteristics like stability, bioavailability, membrane permeability, immunogenicity, and targeted delivery. Case studies demonstrate the effectiveness of these state-of-the-art methods in the creation of cells-penetrating medications, peptide inhibitors, enzyme binders, antimicrobials, and vaccines. Artificial intelligence, computational developments, creative experimental techniques, and the promise of combination therapy and personalised medicine are driving the rapid speed of the research. The future of peptide medicines is being reshaped by persistent innovation, despite ongoing difficulties.

**Keywords:** Peptide therapies, Peptide–protein interactions. Molecular docking, Molecular dynamics, Peptidomimetics, Drug-like properties, Phage display, Cell-penetrating peptides, Peptide inhibitors, Artificial intelligence

**CH-33**

**MOLECULAR DOCKING ANALYSIS OF DISEASE-MODIFYING ANTIRHEUMATIC DRUGS (DMARDS) TARGETING GAUCHER'S SYNDROME INFLAMMATORY PATHWAYS**

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Gaucher's syndrome is a lysosomal storage disorder occurring from mutations in the GBA gene, leading to insufficient β-glucocerebrosidase activity and an accumulation of glucosylceramide. This storage disease triggers persistent inflammatory pathways, including NLRP3 inflammasomes and NF-κB signalling, which leads to systemic complications such as hepatosplenomegaly, a bone crisis, cytopenia, pulmonary disease, and neurological involvement. Current treatments, such as enzyme replacement and substrate reduction, are not highly effective for inflammation and are quite expensive. Disease-Modifying Anti-Rheumatic Drugs (DMARDs), known for their ability to alter immune responses, provide a distinctive repurposing potential for Gaucher's disease. This study used Autodock Vina for molecular docking to examine the interactions of particular DMARDs with inflammation-related targets, including NLRP3 (PDB ID: 7PZC) and NFκB signaling proteins (PDB ID: 4KIK). Docking studies showed that these ligands had favorable binding affinities with key residues of the catalytic and regulatory domains, suggesting that pro-inflammatory cytokine release (IL-1β, IL-6, and TNF-α) may be inhibited. This study's findings suggest that repurposing DMARDs may serve as an additional treatment strategy to enhance ERT or SRT, hence targeting the inflammatory and metabolic aspects of the condition.

**Keywords:** Gaucher's syndrome, DMARDs, NLRP3, NF-κB, inflammation

**CH-34**

**METHOD DEVELOPMENT, VALIDATION, PROFILING OF METALS IN NATURAL PRODUCTS BY INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY (ICP- MS)**

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The analytical method developed for the determination of elemental impurities in Ayurvedic Cream by using Inductively Coupled Plasma Mass Spectrometry (ICP-MS). The method is precise, linear, accurate, selective and sensitive for the determination of class-1 and class-2A metals lead (Pb), Arsenic (As), Mercury (Hg), Cadmium (Cd) and Chromium (Cr) in Ayurvedic Product. Elemental impurities are classified into three categories as per ICH guidelines. Class 1: Arsenic, Mercury, Lead and Cadmium, Class-3: Chromium. The elemental impurities are genotoxic in nature, hence as per ICH guideline Q3D have control limit base on its risk assessment and considered for analysis. The analytical method is having the capability to detect the elemental impurities as 0.007ppm Pb, 0.007ppm As, 0.003ppm Cd, 0.006ppm Hg, 0.065ppm Hg. The analytical method found to be linear with working concentration of 3.0ppm Pb, 16.0ppm As, 8.0ppm Cd, 14.0ppm Hg, 3.1ppm Cr with correlation coefficient 0.9997 Pb, 0.9997 As, 0.9999 Cd, 0.9983 Hg and 1.000 Cr. The % recoveries of impurities at different concentration with spiking in samples were found in acceptable range 80% to 110%. The method was precise and robust and its RSD was below 15%. Therefore, the developed




ISBN: 978-81-980623-8-3

method can use for quantitative determination of elemental impurities in Ayurvedic Product.

**Keywords:** Elemental Impurities, Ayurvedic Cream, Inductively Coupled Plasma Mass Spectrometry.

**CH-35**

## DEVELOPMENT OF STABILITY INDICATING ANALYTICAL METHODS FOR ESTIMATION OF CYCLOBENZAPRINE

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Cyclobenzaprine act as muscles relexant activity. A simple, selective and accurate stability indicating High-Performance Thin-Layer Chromatographic and Reverse Phase High-performance liquid chromatographic method was developed and validated for estimation of cyclobenzaprine hydrochloride in bulk drug and tablets according to ICH guidelines. Chromatographic separation of the drug was performed on aluminium plates precoated with silica gel 60 F254 as the stationary phase and the solvent system consisted methanol: triethylamine (9.0: 0.9: 0.1 v/v/v). Densiometric evaluation of the separated zones was `1performed at 290 nm and the method was validated. The Rf values and drug content of 0.3638 and 99.72% respectively. The calibration curve was found to be linear in the concentration range 10-1000 ng/ml. The linear regression curve was found to be Y-292.955 by height and Y-1844.367 by area. Limit of detection and limit of quantitation were found to be 23.89, 1.69 ng/ml 79.66, 5.39ng/ml by height and area respectively. The develop method was found to be precise as the % RSD values for system, intraday and interday precision studies were 0.4962, 0.4703, 0.8203 respectively. The RP-HPLC analysis was carried out in order to reduce analysis time and maintaining good efficacy on high-speed separations. The method was developed using column thermo ODS C18 / 5µm /150x4.5mm with mobile phase consisting of a mixture of Acetonitrile: Methanol: Ammonium acetate buffer (43:32:25(v/ v/v). The retention time under optimized conditions was found to be 5.2 min with sharp symmetrical peak. The method was validated as per ICH Q2(R2) guidelines for parameter such as accuracy, precision, robustness, ruggedness. An excellent linearity was observed in the concentration range 1-20ug/ml cyclobenzaprine with regression coefficient (r2) value of 0.998. Average recovery was found to be 98.92 ± 0.7186. The LOD and LOQ was found to be 0.0602 ug/ml 5. Linearity and range 0.1826 µg/ml. No interference was observed from excipients, confirming the method's specificity. The study shows that the developed method is simple and accurate. It can be suitable for the determination of Cyclobenzaprine Hydrochloride in bulk and tablet dosage form.

**Keywords:** Cyclobenzaprine, HPTLC, HPLC, LOQ, LOD, Retention factor, TLC chamber

**CH-36**

## COMPREHENSIVE METABOLOMIC FINGERPRINTING AND STANDARDIZATION OF CURCUMA CAESIA RHIZOMES VIA GC-MS

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Curcuma caesia Roxb., locally known as "Kola Halodhee" in Assamese, is a medicinally significant plant of the Zingiberaceae family. Its rhizomes have been traditionally used in treating various ailments due to their rich phytochemical composition and therapeutic potential. The present study aimed to extract, standardize, and analyze the metabolite composition of C. caesia rhizomes using Gas Chromatography-Mass Spectrometry combined with multivariate statistical analysis. Fresh rhizomes were collected, washed, shade-dried, and lyophilized for 24 h. Approximately 40 mg of lyophilized rhizome powder was extracted using 500 µL n-methanol, vortexed for 3 min, and subjected to overnight shaking (15 h) at room temperature. After centrifugation (9000 rpm, 4 °C, 10 min), 200 µL of supernatant was dried overnight in a desiccator. Methoximation was performed with 40 µL methoxyamine-HCl (20 mg/mL in pyridine) at 30 °C for 90 min, followed by derivatization using 20 µL N-trimethylsilyl-N-methyl trifluoroacetamide (MSTFA) at 30 °C for 90 min. GC-MS analysis was conducted on an EB5-MS capillary column under splitless mode, using helium as the carrier gas. Metabolites were identified via the NIST library (≥85% similarity). Data were normalized, log-transformed, and analyzed using Partial Least Squares Discriminant Analysis (PLS-DA) via MetaboAnalyst 4.0, with statistical significance tested using GraphPad Prism (v7). GC-MS profiling revealed diverse bioactive metabolites, including phenolics, terpenoids, flavonoids, curcuminoids, fatty acids, and alkaloids. Standardization confirmed curcumin, demethoxycurcumin, and bisdemethoxycurcumin as key biomarkers. This study provides a comprehensive metabolomic fingerprint of C. caesia, underscoring its potential as a rich source of therapeutic phytochemicals.

**Keywords:** Metabolite profiling, phytochemical standardization, PLS-DA, Black turmeric

**CH-37**

## METHOD DEVELOPMENT FOR THE DETERMINATION OF RELATED SUBSTANCES IN THE TENOFOVIR DISOPROXIL FUMARATE BY USING RP-HPLC.

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The method was optimised after experimenting many trails, all related substances were well separated in the presence of drug substance. The optimised method was done with column YMC, ODS AQ 250 × 4.6mm, 5 µm, pack of ingredient pump mode with flow rate of 1.2ml/min with injected volume 10µl with retention time of 60 min. This method was validated by using all parameters like specificity, accuracy, precision, LOD&LOQ, linearity, robustness etc. It is evident that all impurities and Tenofovir disoproxil are well separated from each other. The method was linear for the determination of related substances because the correlation coefficient for all the related substances and drug substance was NLT 0.999. It is also clear that the method is precise and accurate. It is evident that slight changes in flow rate, column temperature, buffer, pH do not have significant impact on the results confirming the method is robust. The mobile phase and solution are stable for Tenofovir and Adenine up to 48hrs.The batch analysis of 3 consecutive batches is within the specification. The review of above data indicates that the method is validated and can be used for routine analysis of tenofovir disoproxil fumarate batch release for related substances.

**Keywords:** Tenofovir disoproxil, Adenine, related substances, YMC, ODS AQ column

**CH-38**

## *IN SILICO* MOLECULAR DOCKING ANALYSIS OF PHOSPHINE SULPHIDE DERIVATIVES AS ANTI-ALZHEIMER'S AGENTS

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Alzheimer's disease (AD) is the most prevalent neurodegenerative disorder characterized by progressive cognitive decline, memory impairment, and neuronal loss. Approximately 57 million people worldwide were living with dementia in 2021, with over 60% residing in low- and middle-income countries. Current therapies provide only symptomatic relief, thereby requiring the development of novel therapeutic agents targeting multiple pathological pathways. In the present work, novel phosphine sulphide derivatives incorporating thiazole and piperazine moieties, (4-(2-aminothiazol-4-yl)phenyl)(4-(piperazin-1-yl)phenyl)(phenyl)phosphine sulfide), were designed and evaluated for their potential as anti-Alzheimer's agents. Sulphur bioisosteres were selected to improve lipophilicity and metabolic stability, while the piperazine nucleus was introduced for its reported ability to inhibit amyloid-β (Aβ) aggregation and scavenge reactive oxygen species. The designed molecules were subjected to Lipinski's rule-based drug-likeness evaluation and molecular docking studies using acetylcholinesterase (AChE), with PDB ID: 4EY7. Docking analysis revealed that several derivatives exhibited favorable binding affinities compared with co-crystallised ligand and standard acetylcholinesterase inhibitor donepezil. The best-scoring compound demonstrated a binding energy of –12.36 kcal/mol (for m-$NO_2$ derivative). Other derivatives also exhibited significant docking score within the range from –9.63 to –12.36 with interaction at the active site, supporting their potential




ISBN: 978-81-980623-8-3

cholinesterase inhibitor activity. These findings highlighted phosphine sulphide–based heterocyclic hybrids as promising scaffolds for further synthesis, characterization, and pharmacological evaluation in the development of novel anti-Alzheimer's agents.

**Keywords:** Alzheimer's Disease, Dementia, Antialzheimer agent, Acetylcholinesterase inhibitors, Molecular docking

**CH-39**

**STABILITY INDICATING RP-HPLC METHOD FOR SIMULTANEOUS ASSAY OF ATOLTIVIMAB, ODESIVIMAB AND MAFTIVIMAB IN A COMBINED PARENTERAL DOSAGEFORM**

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The present study describes a validated reverse-phase high-performance liquid chromatography (RP-HPLC) method for the simultaneous quantification of Atoltivimab (ALT), Maftivimab (MFT), and Odesivimab (ODE) in the Inmazeb® injection formulation. Chromatographic separation was achieved on an Inertsil column using an isocratic mobile phase of sodium bisulfate and acetonitrile (50:50, v/v) at a flow rate of 1.0 mL/min. Detection was performed at 236 nm. The retention times (RT) for ALT, MFT, and ODE were approximately 2.7, 3.9, and 6.2 minutes, respectively. The method exhibited linearity over the concentration range of 8.33–25 µg/mL for all three analytes. The limits of detection (LOD) were 0.050 µg/mL (ALT), 0.100 µg/mL (MFT), and 0.088 µg/mL (ODE), while the limits of quantification (LOQ) were 0.185 µg/mL, 0.333 µg/mL, and 0.293 µg/mL, respectively. The developed RP-HPLC method provides a simple, accurate, and sensitive approach for routine quality control analysis of Inmazeb® injection.

**CH-40**

**COMPREHENSIVE OVERVIEW ON ANALYTICAL ESTIMATION OF SODIUM [NA] GLUCOSE COTRANSPORTER-2 INHIBITORS [SGLT2]**

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Sodium-Glucose Cotransporter-2 (SGLT2) inhibitors, including dapagliflozin, canagliflozin, and empagliflozin, represent a novel class of oral antidiabetic agents that lower blood glucose by inhibiting renal glucose reabsorption. Due to their therapeutic significance in the management of type 2 diabetes mellitus and associated cardiovascular and renal benefits, precise and reliable analytical methods for their estimation are essential in both pharmaceutical formulations and biological matrices. A wide range of techniques such as UV-visible spectrophotometry, high-performance liquid chromatography (HPLC), ultra-performance liquid chromatography (UPLC), liquid chromatography–mass spectrometry (LC–MS), and capillary electrophoresis have been employed for their quantification. This comprehensive overview highlights method development, validation parameters, and sensitivity aspects across different analytical approaches. The review also emphasizes regulatory considerations, challenges in simultaneous estimation, and advances in hyphenated techniques that enhance accuracy and specificity. Such analytical insights are critical not only for routine quality control but also for pharmacokinetic, bioequivalence, and therapeutic drug monitoring studies, thereby ensuring safe and effective use of SGLT2 inhibitors.

**CH-41**

**GC-MS BASED PHYTOCHEMICAL ANALYSIS AND ANTIDIABETIC EFFICACY OF ARTOCARPUS HETEROPHYLLUS EXTRACT IN STREPTOZOTOCIN-INDUCED DIABETIC WISTAR ALBINO RATS**

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This study investigated the antidiabetics of an aqueous extract from unripe Artocarpus heterophyllus (jackfruit). The research employed both in-vitro and in-vivo methods. Initial phytochemical screening confirmed the presence of alkaloids, tannins, and phenols, while a DPPH assay assessed the extract's antioxidant capacity. For animal study, Wistar albino rats were used, with diabetes induced by a single dose of streptozotocin. The rats were divided into six groups, including a control, a disease control, a standard drug-treated group, and groups receiving low, medium, and high doses of the jackfruit extract over a 21-day period. Blood glucose levels were monitored weekly. The findings demonstrate that the jackfruit extract exhibits promising antidiabetic activity, likely due to its rich phytochemical composition, which supports its historical use in traditional medicine.

**Keywords:** Anti-diabetic, Artocarpus heterophyllus, Streptozotocin, Phytochemical constituents, Lower sugar level, DPPH, GCMS.

**CH-42**

**A COMPREHENSIVE OVERVIEW ON ANALYTICAL ESTIMATION OF SODIUM (NA) GLUCOSE CONTRANSPORTER-2 INHIBITORS**

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Sodium-glucose cotransporter-2 (SGLT-2) inhibitors have emerged as a promising class of antidiabetic agents for the treatment of type 2 diabetes mellitus. Ertugliflozin, bexagliflozin and ipragliflozin are three such SGLT-2 inhibitors that have gained significant attention in recent years. This comprehensive overview focuses on the analytical estimation of these three drugs, highlighting their chemical structures, mechanisms of action, and pharmacokinetic profiles. The review also provides an in depth analysis of various analytical methods, including chromatography, spectroscopy, and mass spectrometry, that have been developed and validated for the estimation of ertugliflozin, bexagliflozin and ipragliflozin in pharmaceutical formulations and biological samples. The analytical methods discussed in this review are crucial for ensuring the quality, safety, and efficacy of these drugs, and will aid in the development of new formulations and therapeutic strategies for the management of type 2 diabetes.

**CH-43**

**FORCED DEGRADATION STUDIES AND CHARACTERIZATION OF DEGRADATION PRODUCTS OF AMLODIPINE BESYLATE**

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Amlodipine Besylate, a widely prescribed calcium channel blocker, is highly susceptible to environmental and stress-induced degradation, making its stability evaluation crucial for ensuring therapeutic efficacy and patient safety. The present work focuses on comprehensive forced degradation studies of Amlodipine Besylate under acid, base, oxidative, thermal, and photolytic conditions, in accordance with ICH guidelines. Degradation pathways were systematically elucidated using advanced analytical techniques, including HPLC, UV–Vis spectroscopy, and mass spectrometry, enabling precise identification and structural characterization of major degradation products. The study revealed distinct degradation profiles under different stress conditions, highlighting oxidative and alkaline environments as the most critical factors for drug instability. Structural elucidation of degradation products provided mechanistic insights into the breakdown of the dihydropyridine moiety, thereby contributing to a deeper understanding of Amlodipine's chemical behavior. The findings not only strengthen the stability-indicating analytical methods for routine quality control but also hold regulatory significance in defining appropriate storage conditions, shelf-life specifications, and impurity limits. This work underscores the importance of degradation profiling as an integral component of pharmaceutical development, bridging the gap between analytical research and regulatory compliance.

**Keywords:** Forced degradation studies, analytical techniques, characterization, HPLC, TLC, NMR, MS.

**CH-44**

**SYNTHESIS, IN-SILICO AND *IN-VITRO* ANTICANCER ACTIVITIES OF NOVEL PYRIMIDINE, OXAZINE AND THIAZINE DERIVATIVES**


ISBN: 978-81-980623-8-3

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The main aim and objective of the study is to synthesize and characterize novel pyrimidine, oxazine and thiazine derivative and to understand the in-silico and *in-vitro* anticancer activities of the above-mentioned derivatives. The synthesis take place in two steps – 1) Synthesis of heterocyclic chalcones using Claisen Schmith condensation method; 2) The chalcones upon reaction with urea and thiourea respectively gives pyrimidine, oxazine and thiazine derivatives. The synthesized compounds were confirmed by the physical (melting point, solubility and Thin Layer Chromatography) and spectral (InfraRed spectroscopy) characterization. Molecular docking studies were carried out for anticancer activity on Liganded X-ray structure of Cyclin dependent kinase 6 (CDK6) (PDB ID: 4AUA) and β-cell lymphoma 2, Human BCL-2, Isoform 1 (PDB ID: 1G5M). The selected compound after docking were studied for short term in–vitro Cytotoxicity using Dalton's Lymphoma Ascites Cells (DLA) by Trypan Blue Exclusion Method. The synthesized compounds were characterised and undergone in-silico biological screening for anticancer activities. In the in-silico anti-cancer study the oxazine derivative oc2 and oc3 showed highest binding affinity against the standard drug Ribociclib. Three compounds pc7, oc8 and tc8 where given for *in-vitro* study. When comparing the 3 derivatives the pyrimidine derivative (pc7) is showing higher activity. The pc7 compound shows about 43% inhibition at a concentration of 200 µg/ml which proves pc7 is showing moderately good antineoplastic focuses on generating novel heterocyclic derived less toxic and cheaper antioxidant cum anticancer drugs with the help of in-silico activity. This pyrimidine derived drugs, up on processing further can replace the resistant drug category and provide efficient and cheaper therapy for cancer treatment with enhanced antioxidant content in body.

**Keywords:** Pyrimidine, Oxazine, Thiazine, in-silico, Anti-cancer activity.

**CH-45**

## COMPUTATIONAL MODELLING AND PHARMACODYNAMIC PROFILING OF AZADIRACHTIN AGAINST TGF-B1 MEDIATED LIVER FIBROSIS

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Liver fibrosis, a hallmark of chronic hepatic injury, is orchestrated by transforming growth factor-beta 1 (TGF-β1)–driven activation of hepatic stellate cells (HSCs), culminating in excessive extracellular matrix deposition. This study investigates the anti-fibrotic efficacy of azadirachtin, a limonoid from Azadirachta indica, through integrated computational modelling and *in vivo* pharmacodynamic profiling in a carbon tetrachloride ($CCl_4$)-induced murine model of liver fibrosis. *In silico* docking revealed strong binding affinity of azadirachtin to the TGF-β1 receptor complex (TGFBR1/TGFBR2), with a binding energy of −9.4 kcal/mol. Molecular dynamics simulations confirmed stable ligand-receptor interactions over 100 ns, while ADMET predictions indicated favourable pharmacokinetics and low toxicity. These computational insights guided the *in vivo* study design. Male Wistar rats (n=30) were randomized into five groups: control, $CCl_4$-induced fibrosis, and three azadirachtin-treated cohorts (low, medium, high dose: 10, 20, 40 mg/kg). Azadirachtin was administered orally for 28 days post-fibrosis induction. Biochemical assays showed significant reductions in serum ALT, AST, and hydroxyproline levels ($p < 0.01$) in treated groups. Histopathological analysis revealed marked attenuation of fibrotic architecture, with reduced collagen deposition and α-SMA expression, confirmed via Masson's trichrome staining and immunohistochemistry. These findings substantiate azadirachtin's therapeutic potential in mitigating TGF-β1–mediated liver fibrosis through dual receptor-level inhibition and transcriptional modulation. The study underscores the translational relevance of combining computational modelling with animal pharmacodynamics for natural product–based antifibrotic drug development.

**Keywords:** Liver fibrosis, Azadirachtin, TGF-β1 signalling, Hepatic stellate cells.

**CH-46**

## ANALYTICAL STUDY OF HERBAL FORMULATIONS

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Most of the people preferred herbal preparations for various diseases and disorders globally. The standardisation of such herbal preparations is required to validate the claims. Different modern analytical methods such as chromatographic, spectroscopic etc. are used for the standardisation of herbal extracts and herbal formulations. RP- HPLC method was explored for standardisation of the extract and herbal formulations i.e. Saptarangi plus Kadha and Saptarangi Tablets in the present study. HPLC method was developed and validated for the standardisation of extract and herbal formulations i.e. Saptarangi plus Kadha and Saptarangi Tablets. RP-HPLC isocratic method was developed for SAL using JASCO (LC4000) System, 4010 diode array detector, YMC-Pack Pro C-18, (250 mm × 4.6 mm, 3 µm) column, software (Crome-Nav 2), data integration at 254 nm was achieved. Water: ACN (30:70 v/v), mobile phase, pH adjusted to 3 with orthophosphoric acid at flow rate of was 1 ml/min was used. HPLC method was validated in terms of linearity, precision, accuracy, specificity, sensitivity and robustness according to ICH guidelines. The linearity was observed over the concentration range of 10-50 µg/ml at 254 nm with R2 0.995 for mangiferin (MAN). The results of assay were found close to 100 %. The method precision (inter-day and intra-day) was determined using six - independent test solutions and % RSD was found <2. Assay method was evaluated with the recovery of the standards. Three different quantities (80 %, 100 % and 120 %) of the standards were added to pre-analyzed formulation and were analyzed by using the developed HPLC method. The results of recovery found close to 100 % confirms accuracy of the method. The accuracy and reproducibility is evident from the data as results are good and standard deviation is low. The result of precision and recovery shows that the methods are precise and accurate. The values of Limit of Detection (LOD) and Limit of Quantification (LOQ) were calculated and method were found to be sensitive. RT of standard in chromatograms of extracts and herbal preparations matches perfectly.

**Keywords:** Standardisation, Saptarangi plus Kadha, Saptarangi Tablets, HPLC, herbal formulation

**CH-47**

## QSAR MODEL BUILDING ON ANTIOXIDANT ACTIVITY OF TRYPTOPHAN AND TRYPTAMINE INDOLE DERIVATIVES

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Oxidative stress, a key outcome of chronic inflammation, contributes significantly to the pathogenesis of various diseases. Antioxidants mitigate oxidative damage by neutralizing free radicals and reactive oxygen species (ROS). Indole derivatives, including tryptophan and tryptamine analogues, have shown notable antioxidant potential. In this study, Quantitative Structure–Activity Relationship (QSAR) models were developed to evaluate and predict the antioxidant activity of 18 selected indole derivatives. Physicochemical descriptors were calculated using Chem Master 1.1, and ADME properties—including gastrointestinal absorption, blood–brain barrier permeability, solubility, and cytochrome enzyme inhibition—were predicted via Swiss ADME software. Four multiple linear regression models were constructed and statistically validated using regression coefficient ($R^2$), root mean square error (RMSE), mean absolute error (MAE), and cross-validation metrics. Among them, Model 3 demonstrated the highest correlation and predictive accuracy, establishing it as the most reliable. Compounds 8, 9, 13, and 14 exhibited superior antioxidant activity, highlighting their potential as therapeutic agents. These findings underscore the utility of QSAR modeling as an efficient computational tool in drug discovery, with future work aimed at extending the approach to 3D-QSAR and molecular dynamics simulations for deeper mechanistic insights.




ISBN: 978-81-980623-8-3

**Keywords:** QSAR (Quantitative Structure-Activity Relationship), Antioxidant activity, Indole derivatives, Oxidative stress, Drug discovery

**CH-48**

## MOLECULAR MODELLING, SYNTHESIS, BIOLOGICAL EVALUATION OF SOME NOVEL SCHIFF BASES

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In light of the increasing antimicrobial resistance, several novel antimicrobial drugs have been developed to treat microbial infections. In order to explore the antimicrobial potential of benzene sulphonic acid derivatives, we have created novel hybrid pharmacophoric scaffold contain Schiff bases linkage in this study by applying bioisosteric replacement structural modification approach. The designed novel pharmacophoric scaffold acted as template to design several novel Schiff bases of benzene sulphonic acid. Several Schiff bases having drug-likeness is predicted by Lipinski parameters. Antifungal potential of Schiff bases evaluated against sterol 14-demethylase (CYP51) of Candida albicans suggest intense network interactions with free energy of binding ranges from -5.30 Kcal/Mol to -2.96 Kcal/Mol. The microwave assisted synthesis of top Schiff bases have resulted practical yield ranging from 60 to 92 percent. Invitro antifungal evaluations of Schiff bases confirm that HAT75 have two-fold higher minimal inhibitory concentration (250 µg/ml). Whereas Schiff bases HAT29, HAT52, HAT92 and HAT70 are having same inhibitory potential (500 µg/ml) as that of standard drug griseofulvin. *In vitro* antibacterial evaluation of synthesized Schiff bases indicates that their antibacterial activity is moderate compared to standard chloramphenicol. The HAT75 who shown excellent antifungal and moderate antibacterial activity. The current study will be a rational attempt to use conventional laboratories facilities, publicly accessible computer-aided drug design and discovery platforms, to find novel antimicrobial agents.

**Keywords:** Antimicrobial agents, Antifungal activity, Antibacterial activity,Molecular Docking, Benzene Sulphonic acid, Schiff base

**CH-49**

## METHOD DEVELOPMENT AND VALIDATION OF ETIFOXINE HYDROCHLORIDE BY USING UV SPECTROPHOTOMETER

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A simple, accurate, precise, and cost-effective UV spectrophotometric method was developed and validated for the estimation of Etifoxine Hydrochloride in its pharmaceutical capsule dosage form. The drug exhibited maximum absorbance (λmax) at 255 nm when scanned in the UV region, which was selected as the analytical wavelength for quantification. The method was validated in accordance with ICH Q2(R1) guidelines, assessing key parameters such as linearity, accuracy, precision, robustness, limit of detection (LOD), and limit of quantitation (LOQ). The calibration curve was found to be linear within the selected concentration range, with correlation coefficient values indicating excellent linearity. Accuracy studies were carried out through recovery experiments and showed satisfactory results, confirming the reliability of the method. Precision studies, both intraday and interday, revealed minimal variation, ensuring reproducibility. Robustness was confirmed by making deliberate small changes in analytical conditions, without significant impact on the results. LOD and LOQ values demonstrated the sensitivity of the method. UV-visible spectrophotometry, which measures the absorption of radiation in the ultraviolet (190–390 nm) and visible (390–800 nm) regions by analytes in solution, proved to be a simple yet powerful tool for this analysis. The proposed method is not only economical and time-saving but also highly suitable for routine quality control and analytical applications in the pharmaceutical industry, ensuring accurate quantification of Etifoxine Hydrochloride in capsule formulations.

**Keywords:** Etifoxine Hydrochloride, UV spectrophotometry

**CH-50**

## SYNTHESIZE AND CHARACTERISATION OF CHITOSAN DERIVATIVES AND EVALUATE FOR CURCUMIN LOADED IN SITU GEL FORMULATION

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In situ gel formulations are the advanced drug delivery approch in which formulation undergo sol-gel transition after administration at the site of action. This transformation is triggered Physioogical conditions such as pH,temperature ,Ionic strength and uv radiation. In situ gel forming tablets constitute a novel strategy in oral drug delivery. Demonstrating significant potential to enhance drug solubility while providing sustained & controlled release synthesize profile.The objectives are to synthesize and characterise chitosan derivatives and evaluate as curcumin loaded In Situ gel formuation. The synthesised of N- palmitoyl chitosan was carried out by using palmitoyl chloride and characterization was carried out by FTIR, DSC & X-ray Diffraction crystallography reveals successful attachment of palmitoyl group to chitosan. Curcumin loaded in chitosan and N-palmitoyl chitosan and evaluated for drug loading and swelling index. Curcumin loaded N-palmitoyl chitosan was showed significant swelling than chitosan. Tablets were formulated by using plane curcumin, loaded N-palmitoyl chitosan and chitosan. Evaluation of prepared tablet including hardness, thickness, disintegration time were meet the standanrd. *In vitro* dissolution studies were conducted using phosphate buffer (pH 6.8), the cumulative % drug release from plane curcumin tablet was 98.92%, curcumin loaded chitosan tablets showed 96.28%, while curcumin loaded N-palmitoyl chitosan tablets more sustain the relased of 72.48% in 6 hr 30 min. The modification significantly enhanced In-Situ gel-forming ability and modulated drug releases.

**Keyword:** Chitosan, Curcumin, Palmitoyl Chitosan, In Situ gel, Sustained Release.

**CH-51**

## A NEW ANALYTICAL RP-HPLC METHOD DEVELOPMENT AND VALIDATION FOR THE ESTIMATION OF NILUTAMIDE IN BULK FORM AND MARKETED PHARMACEUTICAL DOSAGE FORM

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A rapid and precise reverse phase high performance liquid chromatographic method has been developed for the validated of Nilutamide, in its pure form as well as in tablet dosage form. Chromatography was carried out on a Symmetry C18 (4.6 x 150mm, 5µm) column using a mixture of Methanol and water (45:55% v/v) as the mobile phase at a flow rate of 0.8ml/min, the detection was carried out at 260nm. The retention time of the Nilutamide was 2.379 ±0.02min respectively. The method produce linear responses in the concentration range of 24-120mg/ml of Nilutamide. The method precision for the determination of assay was below 2.0%RSD. The method is useful in the quality control of bulk and pharmaceutical formulations. The method was validated for accuracy, precision, linearity, robustness, ruggedness and LOD & LOQ of standard solution. The developed RP-HPLC method was found to be accurate, precise, linear, and robust and was successful applied to a pharmaceutical tablet formulation for qualitative estimation of Nilutamide in Bulk form and Marketed Pharmaceutical Dosage forms.

**Keywords:** Nilutamide, RP-HPLC, Method Development, Validation, Accuracy.

**CH-52**

## DEVELOPMENT AND VALIDATION OF A ROBUST LC-MS/MS ASSAY FOR ABSOLUTE QUANTIFICATION OF NIVOLUMAB IN HUMAN PLASMA: A TOOL FOR PRECISION THERAPEUTIC DRUG MONITORING

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Nivolumab, a fully humanized IgG4 monoclonal antibody, is widely used in cancer immunotherapy. Precise quantification in plasma is essential for therapeutic drug monitoring (TDM) and pharmacokinetic (PK) assessment. Conventional immunoassays, such as ELISA, are limited by




ISBN: 978-81-980623-8-3

cross-reactivity and matrix interference. This study reports the development and validation of a highly specific LC-MS/MS assay for the absolute quantification of nivolumab in human plasma. A surrogate peptide-based strategy was employed. Nivolumab was extracted from plasma by IgG immunocapture, followed by enzymatic digestion. A stable isotope-labeled peptide was used as the internal standard to minimize variability. The peptide ASGITFSNSGMHWVR(AGNS) was selected as the quantifier and monitored in multiple reaction monitoring (MRM) mode (m/z 550.6 → 661.4) on a triple quadrupole mass spectrometer. The assay was validated according to international bioanalytical guidelines. The method exhibited excellent selectivity, reliably differentiating nivolumab-derived peptides from endogenous plasma proteins. Calibration curves demonstrated strong linearity (5–200 µg/mL, $R^2 > 0.99$). Precision and accuracy met acceptance criteria, with intra- and inter-day variation within ±15% for %CV and %RE. Application to patient samples confirmed the method's clinical utility, with measured concentrations consistent with population PK model predictions. The validated LC-MS/MS assay provides a robust, accurate, and reproducible tool for nivolumab quantification in human plasma. This approach offers significant advantages over traditional immunoassays and is well-suited for clinical TDM and PK studies, supporting personalized therapy optimization.

**Keywords:** Nivolumab, LC-MS/MS, Therapeutic Drug Monitoring (TDM), Pharmacokinetics, Monoclonal Antibody Quantification.

**CH-53**

**SIMULTANEOUS ESTIMATION AND DRUG–DRUG INTERACTION STUDY OF EMPAGLIFLOZIN AND LIRAGLUTIDE THROUGH PHARMACOKINETIC APPROACH IN SPIKED HUMAN PLASMA BY LC–-MS/MS.**

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A new rapid, selective and sensitive liquid chromatography-tandem mass spectrometry (LC-MS/MS) method was established and validated for the simultaneous determination of empagliflozin and liraglutide in spiked human plasma. The method was successfully used for pharmacokinetic studies. Empagliflozin D4 and liraglutide D6 were used as deuterated internal standard to ensure accuracy. Plasma samples were preconcentrated by protein precipitation with acetonitrile. HPLC separation was performed on a Waters 2695 HPLC system with high-speed autosampler, column oven, and degasser with a Symmetry C18 column (150 mm 4.6 mm, 3.5 um). Mobile phase was 0.1% formic acid and acetonitrile (30:70, v/v) flowing at 0.8 mL/min. Detection was carried out on a SCIEX QTRAP 5500 mass spectrometer with electrospray ionization (ESI) source, working in positive ion mode and multiple reaction monitoring (MRM) controlled by the Empower-2 program. Method validation was performed in accordance with the USFDA bioanalytical guidelines. The calibration curves were linear for empagliflozin over 8-400 ng/mL and liraglutide over 4-1000 ng/mL. Mean extraction recoveries were high, at 98.240% for empagliflozin, 99.363% for empagliflozin D4, 99.747% for liraglutide and 99.149% for liraglutide D6 at all four QCs.

**Keywords:** Empagliflozin, Liraglutide Pharmacokinetic, quality control, validation.

**CH-54**

**COMPUTATIONAL DESIGN OF SCHIFF BASE DERIVATIVES OF THIADIAZOLES AND DIAZOLES FOR THEIR POTENTIAL AGAINST NSCLC TARGETING PARP1**

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Non-Small Cell Lung Cancer (NSCLC) accounts for over 80% of lung cancer–related deaths and requires reliable biomarkers as well as effective targeted therapies. The PARP1 enzyme plays a crucial role in the pathogenesis of various human cancers, making it a key target for drug development. This study aims to identify novel PARP1 (PDB ID: 4zzz) inhibitors from a library of thiadiazole and diazole derivatives with the potential to inhibit cell proliferation, using a detailed in-silico approach to streamline drug discovery. A series of potential ligands derivatives of thiadiazole and diazoles—as selective PARP1 inhibitors targeting NSCLC were identified through a multi-step computational process, including molecular docking with Glide, ADMET screening with QikProp, and binding free energy calculations using the Prime-MMGBSA module of the Schrödinger suite. The stability of the most promising ligand–protein complex was further validated by a 150 ns molecular dynamics (MD) simulation. The results demonstrated that thiadiazole and diazole derivatives exhibited strong binding affinities, with Glide scores ranging from –8.01 to –11.85 kcal/mol, compared to the standard Niraparib (–8.16 kcal/mol). These lead compounds also showed favorable ADMET profiles and formed stable interactions with critical residues in the PARP1 active site, as supported by their MMGBSA values. The 150 ns MD simulation further confirmed the stability of the top-ranked docking complexes. Overall, this study identified potent thiadiazole- and diazole-based lead candidates for PARP1 inhibition, providing a foundation for further experimental validation and contributing to the advancement of targeted cancer therapies through computational drug discovery approaches.

**Keywords:** PARP1 Inhibitors, NSCLC, Thiadiazoles, Diazoles, In-silico methods

**CH-55**

**DESIGN, SYNTHESIS, AND BIOLOGICAL EVALUATION OF NOVEL FUSED TRIAZINE DERIVATIVES: A MULTI-ACTION APPROACH TOWARD ANTICANCER AND ANTIMICROBIAL THERAPY**

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In this work, Novel Fused Triazine Derivatives were evaluated for their anticancer and antimicrobial activity in the field of pharmaceutical chemistry. A library of structurally diverse compounds was synthesized using established synthetic methodologies. These compounds were then subjected to rigorous screening assays utilizing a wide range of *in vitro* models, including cell lines derived from various cancer types. The results obtained from the screening assays revealed several promising lead compounds, demonstrating potent activity against specific targets involved in cancer progression and proliferation. The objective of this project was to discover new compounds with promising anti-cancer activity by designing a diverse library of compounds based on extensive literature research and SAR studies. The synthesized compounds were purified by recrystallization and column chromatography and characterized using single spot thin-layer chromatography, melting point determination, $^{13}$C-NMR, $^{1}$H-NMR, FT-IR, mass spectral, and elemental analysis studies. The biological screening of anticancer activity, the MTT assay was used to determine the cell proliferation rate, while the SRB assay was used to determine cell density based on cellular protein content. Compound RA20 was found to have potent antiproliferative activity against Vero Cell Line, HaCaT (Psoriatic skin cancer) cell lines, DAL (Dalton ascites carcinoma) cell line, HT-29 (colon cancer) cell line, and MG-63 (osteosarcoma) cell line. RA20 had an overall significant activity and a good binding energy of -7.143 kcal/mol, as observed through GLIDE Module Software. Antimicrobial activity, compound RA6 showed a broad spectrum of activity against all microbial strains tested. Nitro-substituted and chloro-substituted compounds also exhibited high antibacterial activities. For antifungal activity, compounds with para-substitution of methyl, methoxy, ethoxy, and ortho-substituted methyl and methoxy groups showed promising activity against Candida albicans.

**Keywords:** Fused Triazine, anticancer agents, antimicrobial activity, molecular docking, dual-action therapeutics, structure-activity relationship (SAR)

**CH-56**

**DESIGN, SYNTHESIS AND BIOLOGICAL EVALUATION OF PROTAC FOR ITS ANTICANCER ACTIVITY.**

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Prostate cancer is a prevalent disease, affecting one in six men. The androgen receptor (AR) is vital in prostate cancer progression. However, current AR inhibitors like Enzalutamide and Bicalutamide face limitations


ISBN: 978-81-980623-8-3

in targeting undruggable proteins and developing resistance. To overcome these obstacles, PROTACs were introduced. We designed a PROTAC using Enzalutamide and Thalidomide as ligands and N-Boc-1,6-hexandiamine as the linker. Molecular docking (AutoDock 12.3) and molecular dynamics simulations (DESMOND module, Schrodinger) were performed using PDB IDs 7KHL and 7KHH. The synthesis involved four steps including amidation reaction followed by acidification, monitored by melting point, TLC, and IR interpretation. NMR and MASS spectroscopy confirmed the structure. *In-vitro* activity against PC-3, DU-145 and MCF-7 cell lines. Molecular docking revealed dock scores of -10.65 kcal/mol (7KHL) for the PROTAC molecule. Characterization data confirmed its structure: IR spectra displayed N-H stretching bands indicating the amide linkage, NMR spectra showed specific signals validating the presence of 2,6-dioxopiperidine and dimethyl-4-oxo-2-thioxoimidazolidin (Enzalutamide), and mass spectrometry confirmed the molecular weight. *In vitro* studies demonstrated significant anticancer activity of the PROTAC against selected cell lines. The synthesis of enzalutamide-based PROTACs represents a novel and promising approach for targeted protein degradation. Enzalutamide, an androgen receptor inhibitor primarily used in the treatment of prostate cancer, can be utilized as a component in PROTACs to overcome drug resistance and enhance therapeutic efficacy.

**Keywords:** PROTAC, Prostate cancer, Enzalutamide.

**CH-57**

## SYNTHESIS, CHARACTERIZATION, MOLECULAR DOCKING STUDIES, ANTHELMINTIC AND ANTI-CANCER ACTIVITY OF IMIDAZOLE DERIVATIVES.

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Imidazole-5-one scaffold has been predicting in the important synthetic drugs analogs which gave a valuable information for treatment and high binding affinity to the multiple receptors helpful drug development. To synthesize and evaluate the anthelmintic, anticancer and Insilco docking studies of pyrazole contain novel Indole derivatives (4a-4h). In the present work, we intended to the synthesis of pyrazole contain novel Indole derivatives (4a-4h) by conventional method. All the newly synthesized molecules (4a-4h) were characterized by FTIR, 1HNMR and Mass spectral analysis. The compounds 4c and 4f showed high anthelmintic activity compare with Albendazole as standard and the compounds 4b, 4e, 4f and 4g exhibited good anticancer activity against MCF-7 cell line using MTT Assay method, and comparison with Cisplatin as a standard. From the results the IC50 values of all test compounds were found to be between 17.63 -47.79 mM and the compounds 4b, 4e, 4f and 4g exhibited good anticancer activity against breast (MCF-7) cancer cell lines at a concentration of 0.5mg / mL-1. In molecular docking research, dock rankings of all the synthesized derivatives ranged from -5.972 (compound 4h) to -3.127 (compound 4d). It is revealed that Imidazole-5-one derivatives have diverse biological activities and also have a cytotoxic potential to be explored for newer therapeutic possibilities.

**Keywords:** Isatin, Pyrazole, Anthelmintic, Anticancer activities, Molecular Docking.

**CH-58**

## DESIGN, SYNTHESIS, CHARACTERISATION AND BIOLOGICAL EVALUATION OF NOVEL ISATIN PHENOLIC DERIVATIVES

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In the present research, a series of novel isatin phenolic derivatives were synthesized and evaluated for their anticancer and anti-inflammatory activities. The objective of this work was to investigate the structural modifications of the isatin scaffold through phenolic substitution and assess their biological potential. The derivatives (ISPH-A, ISPH-B, and ISPH-C) were synthesized via Sandmeyer's reaction followed by phenolic substitution, and their structures were confirmed using IR, NMR, and mass spectrometry. In-silico molecular docking was performed against cancer-related (3BZI) and inflammation-related (1HNE) protein targets, which predicted strong binding affinities. The compounds were further subjected to *in-vitro* assays, including cytotoxicity studies against Dalton's lymphoma ascites (DLA) cells and protease inhibition assay for anti-inflammatory activity. Among the synthesized derivatives, ISPH-A exhibited the most potent anticancer activity, while ISPH-C demonstrated superior anti-inflammatory activity. The results establish isatin phenolic derivatives as promising dual-action candidates and provide a foundation for their further development as novel therapeutic agents.

**Keywords:** Isatin, phenolic derivatives, anticancer, anti-inflammatory, molecular docking, cytotoxicity

**CH-59**

## DEVELOPMENT AND VALIDATION OF A ROBUST HPTLC METHOD FOR STABILITY AND SIMULTANEOUS QUANTIFICATION OF LIQUIRITIN AND GLABRIDIN IN NANO-FORMULATION AND BIOLOGICAL SAMPLES

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Alzheimer's disease (AD) is the most common form of dementia, marked by progressive memory loss, cognitive decline, and ultimately death. Naturally derived Liquiritin of Glycyrrhiza uralensis roots, Glabridin of Glycyrrhiza glabra Linne, exhibiting potent pharmacological activities including antioxidant, anti-inflammatory, and neuroprotective effects. To facilitate their further investigation, an HPTLC method was developed and validated for the simultaneous quantification of Liquiritin and Glabridin in nanoformulations and biological samples. Method optimisation was carried out using a design of experiments approach, establishing robust chromatographic conditions with aluminium HPTLC plates coated with silica gel 60 F254 as the stationary phase and a mobile phase of ethyl acetate, toluene, and methanol (6:3:1, v/v). The method provided well-resolved retention factor values for Liquiritin at Rf ≈ 0.26, Glabridin at Rf ≈ 0.88, with linearity confirmed in the range of 100–500 ng/band and correlation coefficients indicating excellent accuracy. Limits of detection and quantification reflected high sensitivity, while precision studies showed relative standard deviations below 2%, confirming reproducibility. Recovery studies across lipid-based nanoparticles, plasma, and urine samples yielded satisfactory recoveries of 96.2%–102.1%. Stress degradation studies demonstrated the stability of both analytes. Overall, this HPTLC method provides a rapid, sensitive, and reliable approach for the concurrent estimation of Liquiritin and Glabridin, offering a valuable analytical tool to support their application in Alzheimer's disease research and combination therapies.

**Keywords:** Liquiritin, Glabridin, HPTLC, Alzheimer's, Design of experiment.

**CH-60**

## RATIONAL DESIGN, SYNTHESIS AND BIOLOGICAL ACTIVITY OF PHENYLTHIAZOLE TRIAZINE DERIVATIVES AS ANTIMALARIAL AGENTS

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Plasmodium falciparum, a highly adaptive protozoan parasite, is the causative agent of malaria, which remains a major global health concern with millions of cases annually. The parasite's rapid mutation rate has led to widespread drug resistance, reducing the effectiveness of existing therapies. Antifolate antimalarials, long used in treatment, act by inhibiting the essential enzyme dihydrofolate reductase-thymidylate synthase (Pf-DHFR-TS). Inhibition of this enzyme halts DNA synthesis and dTMP production, thereby blocking parasite proliferation. In this work, a rational drug design strategy was employed to investigate Phenylthiazole-Triazine derivatives as potential Pf-DHFR-TS inhibitors. Molecular docking and *in silico* modelling were carried out to assess their binding interactions with wild-type Pf-DHFR-TS. Several derivatives demonstrated strong hydrogen-bonding interactions and substantial binding affinities, performing comparably or better than standard antifolate drugs such as cycloguanil and WR99210. From computational




ISBN: 978-81-980623-8-3

predictions, a series of novel derivatives were synthesized through multi-step reactions and structurally characterized using $^1$H-NMR, IR, and mass spectrometry. Their biological evaluation revealed significant *in vitro* antiplasmodial activity against both chloroquine-sensitive and resistant strains of P. falciparum. Several compounds exhibited inhibitory effects equal to or exceeding those of established antimalarials. A preliminary structure–activity relationship (SAR) analysis further indicated that electron-donating substituents and heteroaryl groups contributed to improved efficacy. Overall, phenylthiazole–triazine scaffolds emerge as a promising chemotype for next-generation Antimalarial agents. These findings provide a solid foundation for further optimization and preclinical evaluation to address the urgent challenge of drug-resistant malaria.

**Keywords:** Plasmodium falciparum; Pf-DHFR-TS inhibitors; Phenylthiazole–triazine; Molecular docking; Antiplasmodial activity.

**CH-61**

**RATIONAL DESIGN AND MOLECULAR DYNAMICS SIMULATION OF 1,2,4-TRIAZOLE DERIVATIVES FOR TOPOISOMERASE II INHIBITION**

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1,2,4-triazole derivatives have gained considerable attention as versatile scaffolds owing to their broad spectrum of pharmacological applications, particularly as antimicrobial and anticancer agents. In light of this potential quantitative structure activity relationship (QSAR) modelling was conducted using the QSARINS platform to develop and validate robust predictive models for a newly designed library of 1,2,4-triazole derivatives. The study emphasised the significance of crucial molecular descriptors such as MoRSEV22, AVP-1, MoRSEV1, and GATSe7, thereby facilitating the rational optimization of these scaffolds. Furthermore, molecular docking and molecular dynamics (MD) simulation studies were performed to evaluate the binding affinities and conformational stability of the designed molecules with the target protein Topoisomerase II. The inhibitory interactions were assessed through AutoDock and molecular simulations, while the stability was confirmed using RoG, RMSF, H-bond, RMSD, and SASA analysis. The SwissADME profiling further predicted favourable drug-likeness and pharmacokinetic properties. Among the designed derivatives, compound 111 emerged as the most promising candidate, exhibiting strong and stable binding with the 4KCL protein throughout the simulation period. The theoretical investigation highlights compound 111 as a potential lead for selective topoisomerase II inhibition, providing a valuable foundation for experimental validation and subsequent development.

**Keywords:** QSARINS, Triazole derivatives, Docking, Simulation, Topoisomerase II.

**CH-62**

**EXPLORING ANTI-TUBERCULAR ACTIVITY OF VARIOUS SIX MEMBERED N – CONTAINING HETEROCYCLIC COMPOUNDS: A COMBINED *IN-SILICO* AND *IN-VITRO* APPROACH**

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In this study, heterocyclic ring systems—pyrimidine, oxazine, and thiazine—were selected as the core scaffolds for the design and development of novel anti-tubercular agents. The primary objectives were to perform in-silico studies, synthesize selected derivatives, carry out their physicochemical and spectral characterization, evaluate their *in-vitro* anti-tubercular activity, and compare the *in-silico* and *in-vitro* findings. A total of 27 derivatives (9 from each ring system: pyrimidine, oxazine, and thiazine) were theoretically designed and evaluated using in-silico tools for their physicochemical properties, pharmacokinetic profiles, bioactivity, toxicity predictions, and molecular docking. The software tools employed included Molinspiration, SwissADME, Molsoft, Lazar, pkCSM, and AutoDock Vina (version 1.5.6). Based on the in-silico analysis, the compounds pc7, pc8, pc9 (pyrimidine derivatives), oc7, oc8, oc9 (oxazine derivatives), and tc7, tc8, tc9 (thiazine derivatives) were identified as the most promising candidates and were selected for synthesis. The synthesized compounds were characterized by physical methods such as melting point determination, TLC, and solubility, and confirmed through FT-IR, 1H NMR, 13C NMR, and GC-MS spectral analysis. The in-silico anti-tubercular activity was assessed using molecular docking studies against the M. tuberculosis enzyme DprE1 in complex with nitrobenzothiazinone (PDB ID: 6HF3). *In-vitro* anti-tubercular activity was evaluated using the Alamar Blue susceptibility assay. The results revealed that although the pyrimidine derivatives (particularly pc7 and pc9) demonstrated strong in-silico anti-tubercular activity—sometimes exceeding that of the standard drug—the *in-vitro* studies identified the thiazine derivatives as more potent. Specifically, compound tc8 exhibited the highest *in-vitro* activity with a minimum inhibitory concentration (MIC) of 4 µg/mL against Mycobacterium tuberculosis. Furthermore, in-silico toxicity predictions indicated that aza (nitrogen-containing) derivatives are more prone to toxicity, whereas thia (sulfur-containing) and oxa (oxygen-containing) derivatives showed reduced toxicity profiles. These findings suggest a potential advantage for thiazine and oxazine frameworks in drug development. The comparative analysis between in-silico and *in-vitro* results highlights a critical insight: reliance solely on in-silico predictions may be misleading.

**Keywords:** Heterocyclic compounds, AutoDock, Anti-tubercular activity, Characterization.

**CH-63**

**SYNTHESIS OF NOVEL SCHIFF BASE COMPOUNDS FROM UNSATURATED FATTY ACID: CHARACTERIZATION AND *IN-VITRO* BIOLOGICAL STUDY**

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Fatty acids, both free and as part of complex lipids, play a number of key roles in metabolism, as essential components of all membranes, and as gene regulators. Undecylenic acid is an organic compound with the formula CH2=CH(CH2)8CO2H. It is an unsaturated fatty acid derived from castor oil. It is an antifungal agent. Schiff base derivatives are available in numerous bioactive atoms and show a wide variety of biological activities, like antitubercular, antifungal, antiviral, anticancer. 11 Schiff bases were prepared by reacting hydrazide of undecylenic acid with different aldehydes. The structure of the compound confirmed by FT-IR, 1H NMR and Mass spectra. The physico-chemical properties and in-silico bioactivity of synthesised compounds carried out by using Molinspiration software. According to Lipinski rule of five, all the compounds are lipophilic in nature. From the bioactivity score, all the compounds show moderate activity. In-silico toxicity studies showed that the synthesized derivatives will not penetrate in to the human blood brain barrier. Molecular docking studies confirmed that **S1** possess maximum antitubercular activity (-6.1) on Enoyl acyl carrier protein reductase (PDB ID: 2YES) than the standard INH (-5.6kCal/mol) and **S9** shows maximum antioxidant activity on Tyrosinase oxidoreductase (3NM8) (-8.6kCal/mol) than the standard Ascorbic acid (-6.0kCal/mol). The *in-vitro* antitubercular activity (**S4**) shows good activity (MIC 2µg/ml) on M. tuberculosis H37Rv ATCC 27294 by using broth dilution assay method. All the compounds showed good antifungal than the standard Fluconazole. Schiff base derivatives of undecylenic acid have good anti-fungal and anti-tubercular activity. These derivatives are seeming to have good potential for novel drug discovery with low toxicity and good activity.

**Keywords:** Undecylenic acid, Schiff base, Molecular docking, Anti-tubercular activity, Characterization.

**CH-64**

**HYDRAZIDE-2-OXINDOLE DERIVATIVES AS GSK-3B KINASE INHIBITOR: POTENTIAL LEAD AGAINST CANCER.**

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ISBN: 978-81-980623-8-3

Glycogen synthase kinase-3β (GSK-3β) is a promising target in cancer research due to its central role in regulating key oncogenic signalling pathways. Although no GSK-3β inhibitor has been approved for cancer therapy, the preclinical studies have shown these inhibitors can sensitize tumors to conventional treatments and help to overcome chemo-resistance. In continuation of our previous work, a series of novel hydrazide-linked oxindole derivatives were designed, synthesized, and evaluated for their potential anti-proliferative activity via inhibition of GSK-3β. All derivatives were screened against cancerous MCI-4460, Capan-1, LN-229, DND-41, K-562, MOLT-4, Z-138, HCT-116, HL-60 (cancerous cells) and normal HEK-293 cells. Among them, compounds 6Eb and 6Ec exhibited the most potent cytotoxic property against the pancreatic cancer cell line Capan-1, with $CC_{50}$ values of 9.40 µM and 8.25 µM, respectively. Consistently, these compounds also demonstrated strong GSK-3β kinase inhibition with $IC_{50}$ values of 11.02 µM (6Eb) and 59.81 µM (6Ec). Molecular docking studies revealed favorable binding affinities for 6Eb and 6Ec, with docking scores of -10.5 kcal/mol and -8.8 kcal/mol (reference compound bio-acetoxime: -7.7 kcal/mol) respectively. Furthermore, molecular dynamics (MD) simulations, density functional theory (DFT) calculations, and in-silico ADME profiling were performed to corroborate the *in-vitro* findings. These computational studies supported the stability, drug-likeness properties, and high binding efficiency of 6Eb and 6Ec highlighting their potential as promising lead compounds for GSK-3β-targeted anticancer therapy.

**Keywords:** Hydrazide**,** 2-oxindole**,** GSK-3β kinase, molecular docking, anticancer.

**CH-65**

## DETERMINATION OF N-NITROSAMINE IMPURITIES IN OLMESARTAN MEDOXOMIL AND ITS FORMULATION USING HPLC

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Nitrosamine impurities have emerged as a critical concern in the pharmaceutical industry due to their potential carcinogenicity, prompting rigorous research into their formation, detection, and control. This study focuses on the development and validation of a rapid, precise, and accurate high-performance liquid chromatography (HPLC) method for estimating N-nitrosamine impurities, specifically NDMA, NDEA, NDIPA, and NDPA, in both the active pharmaceutical ingredient (API) and the final dosage form of Olmesartan. Chromatographic separation was achieved using an INTERSIL C18 (150 mm x 4.6 mm, 2.7 µm) column under isocratic conditions with a mobile phase of methanol and 0.1% formic acid (40:60 v/v). Detection was performed at 240 nm, using a 20-µL injection volume and a flow rate of 1.0 mL/min. The method was validated according to ICH guidelines for linearity, precision, accuracy, limit of detection (LOD), and limit of quantitation (LOQ). Excellent linearity was observed across a wide concentration range ($R \geq 0.998$). The method demonstrated high precision (%RSD < 15%) and accuracy, with recovery rates ranging from 96.6% to 109.1%. LOD and LOQ values were in the sub-ng/ml range, confirming the method's sensitivity. Application of the validated method revealed the presence of NDMA and NDEA in both API and tablet formulations at levels well below the USFDA's acceptable daily intake limits. NDIPA and NDPA were either not detected or found at trace levels. Overall, the method proves to be a robust tool for regulatory compliance and routine monitoring of nitrosamine impurities in Olmesartan-containing products.

**Keywords**: High-performance Liquid chromatography, N-Nitrosamine Impurities, Olmesartan

**CH-66**

## ANALYTICAL METHOD DEVELOPMENT AND VALIDATION FOR ESTIMATION OF MEXILETINE IN BULK AND TABLET DOSAGE FORM BY RP-HPLC

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A rapid and precise reverse phase high performance liquid chromatography method has been developed for the validated of Mexiletine, in its pure form as well as tablet dosage form. Chromatography was carried out on a targetsil C18 (4.6 X 150 mm, 5 microns). Column using a mixture of methanol 100 % v / v as mobile phase at flow rate of 1 ml / min, the detection was carried out at 274 nm. The retention time was 2.267 + 0.02 min. the method produces linear response in the concentration range 5-25 ppm of mexiletine. The method precision for the determination of assay was below 2.0 % RSD. The method is useful in the quality control of pharmaceutical formulations.

**Keywords:** Mexiletine, RPHPLC, Validation.

**CH-67**

## "SIMULTANEOUS ESTIMATION AND FORCED DEGRADATION STUDIES OF VILDAGLIPTIN AND EMPAGLIFLOZIN BY SIMPLE AND ECONOMICAL REVERSE PHASE HPLC METHOD".

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The present study focused on the development and validation of a reliable Reverse Phase High-Performance Liquid Chromatography (RP-HPLC) method for the simultaneous quantification of Empagliflozin (EMPA) and Vildagliptin (VILDA) in pharmaceutical products. The RP-HPLC technique was selected for its high separation efficiency and superior peak resolution, utilizing a non-polar stationary phase in conjunction with a polar mobile phase. Following aextensive optimization, the chosen mobile phase consisted of Potassium dihydrogen orthophosphate Buffer (pH 3, adjusted with Orthophosphoric acid) and Acetonitrile (ACN) in a 60:40 v/v ratio. The detection was carried out at an isosbestic wavelength of 205nm using a UV detector, with a flow rate of 1.0 mL/min on a Zodiac C-18 column. The method exhibited excellent linearity for both EMPA and VILDA within the 6-12 µg/mL and 30-70 µg/mL, respectively. concentration range, with correlation coefficients of 0.9996 and 0.9986, respectively. Specificity was confirmed, with no interference observed from excipients or diluents. Sensitivity was validated through the calculation of appropriate Limits of Detection (LOD) and Limits of Quantification (LOQ). Accuracy was supported by recovery studies, which ranged from 99.55% to 104.45%. Additionally, forced degradation studies verified the stability-indicating nature of the method. Overall, this RP-HPLC method is precise, accurate, specific, robust, and suitable for the simultaneous estimation of EMPA and VILDA in pharmaceutical formulations.

**Keywords:** Empagliflozin, Vildagliptin, High performance liquid chromatography, Method development, ICH guidelines, Stability studies.

**CH-68**

## UHPLC-BASED ANALYTICAL METHOD DEVELOPMENT AND VALIDATION FOR ANTIVIRAL DRUG: A SYSTEMATIC APPROACH IMPURITY DETECTION AND BY QUANTIFICATION

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A Sytamatically design, develop and validating an Ultra High Performance Liquid chromatography. Successful implementation of the Design of Experiments (DoE) approach will result in an optimized UHPLC method for detecting and quantifying impurities in antiviral drugs. This method will exhibit improved separation, resolution, and overall performance. Through the application of DoE, the UHPLC method is anticipated to demonstrate enhanced sensitivity, enabling the detection and quantification of impurities at low concentrations. This heightened sensitivity aligns with stringent regulatory requirements for pharmaceutical analysis. Successful validation of the UHPLC method, guided by ICH guidelines, will ensure its accuracy, precision, specificity, linearity, and robustness. This validation outcome is crucial for establishing the method's impurity detection and quantification reliability. Applying the validated UHPLC method to molnupiravir, is expected to accurately quantify impurities in these antiviral drugs. This outcome is vital for the pharmaceutical industry's quality control and regulatory compliance. The developed UHPLC method, optimized using




ISBN: 978-81-980623-8-3

DoE and validated according to ICH guidelines, is anticipated to meet regulatory standards for pharmaceutical analysis. This outcome establishes the method's acceptance in quality control processes and regulatory submissions. The UHPLC method's robustness and reproducibility, achieved through the systematic application of DoE principles, will contribute to its reliability under varying experimental conditions and across different analysts. This is essential for routine application in pharmaceutical laboratories.

**Keywords:** Molnupiravir, UHPLC method, Quantification

**CH-69**

## DEVELOPMENT OF A VALIDATED SPECTROPHOTOMETRIC METHOD FOR LULICONAZOLE QUANTIFICATION IN PHARMACEUTICAL FORMULATION USING ION PAIR FORMATION WITH BROMOCRESOL GREEN

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Luliconazole is a novel, broad-spectrum antifungal agent belonging to the imidazole class. With the continuous emergence of new and modified drug entities, reliable analytical methods are essential for accurate quantification. This study aimed to develop and validate a simple UV spectrophotometric method for the estimation of Luliconazole in pharmaceutical formulations based on ion-pair formation with bromocresol green. The pure drug was procured from Luxica Pharma, Gujarat, and its authenticity confirmed through melting point analysis, differential scanning calorimetry (DSC), and Fourier-transform infrared spectroscopy (FTIR). The melting point was recorded at 152 °C, consistent with DSC results, while FTIR spectra confirmed the structural identity of Luliconazole. The spectrophotometric method was optimized using a solution of bromocresol green in phosphate buffer, with maximum absorbance observed at 419 nm. The method exhibited linearity within the concentration range of 6–30 µg/ml. Validation was performed according to ICH guidelines, assessing parameters such as precision, accuracy, linearity, limit of detection (LOD), and limit of quantification (LOQ). Precision studies showed a standard deviation of 0.2410 and a coefficient of variation of 2.54%. Accuracy results demonstrated recovery values ranging from 95.34% to 107.19%, with a mean recovery of 102.29%. Linearity was confirmed by a correlation coefficient of 0.997. The LOD and LOQ were determined as 1.6987 µg/ml and 5.1478 µg/ml, respectively.

**Keywords:** Luliconazole, ion pair formation, bromo cresol green, validation, spectrophotometric method.

**CH-70**

## METHOD DEVELOPMENT AND VALIDATION BY RP-HPLC OF LOPINAVIR AND RITONAVIR

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A reverse phase liquid chromatographic method for estimation of Lopinavir and Ritonavir in bulk drugs and marketed pharmaceutical dosage form was developed and validated. The chromatographic conditions to achieve the highest performance parameters using Sunfire C18 (4.6×250mm) 5µm Column with guard filter were optimized. The separation was carried out using a mobile phase containing Acetonitrile: Water (40:60% v/v) in the ratio of 40:60% v/v pumped at a flow rate of 0.9 mL/min with detection at 220 nm. The method was shown to be linear in 5–25 µg/mL and 75–375 µg/mL concentration range (regression coefficients of 0.9995 and 0.9982) for Lopinavir and Ritonavir respectively. The limit of detection (LOD) and limit of quantification (LOQ) was found to be 0.7µg/ml and 2.1µg/ml & 13.8µg/ml and 41.8µg/ml for Lopinavir and Ritonavir respectively. The accuracy of the method was assessed by adding fixed amount of pre-analyzed sample to different standard solutions (50%, 100%, and 150% of the tested concentration) in triplicate. The percentage mean recoveries were found to 98%-102%. The method was found to be precise with %RSD value was found to be within the limits for intraday and interday precision study, respectively. The method specificity and robustness were also established. New and sensitive RP-HPLC method for estimation of Lopinavir and Ritonavir has been developed, in respect to the reviewed analytical methods.

**Keywords:** Lopinavir and Ritonavir, RP-HPLC, Accuracy, Precision, Robustness.

**CH-71**

## SYNTHESIS AND EVALUATION OF MCC–PEG CONJUGATE AS TABLET SUPER DISINTEGRANT

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The objective of the study is synthesis of MCC–PEG Conjugate and improves the water uptake capacity of MCC, so as to improve the bioavailability of drug. PEGylated conjugate of microcrystalline cellulose (MCC) was synthesized by reacting MCC with polyethylene glycol (PEG) in the presence of catalyst at elevated temperature. The prepared MCC–PEG Conjugate has shown excellent flowability characteristics. Mouth dissolving tablets of Memantine hydrochloride were prepared employing MCC-PEG conjugate as superdisintegrant and comparison with commercial superdisintegrants. Total nine batches of mouth dissolving tablets were prepared using superdisintegrants like Crosscarmellose sodium (CCS), Sodium Starch Glycolate (SSG) and MCC–PEG Conjugate by direct compression method. The results of precompression parameters (Angle of repose, Carr's index and Hausner ratio) were in acceptable range as per the specifications given in IP. Prepared tablets were evaluated for thickness, uniformity of weight, hardness, friability and results are well within IP limits. Out of nine formulations, the tablets which contain 40 mg of MCC–PEG Conjugate (F9) had shown low *in vitro* disintegration time 5 sec and highest drug release profile i.e. 99.81% which releases the drug within 12 minutes. After comparing its results with that of commercial superdisintegrants, it can be concluded that MCC–PEG conjugate can prove to be a good superdisintegrant and the developed mouth dissolving tablet formulation of memantine hydrochloride could release the drug faster compared to conventional immediate release tablets which is useful in paediatric, geriatric and psychiatric patients.

**Keywords:** MCC–PEG Conjugate, Memantine Hydrochloride Superdisntegrents, Mouth dissolving tablets and Bioavailability

**CH-72**

## AGRICULTURE WASTE VALORIZATION: ECO-FRIENDLY SOLUTIONS FOR PHARMACEUTICAL & BIOMEDICAL TECHNICAL APPLICATIONS

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Waste is broadly defined as any material that is discarded, intended for disposal, or mandated for elimination. In India, large volumes of lignocellulosic residues are generated during planting, harvesting, and post-processing of crops. The conventional practice of stubble burning leads to the release of particulate matter and toxic emissions, exacerbating air pollution and respiratory health risks. Recent advances in pharmaceutical sciences highlight the potential of cellulose-rich agricultural residues as renewable feedstocks for developing excipients and value-added biomaterials. Cellulose and its derivatives, obtained through eco-friendly extraction and modification processes, demonstrate promising functional roles as binders, disintegrants, stabilizers, and film-formers in dosage form design. Utilizing such waste not only addresses environmental concerns but also provides a cost-effective and sustainable alternative to synthetic excipients. This valorization approach integrates waste management with pharmaceutical as well as biomedical technology, aligning with the principles of green chemistry and circular bioeconomy.




ISBN: 978-81-980623-8-3

**Keywords:** Cellulose biomass, Agricultural residues, pharmaceutical excipients, Pollution, Green pharmacy, Sustainability, Circular economy

**CH-73**

## COMPUTATIONAL DESIGN, SYNTHESIS AND PHARMACOLOGICAL EVALUATION OF DUAL TARGETING DIPHENYL DERIVATIVES AS COX-2 AND TNF-A INHIBITORS AS ANTI-ARTHRITIC AGENT

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COX-2 and TNF-α are considered to be the proinflammatory cytokines responsible for arthritis. Literature reported substituted Diphenyls and isoquinolines to be effective in inhibiting COX-2 and TNF-α which is useful in the improvement of inflammation in RA patients. So a plan was made to design a new compound which could simultaneously inhibit both COX-2 & TNF-α as better Anti-Arthritic agent. The present investigation includes design, synthesis, characterization and biological evaluation of these diphenyl derivatives against arthritis. Results of these studies indicates that these derivatives have affinity towards COX-2 & TNF-α active site. Docking studies were performed to study the binding mode of these derivatives. The docking analysis of highest active molecule PD-FL shows significant interaction with the active site amino acid residue. The synthesis was carried out by multiple steps. The physiochemical characterization was done using IR, 1H NMR and mass analysis. The pharmacological evaluation was carried out by carrageenan induced rat paw edema and formaldehyde induced arthritic model. The compound PD-FL shows potent anti-arthritic activity as compared to that of standard. The designed compounds are devoid of sulphonamide and carboxy group for having minimal side effect on heart and stomach. Histopathological studies on animal heart, stomach and foot reveal the extend of side effective.

**Keywords:** COX-2 & TNF-α inhibitors; Diphenyl derivatives; Anti-arthritic agent

**CH-74**

## DECIPHERING MICRORNA-MEDIATED DNA REPAIR PATHWAYS IN POST-MI COGNITIVE IMPAIRMENT: A COMPUTATIONAL DRUG DISCOVERY PERSPECTIVE

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Comorbidities like cognitive decline and mood alterations often follow myocardial infarction (MI). The present study explored the underlying molecular mechanisms using in-silico molecular analyses to determine the association of MI-induced cognitive degeneration and altered gene expression, which contributed to neuroinflammation, oxidative stress and dysregulated DNA damage response (DDR). A computational drug discovery tool is leveraged to target microRNAs (miRNAs) responsible for regulating DDR pathways, seeking to mitigate degeneration. BRCA1/2, ATM, RAD51, ERCC3/4, and other genes related to DDR were curated from the Gene Expression Omnibus (GEO) and literature. miRTarBase and miRDB were used to identify 32 miRNAs that interacted with the genes. The secondary and tertiary structures of miRNA-mRNA duplexes were predicted using ViennaRNA and RNAComposer. 330 ligands were screened virtually through the PSRR server, and compounds with strong miRNA downregulation scores (>0.85) were prioritised. SWISSADME was used to evaluate ADMET and drug likeness. Molecular docking by AutoDock Vina revealed multiple compounds, including statins, kinase inhibitors, and glucocorticoids, expressed strong binding affinities (<= 9.8 kcal/mol) to miRNA-mRNA complexes, indicating their potential to inhibit miRNA-mediated gene silencing. For the identification of disease associations and enriched pathways, FNDEx IQuery and miRNet were applied for comprehensive network analysis. Additionally, Enrichr KG provided insights into multi-omics gene set enrichment. These findings emphasise the potential of repurposing approved drugs to restore DDR gene expression, modulate miRNA activity, and offer a novel therapeutic approach for MI-associated cognitive impairment. Through integrative computational and translational research, this research seeks to advance precision pharmacology.

**Keywords:** Myocardial Infarction (MI), Cognitive Decline, DNA Damage Response (DDR) MicroRNAs (miRNAs), Computational Drug Discovery

**CH-75**

## DEVELOPMENT AND VALIDATION OF A ROBUST RP-HPLC METHOD FOR SIMULTANEOUS ESTIMATION OF REMOGLIFLOZIN AND VILDAGLIPTIN IN FIXED-DOSE COMBINATION TABLETS

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A simple, precise, and robust reverse-phase high-performance liquid chromatography (RP-HPLC) method was developed and validated for the simultaneous estimation of Remogliflozin and Vildagliptin in bulk and fixed-dose combination tablets. The chromatographic separation was achieved using a C18 column with an isocratic mobile phase comprising acetonitrile, orthophosphoric acid, and methanol in the ratio of 80:10:10 (v/v/v), delivered at a flow rate of 0.7 mL/min. UV detection was performed at 215 nm. The method demonstrated sharp and well-resolved peaks with retention times of 2.8 min for Vildagliptin and 4.2 min for Remogliflozin. The method was validated according to ICH Q2(R1) guidelines and showed excellent linearity in the concentration ranges of 2–20 µg/mL for Remogliflozin and 1–10 µg/mL for Vildagliptin, with correlation coefficients of 0.9999 and 0.9991, respectively. The limits of detection (LOD) were found to be 0.178 µg/mL for Remogliflozin and 0.310 µg/mL for Vildagliptin, while the limits of quantification (LOQ) were 0.540 µg/mL and 0.940 µg/mL, respectively. Precision studies exhibited %RSD below 2% for both intra- and inter-day evaluations. Accuracy was confirmed through recovery studies at three spiking levels, with mean recoveries within the range of 98.6% to 100.5%. Robustness was proven by small deliberate changes in method parameters, and specificity was confirmed through the absence of interfering peaks. The method was successfully applied to assay the marketed formulation Remo V, and statistical comparison with a reference method showed no significant difference. The developed method is suitable for routine quality control and quantitative analysis of Remogliflozin and Vildagliptin in pharmaceutical dosage forms.

**Keywords:** Remogliflozin, Vildagliptin, RP-HPLC, Method validation, Fixed-dose combination

**CH-76**

## QUALITY BY DESIGN METHOD DEVELOPMENT AND VALIDATION OF CINNAMALDEHYDE BY RP- HPLC

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Quality by design analytical method development for determination of cinnamaldehyde an anticancer phytoconstituent was performed by RP-HPLC and its validation was done as per ICH guidelines. The 32 factorial design was selected in which independent factors i.e. mobile phase composition and flow rate & its effects on retention time and tailing factor was determined. Effect of such critical process parameter on critical quality attribute of the method was studied. The optimized chromatographic parameters obtained by applying QbD were mobile phase i.e. methanol and water in the ratio of 75:25 %v/v and the flow rate of 1.0 mL/min. The responses i.e. retention time and tailing factor obtained was 3.723 min and 0.941 respectively. Further the experimental model was subjected to statistical analysis by ANOVA and it was revealed that the selected model was significant with F-value of 17.17 & P-values less than 0.0500. The optimized method obtained by QbD was validated successfully with validation parameters such as linearity of R2=0.9991, LOD of 0.00003, LOQ of 0.00012, & mean recovery was found to be 99.95%. The developed method has the advantages of simplicity, repeatability, sensitivity and requires less expensive reagents.

**CH-77**

## A STABILITY-INDICATING RP-HPLC APPROACH FOR ASSESSING GLIMEPIRIDE CONTENT IN FORMULATIONS




ISBN: 978-81-980623-8-3

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In this study, we present a robust and reliable RP-HPLC method designed to accurately assess the content of glimepiride in various formulations while ensuring stability. The process of method development included refining chromatographic conditions to effectively separate glimepiride from degradation byproducts typically generated during storage within formulations. The column used for optimal separation had a C18 composition and dimensions of 250 mm length, 4.6 mm inner diameter, and 5 µm particle size. The mobile phase consisted of acetonitrile and 20 mM phosphate buffer at pH 5 (60:40 v/v) at a flow rate of 1 mL/min. Detection occurred at 228 nm, with glimepiride showing a retention time of 7.214 minutes. The drug exhibited susceptibility to acidic, basic, neutral, oxidative and thermolytic conditions but remained stable photolysis conditions. Validation investigations affirmed the method's appropriateness for quantification, showcasing exceptional linearity, precision, accuracy, and specificity. Furthermore, stress testing conducted under various conditions verified the method's capability to indicate stability, allowing precise determination of glimepiride content even amidst potential degradation products. In summary, this RP-HPLC methodology presents a valuable resource for the routine assessment of glimepiride formulations, guaranteeing the maintenance of product quality and integrity.
**Keywords:** Glimepiride; RP-HPLC; Stability indicating; validation; Forced degradation.

**CH-78**

## FORCED DEGRADATION STUDIES OF FOSFOMYCIN TROMETAMOL USING UV-VISIBLE SPECTROPHOTOMETER

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Forced degradation studies are performed for the product degradation pathways under stressful conditions, such as heat, light, acid, base, or oxidation. Its to develop and validate stability-indicating analytical methods to ensure drug's safety and efficacy over its shelf life of active drug and its degradation products. This stable formulations in case of Fosfomycin Trometamol for UTI was used to determine its λ max at 397 nm, revealing degradation of its instability by its epoxide ring. So, we were tested marketed samples (Monurol -8mg sachet - Modi Mundi Pharma) within 24 hours and found that consistent decreases in absorbance across different concentrations (0.1, 0.5, and 1 mg/ml, confirmed degradation against normal as control of fosfomycin sample sachet without degradation process. These findings has validated and method's for validated to indicate stability and support the development of robustness in analytics for Fosfomycin Trometamol. Thus, a work on project to confirm of short half-life of drug Fosfomycin trometomol reveals to report that under confirmed in that degradation.
**Keywords:** Fosfomycin, forced degradation, Stress condition, spectrophotometric assay

**CH-79**

## DESIGN, DOCKING, ADMET, PASS, SYNTHESIS & BIO-EVALUATION OF NOVEL 7-O-SUBSTITUTED FLURO APIGENIN HYBRIDS AS AN ANTIOXIDANT & ANTICANCER AGENTS TARGETING VEGFR-2.

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VEGFR-2 is a key mediator of tumor angiogenesis and an important target in cancer therapy. However, existing VEGFR-2 inhibitors often exhibit toxicity and drug resistance. Apigenin, a flavonoid with known anticancer activity and VEGFR-2 affinity, is limited by poor pharmacokinetics. To address this, a series of 7-O-substituted fluroapigenin derivatives (F1–F14) was designed by incorporating hydrogen-bonding and hydrophobic groups to improve binding affinity and drug-like properties, guided by VEGFR-2 structural analysis. The study aimed to design, synthesize, and evaluate novel apigenin derivatives through computational and *in vitro* approaches. Molecular docking was performed against VEGFR-2, and ADMET profiling was used to predict pharmacokinetic and toxicity profiles. In-silico cytotoxicity screening was carried out using CLC-Pred and BC CLC-Pred across nine breast cancer cell lines. Selected derivatives were synthesized via alkylation and esterification, and characterized by UV, IR, NMR, and mass spectrometry. Antioxidant activity was assessed using the DPPH assay, while anticancer activity against the MCF-7 cell line was determined using cell viability assays, comparing $IC_{50}$ values with ascorbic acid and sorafenib. Docking and ADMET results identified several promising candidates, especially among alkylamino derivatives. Compound F8 showed exceptional antioxidant activity ($IC_{50}$ = 0.6 µM), outperforming both apigenin and ascorbic acid. F8 and F13 also exhibited strong anticancer activity ($IC_{50}$ = 1.0 and 1.5 µM, respectively), approaching sorafenib efficacy. These findings suggest that rational modifications of apigenin can enhance its therapeutic potential. F8 and F13, in particular, show promise as multifunctional agents for VEGFR-2-targeted breast cancer therapy.
**Keywords:** Apigenin hybrids, Flavone, Anticancer, VEGFR-2 inhibition, Breast cancer

**CH-80**

## *IN SILICO* SCREENING OF HETEROCYCLIC DERIVATIVES TARGETING PARP 1 FOR CANCER THERAPY

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PARP-1, a key enzyme in DNA repair, plays an essential role in the treatment of BRCA-mutated cancers through its inhibition. Heterocyclic derivatives have shown significant anticancer potential, and *in silico* approaches provide cost-effective strategies to evaluate their efficacy as PARP-1 inhibitors. In this study, molecular docking was performed using the PARP-1 crystal structure (PDB ID: 7kk4), and ten heterocyclic derivatives with strong binding affinities (–6 to –9 kcal/mol) were identified. These compounds were further analysed through ADMET profiling, which revealed favourable pharmacokinetic properties including high absorption, low toxicity, and good metabolic stability. Binding free energy calculations using MM-GBSA confirmed strong protein–ligand interactions, with values ranging from –57 to –86 kcal/mol. Molecular dynamics simulations further validated the stability of the top-ranked protein–ligand complexes. Overall, the findings highlight promising heterocyclic derivatives as potential PARP-1 inhibitors, providing a strong foundation for further experimental validation and contributing to the development of targeted cancer therapies through computational drug discovery approaches.
**Keywords:** PARP-1 inhibitors, Heterocyclic derivatives, Molecular docking, ADMET analysis, MM-GBSA, Molecular dynamics simulation

**CH-81**

## DESIGN, SYNTHESIS, *IN SILICO* STUDY AND *IN VITRO* STUDIES OF 2-AMINOBENZOTHIAZOLE - PHENYL BENZOPYRANONE ANALOGUES AS ANTIOXIDANT & ANTICANCER AGENTS

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A novel series of 2-aminobenzothiazole Phenyl Benzopyranone analogues was designed and synthesised as potential antioxidant & anticancer agents. The design process involved evaluating molecular properties such as receptor binding affinity, binding energy, toxicity profile, and compliance with Lipinski's Rule of Five. Selected compounds showing promising *in silico* results were synthesised through a multi-step process. Initially, acacetin was reacted with 1,4-dibromobutane using potassium carbonate as a base in anhydrous DMF to form an intermediate. This intermediate was then reacted with various substituted 2-aminobenzothiazoles via the Betti reaction to obtain the final 2-aminobenzothiazole Phenyl benzopyranone analogues (S1–S6). The synthesised compounds were characterised using elemental and spectral analysis, confirming their proposed structures. All analogues were evaluated for anticancer activity using the MCF-7 breast cancer cell




ISBN: 978-81-980623-8-3

line via the MTT assay. Among the tested compounds, S1, S5, and S6 exhibited notable anticancer activity compared to the others. Antioxidant activity was assessed using the DPPH radical scavenging assay, where compound S5 showed the highest activity, followed by S2 and S1.

**Keywords:** Flavone, Phenyl benzopyranone, 2-aminobenzothiazole, Anticancer, Acacetin

**CH-82**

## ANALYTICAL METHOD DEVELOPMENT AND VALIDATION FOR THE SIMULTANEOUS ESTIMATION OF ABACAVIR AND LAMIVUDINE BY USING RP-HPLC

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A new, simple and accurate, precise RP-HPLC method was developed for simultaneous determination of Abacavir and Lamivudine in bulk and in combined pharmaceutical dosage form. The separation of Abacavir and Lamivudine was achieved within 8 minutes on an Agilent Zorbax (C18) (150 mm x 4.6 mm, 5µm) column using Methanol: Acetate Buffer pH-3.8 (24:76 v/v) as the mobile phase. Detection was carried out using wavelength at 254 nm. The method showed adequate sensitivity concerning linearity, accuracy and precision over the range 100-500 µg/mL and 50-250 µg/mL for Abacavir and Lamivudine, respectively. Careful validation proved advantages of high sensitivity, accuracy, precision, selectivity, robust and suitability for quality control laboratories. The developed method was robust as the % RSD was within the range and without effecting system suitability parameters. The proposed method is suitable for simultaneous determination of Abacavir and Lamivudine in bulk and pharmaceutical dosage form.

**Keywords:** Abacavir and Lamivudine, RP-HPLC, Validation, Robustness, ICH Guidelines, UPLC-MS/MS; Method development; Simultaneous estimation.

**CH-83**

## NOVEL ISATIN-CHALCONE DERIVATIVES: SYNTHESIS, CHARACTERIZATION AND EVALUATION FOR ANTIMICROBIAL AND ANTICANCER APPLICATIONS

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A series of novel isatin-chalcone hybrids (IA-IM) were synthesized via a microwave-assisted method and evaluated for their antimicrobial, antifungal, antitubercular and anticancer activities. The compounds were characterized using spectroscopic techniques and screened for antibacterial activity against Staphylococcus aureus and Escherichia coli, antifungal activity against Candida albicans and Aspergillus niger, antitubercular activity against Mycobacterium tuberculosis H37Rv and cytotoxicity against breast (MCF-7) and cervical (HeLa) cancer cell lines. Compounds IK (4-NH2), IF (2-Cl) and IL (2-F) exhibited potent antibacterial activity, with zones of inhibition (ZOI) comparable to or exceeding amikacin at higher concentrations. Against fungal strains, IM (4-NO2), IK (4-NH2) and IL (2-F) demonstrated significant activity, approaching the efficacy of fluconazole. In antitubercular assays, compounds ID (2-F), IE (3,4-OCH3), IF (2-Cl) and IG (4-Cl) showed sensitivity at 12.5-25 µg/mL. Anticancer evaluations revealed that compounds IH (4-Br), IK (4-NH2) and IE (3,4- OCH3) were highly potent against MCF-7 and HeLa cells, with IC50 values as low as 6.53 ± 1.12 µM, while sparing normal HEK-293 cells. Structure-activity relationship (SAR) studies highlighted the importance of electron-donating groups (e.g. -NH2, -OCH3) and halogen substitutions (e.g. -Cl, -Br) in enhancing biological activity. These findings demonstrate the potential of isatin-chalcone hybrids as multifunctional therapeutic agents, providing a foundation for further optimization and development.

**Keywords:** Isatin, Chalcone, Antibacterial, Antifungal, Anti-tubercular, Anticancer.

**CH-84**

## IMPLEMENTATION OF QBD APPROACH TO THE ANALYTICAL METHOD DEVELOPMENT AND VALIDATION FOR THE SIMULTANEOUS ESTIMATION OF ALFUSOSIN AND TADALAFIL IN TABLET DOSAGE FORMS

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A Quality by Design (QbD)-driven RP-HPLC method was developed for the simultaneous estimation of Alfuzosin and Tadalafil in pharmaceutical formulations. Utilizing a systematic approach, critical method parameters (CMPs) such as buffer pH, flow rate, and organic composition were optimized through a Box-Behnken design, ensuring robustness and consistent performance. Chromatographic separation was achieved using a Platisil C18 column (250×4.6 mm, 5 µm) with a mobile phase of phosphate buffer (pH 6.0): methanol (40:60), a flow rate of 1.0 ml/min, and detection at 272 nm. The retention times for Alfuzosin and Tadalafil were 2.25 min and 3.04 min, respectively.The method was optimized and evaluated using ANOVA, which confirmed the significance of model parameters on resolution and tailing factor. System suitability parameters were within acceptable ranges: resolution > 4.0, tailing factor < 1.2, and plate count > 4000, establishing the method's effectiveness for routine analysis. Linearity was over a wide concentration range with correlation coefficients ($R^2$) of 0.999 for Alfuzosin and0.999 for Tadalafil, confirming excellent analytical response. Validation as per ICH guidelines demonstrated that the method is precise (%RSD < 0.5%), accurate (mean recoveries of 99.2% and 99.3%), and sensitive with low LOD (0.90 µg/ml for Alfuzosin and 3.32 µg/ml for Tadalafil) and LOQ values. This validated method is suitable for the routine assay and quality control of Alfuzosin and Tadalafil in bulk drug substances and finished dosage forms, meeting both regulatory expectations and industry best practices.

**Keywords:** Quality by Design, Alfuzosin, Tadalafil, RP-HPLC, Validation.

**CH-85**

## WHITE ANALYTICAL RP-HPLC METHOD FOR ESTIMATION OF FINERENONE AND ITS IMPURITIES

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An eco-friendly reverse-phase high-performance liquid chromatography (RP-HPLC) method was developed for the quantitative and qualitative analysis of Finerenone and its impurities in pharmaceutical dosage forms. Chromatographic separation was achieved on a Waters Alliance e2695 system equipped with a Waters X-Terra RP-18 column (150 × 4.6 mm, 5 µm). The mobile phase consisted of ammonium formate (pH adjusted to 3.0 with orthophosphoric acid) and acetonitrile in a 60:40 v/v ratio. The flow rate was maintained at 1 mL/min, and detection was performed at 235 nm using a photo-diode array detector under ambient temperature conditions. The number of theoretical plates for Finerenone and its impurities exceeded 2000, with a tailing factor not greater than 2. The relative standard deviation (%RSD) of peak areas for all measurements was below 2.0. The method was validated in accordance with International Council for Harmonization (ICH) Q2(R2) guidelines. Furthermore, the method was found to be simple, eco-friendly, and cost-effective. Its environmental impact and sustainability were evaluated using whiteness profile assessment tools such as AGREE and ComplexGAPI, and the obtained scores confirmed that the developed method qualifies as a white analytical procedure for analysis of Finerenone and its impurities.

**Keywords:** Finerenone, impurities, RP-HPLC, eco-friendly.

**CH-86**

## ANALYTICAL AND BIOANALYTICAL RP-HPLC METHOD DEVELOPMENT FOR THE ESTIMATION OF AN ANTI-ALZHEIMER'S DRUG IN LIPID FORMULATIONS

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ISBN: 978-81-980623-8-3

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This study aimed to develop, optimize, and validate a robust reversed-phase high-performance liquid chromatography (RP-HPLC) method for Mangiferin (MGN) quantification in bulk, nanoformulations, and biological matrices. A Quality by Design approach was employed, wherein critical method parameters were screened using Taguchi orthogonal array and further optimized by Box–Behnken design. The optimized chromatographic conditions consisted of a mobile phase of methanol:acetonitrile (22% v/v) with phosphate buffer (pH 3.2, 78% v/v), flow rate 1.0 mL/min, and oven temperature 26 °C. Under these conditions, MGN showed a retention time of 8.36 min, tailing factor of 1.2, and theoretical plates of 2953. The method exhibited excellent sensitivity (LOD 0.52 ng/mL, LOQ 1.56 ng/mL) and linearity over 50–5000 ng/mL ($R^2$ = 0.9999). Validation confirmed accuracy, precision, specificity, and robustness, with stability maintained in the presence of degradation products. A bioanalytical RP-HPLC method was further developed using caffeine as an internal standard (IS). Retention times for caffeine and MGN were 7.4 and 9.4 min, respectively, under identical conditions. The calibration curve demonstrated wide linearity (60 ng/mL–150 µg/mL) with $R^2$ = 0.999, confirming suitability for pharmacokinetic and *in vivo* applications. The developed RP-HPLC method proved reliable for quantification of MGN in nanoformulations, *in vitro* dissolution studies, and bioanalytical investigations, supporting its potential for regulatory and translational research applications.

**CH-87**

## ENVIRONMENTALLY BENIGN ALTERNATIVES TO HAZARDOUS ORGANIC SOLVENTS IN PHARMACEUTICAL LABORATORIES: A COMPREHENSIVE REVIEW

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The widespread use of hazardous solvents, including benzene, carbon tetrachloride, 1,2-dichloroethane, chloroform, and 1,1,1-trichloroethane, in undergraduate laboratories presents significant environmental, health, and regulatory concerns. These solvents are highly toxic, carcinogenic, or genotoxic; consequently, their application in pharmaceutical laboratories should be strictly avoided. Permissible exposure is recommended only when absolutely unavoidable, in minimal quantities, and with rigorous justification. Increasing regulatory restrictions have intensified the demand for safer and more sustainable solvent alternatives. This communication highlights the integration of green chemistry strategies to reduce hazardous solvent use while maintaining or enhancing synthetic efficiency and good laboratory effectiveness. Practical substitution approaches include replacing dichloromethane with ethyl acetate, acetone, methyl formate, or methyl acetate; substituting hexane with heptane; and replacing diethyl ether or diisopropyl ether with ethyl acetate or isopropyl acetate in extraction protocols. These alternatives provide lower toxicity and compatibility with conventional extraction, chromatographic, and reaction procedures. Solvent selection is guided by physicochemical characteristics, safety considerations, and sustainability metrics, consistent with safety principles. Adoption of green solvents not only ensures regulatory compliance but also promotes sustainable laboratory practices essential for modern scientific research and education. By consolidating current knowledge and practical guidance, this study provides chemists with a structured framework to mitigate solvent-related hazards and integrate safer, sustainable alternatives into laboratory teaching.

**CH-88**

## DEVELOPMENT AND VALIDATION OF RP-HPLC METHOD FOR SIMULTANEOUS ESTIMATION OF CLOTRIMAZOLE, TINIDAZOLE AND POVIDONE IODINE IN PHARMACEUTICAL DOSAGE FORM

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The present research focuses on the development and validation of a novel Reverse Phase High-Performance Liquid Chromatography (RP-HPLC) method for the simultaneous estimation of Clotrimazole, Tinidazole, and Povidone Iodine in pharmaceutical dosage forms. Chromatographic separation was achieved using a Fortis C18 column (150 × 4.6 mm, 5 µm) with a mobile phase consisting of methanol and phosphate buffer (85:15 v/v; pH 2.5, adjusted with orthophosphoric acid) at a flow rate of 1 ml/min, and detection at 232 nm. The proposed method demonstrated excellent linearity ($r^2$ > 0.999), accuracy (98–102% recovery), and precision with low %RSD values for intra-day and inter-day studies, in accordance with ICH Q2(R1) guidelines. Specificity studies confirmed the absence of interference from excipients and degradation products, while robustness testing verified the reliability of the method under deliberate variations of analytical parameters. The validated method proved to be simple, precise, accurate, and robust, making it highly suitable for routine quality control and analysis of marketed formulations containing this triple combination.

**Keywords:** RP-HPLC, Clotrimazole, Tinidazole, Povidone Iodine, Method Validation, Pharmaceutical Quality Assurance

**CH-89**

## MOLECULAR DOCKING ANALYSIS OF CAPSAICIN WITH PRO-INFLAMMATORY CYTOKINES AS POTENTIAL THERAPEUTIC TARGETS

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Pro-inflammatory cytokines such as TNF-α, IL-17a, IL-1β, IL-23, and IL-12 play a major role in the initiation and progression of inflammatory disorders like osteoarthritis. Capsaicin, the pungent alkaloid of chili peppers, is well known for its analgesic and anti-inflammatory properties, yet its molecular interactions with cytokine targets remain underexplored. In this study, molecular docking simulations were performed to evaluate the binding potential of capsaicin with key cytokine proteins, namely TNF-α (PDB ID: 7JRF), IL-17a (7AMA), IL-1β (6Y8I), IL-23 (4GRW), and IL-12 (IF45). Docking scores were used to assess binding affinity and interaction strength. Capsaicin exhibited favourable interactions with all the selected targets, yielding scores of −7.028 for TNF-α, −5.100kcal/mol for IL-17a, −8.235 kcal/mol for IL-1β, −7.050 kcal/mol for IL-23, and −4.593 kcal/mol for IL-12. Among these, the strongest interaction was observed with IL-1β, followed by IL-23 and TNF-α, suggesting that capsaicin may exert significant inhibitory effects on these cytokines. These findings provide molecular insights into the anti-inflammatory potential of capsaicin and highlight its promise as a natural therapeutic candidate for managing cytokine-mediated inflammatory diseases. The work presented a multi-target docking analysis across major cytokines central to inflammatory pathways. Further *in vitro* and *in vivo* studies are warranted to validate these interactions and explore clinical applicability.

**Keywords:** Capsaicin, Cytokines, Molecular docking, Inflammation, Osteoarthritis

**CH-90**

## DEVELOPMENT AND VALIDATION OF RP-HPLC-BASED BIOANALYTICAL METHOD OF SORAFENIB-LOADED MICROEMULSION GEL AND ITS PHARMACOKINETIC EVALUATION IN WISTAR RATS

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The present study aimed to develop and validate a robust RP-HPLC method for the quantification of sorafenib in rat plasma and to evaluate a microemulsion formulation with potential for brain targeting. Protein precipitation using methanol was employed for sample preparation. Chromatographic separation was achieved on an Agilent Symmetry C18 column with a mobile phase consisting of methanol:water (80:20 v/v) at a flow rate of 0.8 mL/min, using isocratic elution and UV detection at 265 nm. The method provided satisfactory resolution with a retention time of 3.5 min for sorafenib. The method demonstrated excellent linearity (5–85 µg/mL) with a high correlation coefficient ($r^2$ = 0.9999). Validation met USFDA bioanalytical guidelines, confirming accuracy, precision, and stability. The microemulsion formulation showed globule sizes below




ISBN: 978-81-980623-8-3

100 nm with >95% drug loading efficiency. In conclusion, the validated RP-HPLC method proved reliable for the determination of sorafenib in rat plasma and is suitable for pharmacokinetic investigations. Furthermore, brain distribution studies indicated that the nasal route achieved the highest brain concentrations of sorafenib, confirming successful blood–brain barrier penetration of the microemulsion formulation. These findings highlight its potential for effective brain targeting applications.

**Keywords:** Sorafenib, RP-HPLC, Bioanalytical method, Microemulsion, Brain targeting

**CH-91**

## *IN SILICO* DESIGN, SYNTHESIS, CHARACTERIZATION AND PHARMACOLOGICAL EVALUATION OF NOVEL QUINAZOLINE DERIVATIVES

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Heterocyclic compounds are of crucial importance in pharmaceutical research because of their tremendous biological relevance. Quinazoline is one of the notable heterocyclic cores and privileged structural motifs in medicinal chemistry. Quinazoline derivatives are commonly known for their rich pharmacological activities, especially their anticancer activity. Structurally, quinazoline is composed of two six-membered fused aromatic rings, one pyrimidine ring, and one benzene ring, giving a broad platform for developing biologically active compounds. In the current study, new quinazoline derivatives were rationally designed through *in silico* molecular modeling methods. Different journal literature was studied, and eight synthetic routes were chosen. 100 Quinazoline derivatives were synthesized and tested using MolSoft, PASS Online, and ADMET analysis. Among them, 40 compounds satisfied Lipinski's rule of five, while 60 derivatives passed MolSoft predictions. Further, 100 compounds were virtually screened for anticancer potential using PubMed/MEDLINE references, and docking scores were obtained. From this set, seven compounds were synthesized in the laboratory through a single-step reaction using microwave-assisted synthesis. These derivatives were further characterized and evaluated for solubility and stability. Anticancer screening was conducted, and docking outcomes showed that among all the synthesized compounds, one had the highest docking score and considerable activity. Therefore, in this research, the successful design, synthesis, and assessment of quinazoline derivatives are presented, finding them to be promising anticancer drug discovery scaffolds.

**Keywords**: Quinazoline, *in silico*, Anticancer, Docking, MolSoft

**CH-92**

## DEVELOPMENT AND VALIDATION OF QBD APPROACH IN RP-HPLC ANALYTICAL METHOD FOR SEPARATION AND IDENTIFICATION OF ANTI-TUBERCULOSIS DRUG DELAMANID

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This study presents a simple method to set up and test RP-HPLC for Delamanid This drug is used to treat tuberculosis. We used a we Quality by Design (QbD) approach. A strong and fast RP-HPLC method was created to measure delamanid in drugs. It is accurate and specific for both qualitative and quantitative analysis. The method uses a mobile phase with Methanol and 0.1% orthotic Phosphoric Acid. It also employs a C18 column and detects at a wavelength of 242 nm. Using QbD principles for method development helped identify critical method parameters (CMPs). This led to a clearer understanding of variability and made the methods more robust. Validation was carried out per ICHQ2(R1) guidelines. The method showed great linearity (r2 = 0.9999), precision, accuracy, and specificity. The limits of detection (LOD) and quantification (LOQ) were 3 µg/mL and 12 µg/mL,respectively. This optimized method can be reliably used for routine analysis of delamanid.

**Keywords:** Delamanid, RP-HPLC, Quality by Design, Method Validation, Anti-Tuberculosis, Analytical Method Development

**CH-93**

## DISCOVERY DRIVEN *INSILICO* EXPLORATION OF PIPERNONALINE MODULATION IN PANC-1 PANCREATIC CANCER

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Pancreatic cancer remains a major unresolved Challenge in Oncology due to its aggressive nature and limited response to existing treatments. This work presents a computational investigation of pipernonaline an alkaloid derived from piperlongum as a potential modulator of critical molecular pathways in PANC-1 pancreatic cancer cells. The study was designed to identify novel protein interactions that might support future drug development. The docking experiment was conducted using different protein structures and unbiased ligand conformers followed by dynamic Stability assessments. Initial results reveal that pipernonaline achieves stable binding with several target proteins, exhibiting interactions indicative of possible interference with cellular stress adaptation mechanisms. Notably, the profile and targets identified in this work have not been previously reported in molecular docking studies with pipernonaline.

**Keywords:** Docking Studies, PANC-1, Pipernonaline, Pancreatic cancer.

**CH-94**

## DEVELOPMENT AND VALIDATION OF A STABILITY-INDICATING RP-HPLC METHOD FOR THE ESTIMATION OF INAVOLISIB AND ITS RELATED IMPURITIES

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A robust RP-HPLC method was developed and validated for the simultaneous estimation of Inavolisib and its related impurities using a Waters X-Terra RP-18 column (150 mm × 4.6 mm, 3.5 µm). The mobile phase consisted of ammonium formate buffer (pH 2.5 with formic acid) and acetonitrile (60:40 v/v) at a flow rate of 1.0 mL/min, with detection at 251 nm. The chromatographic conditions provided well-resolved peaks with retention times of 2.61, 3.74, 5.36, 6.62, and 8.05 minutes for Imp-1, Imp-2, Imp-3, Imp-4, and Inavolisib, respectively. System suitability parameters, including theoretical plates, resolution, and tailing factors, were within acceptable limits. Linearity was observed in the range of 25–150 µg/mL for Inavolisib and 1.25–7.50 µg/mL for impurities with correlation coefficients ($r^2$) > 0.999. Precision studies showed %RSD values below 2.0%, while recovery at 80%, 100%, and 120% levels ranged from 98.2% to 100.8%, confirming accuracy. Specificity tests confirmed no interference from blanks, and robustness and ruggedness studies demonstrated stability under deliberate variations. The LOD and LOQ were 1.50 and 5.00 µg/mL for Inavolisib, and 0.10 and 0.25 µg/mL for impurities, respectively. Forced degradation under acid, alkali, oxidative, reductive, thermal, photolytic, and hydrolytic conditions confirmed the stability-indicating nature of the method, with all degradation products resolved from the analyte. Overall, the validated method is precise, accurate, specific, and stability-indicating, making it suitable for routine quality control of Inavolisib and its impurities.

**Keywords:** Inavolisib, RP-HPLC, Method validation, Forced degradation, Stability-indicating method

**CH-95**

## ANALYTICAL CHROMATOGRAPHIC METHOD DEVELOPMENT AND VALIDATION OF ANTIDIABETIC DRUGS IN BULK & TABLET FORMULATION

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Dapagliflozin, Teneligliptin, Metformin are anti-diabetic drugs. Dapagliflozin (SGLT2 inhibitor) lowers glucose by urinary excretion, Teneligliptin (DPP-4 inhibitor) enhances incretin to increase insulin and reduce glucagon, and Metformin (Biguanide) decreases hepatic glucose production and improves insulin sensitivity. Several attempts were made on simultaneous analysis of Metformin with either Dapagliflozin or Teneligliptin but no work were carried out on simultaneous analysis of




ISBN: 978-81-980623-8-3

all three drugs combination. In the present work, efforts are made to develop a simple, precise, accurate, economical analytical method and linear reverse phase high performance liquid Chromatographic (RP-HPLC) method for simultaneous estimation of Dapagliflozin (DAPA), Teneligliptin (TEN) and Metformin (MET) in bulk drug and marketed tablet formulation. Different analytical performance parameters such as linearity, precision, accuracy, specificity, limit of detection (LOD) and limit of quantification (LOQ) were determined according to International Conference on Harmonization ICH Q2B guidelines. Chromatographic separation was achieved on water's ARC HPLC system using isocratic elution with ortho-phthalaldehyde (OPA) acetonitrile (85:15, v/v) as a mobile phase. The ultraviolet detector was operated and the retention time for DAPA, TEN, and MET were found to be 2.48 ± 0.5 min, 3.12 ± 0.5 min, and 1.11 ± 0.5 min respectively. The standard curve was linear over the concentration range of 2-12 µg/ml ,10-60 µg/ml and 5-30 µg/ml with correlation coefficient values close to one ($r^2 \approx 0.999$). The proposed method was validated for system suitability, specificity, linearity, accuracy, precision, LOD, LOQ. All parameters were found to be within the acceptance limit.

**Keywords:** Dapagliflozin, Teneligliptin, Metformin, RPHPLC.

**CH-96**

## *IN VITRO* ANTIDIABETIC POTENTIAL OF 5-((E)-4-((E)-(SUBSTITUTEDARYL/ALKYL)METHYL) BENZYLIDENE)THIAZOLIDINE-2,4-DIONE DERIVATIVES

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In view of extensive range of biological activities of thiazolidine-2,4-dione, *in vitro* antidiabetic potential of 20 thiazolidine-2,4-dione analogues already synthesized by Kumar et al., 2020 was evaluated by α-amylase using diastase (amylase enzyme) at absorbance 540 nm by taking acarbose as standard drug. A solution of 0.25 gm of soluble potato in 50 ml of 20 mM phosphate buffer (pH 6.9) was prepared. 1 mg diastase (amylase enzyme) was mixed in 100 ml of 20 mM phosphate buffer (pH 6.9) to obtain the enzyme solution. The coloring agent was prepared by mixing 20 ml of 96 mM 3,5-dinitrosalicylic acid with 5.31 M sodium potassium tartrate in 8 ml of 2 mM sodium hydroxide and 12 ml of deionized water. 1 ml of enzyme solution was mixed with 1 ml of each synthesized derivative and then incubated for 10 minutes at 25 ºC. 1 ml of this mixture was mixed with 1 ml of soluble potato and incubated for 10 minutes at 25 ºC. Then 1 ml of color reagent was added and placed into water bath for 15 minutes at 85 ºC. The absorbance was taken after diluting mixture with distilled water. The antidiabetic activity indicated that compounds 8 and 15 (IC50 = 29.4 µg/mL and 30.5 µg/mL) exhibit almost equipotent activity when compared with standard acarbose (IC50 = 30.08 µg/mL). Thus, it can be concluded that analogues 8 and 15 can further be evaluated for *in vivo* studies to establish new antidiabetic molecule.

**Keywords:** Thiazolidin-2,4-dione, α-amylase, diastase, 3,5-dinitrosalicylic acid, Antidiabetic.

**CH-97**

## REPURPOSING OF FDA-APPROVED ANTIVIRAL DRUGS AGAINST MONKEYPOX VIRUS: COMPUTATIONAL TARGETING OF VP39 METHYLTRANSFERASE

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Monkeypox virus (MPXV), a re-emerging zoonotic orthopoxvirus, has become a global health concern due to its rapid spread and lack of specific antiviral therapies. VP39, a 2′-O-methyltransferase enzyme essential for viral mRNA capping and immune evasion, is absent in humans, making it a highly selective therapeutic target. Repurposing FDA-approved antivirals offers a rapid and economical strategy to identify effective drug candidates. A total of 25 FDA-approved antiviral drugs were screened against the sinefungin-binding pocket of VP39 (PDB ID: 8B07) using Glide molecular docking (Schrodinger). The top-ranked ligands were further validated by 100 ns molecular dynamics (MD) simulations using Desmond (Schrodinger) to assess conformational stability. Binding free energies were calculated using the MM-GBSA approach to quantify interaction strength. Adefovir exhibited the highest affinity, with a docking score of –8.717 and a binding free energy of –42.25 kcal/mol. It formed stable hydrogen bonds and ionic interactions with catalytic residues Arg140, Asp138, and Arg143. MD simulations confirmed the stability of the Adefovir–VP39 complex through consistent RMSD, low RMSF, compact radius of gyration, and persistent hydrogen bond occupancy. Other drugs such as Sofosbuvir, Ribavirin, Zanamivir, and Remdesivir also showed favorable binding interactions. This study identifies Adefovir as a promising repurposed candidate against MPXV and demonstrates the utility of computational pipelines as rapid and cost-effective approaches for antiviral discovery.

**Keywords:** Monkeypox virus, VP39 methyltransferase, drug repurposing, Adefovir, molecular docking

**CH-98**

## ANALYTICAL METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS DETERMINATION OF DAPAGLIFLOZIN PROPANEDIOL MONOHYDRATE AND TELMISARTAN USING UV AND RP-HPLC TECHNIQUES

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To determine Dapagliflozin Propanediol Monohydrate and Telmisartan in their synthetic mixture, A simple, rapid, and precise UV Spectrophotomertic (Absorbance Correction Method) and RP-HPLC methods were developed and validated in accordance with ICH Q2(R2) guidelines. Methanol has been used as a solvent in the development of UV Spectrophotomertic Method for Dapagliflozin Propanediol Monohydrate and Telmisartan at 244nm and 296nm respectively. The RP-HPLC method has been developed using a mobile phase consisting mixture of Acetonitrile: Water (60:40%v/v) at a flow rate of 1.2 ml/min at 35°C column oven temperature. C18 column (250 mm×4.6 mm, 5 µm) was used as a stationary phase and the detection wavelength was 235nm. The retention time of Dapagliflozin Propanediol Monohydrate and Telmisartan were 12.056min and 7.903min. respectively. Linearity was observed in the concentration ranges of 2-12µg/ml for DAPA and 5-30µg/ml for TELM using absorbance correction method and 4-20µg/ml for DAPA and 10-50µg/ml for TELM using RP-HPLC method with correlation coefficient of 0.999. The percentage recoveries obtained for DAPA and TELM were 98.66-99.33% for UV Spectrophotomertic and 98.96-99.44% for RP-HPLC method.The %RSD value for precision of Dapagliflozin Propanediol Monohydrate and Telmisartan were within acceptable range in both methods. For the simultaneous estimation of Dapagliflozin Propanediol Monohydrate and Telmisartan, which was employed for quantitative analysis, the established method is precise, accurate and specific.

**Keywords:** Dapagliflozin Propanediol Monohydrate, Telmisartan, Absorbance Correction Method, RP-HPLC method.

**CH-99**

## A REVIEW OF ANALYTICAL DEVELOPMENT METHODS FOR THE DETERMINATION OF VILDAGLIPTIN

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Vildagliptin is an antihyperglycemic agent (anti-diabetic drug) of the new dipeptidyl peptidase-4 (dpp-4) substance category of medicine. Vildagliptin was approved by the USFDA in 2007. Pharmaceutical analysis plays an outstanding conspicuous role in quality assurance similarly to internal control of bulk medication and pharmaceutical formulations. Development of analytical methodologies has therefore emerged as the primary research focus. New drug molecules are being developed and the analysis is also gaining equal importance. A huge survey was conducted for the determination of Vildagliptin from the research articles published in various pharmaceutical and analytical chemistry Journals. Nowadays, Vildagliptin is available in tablet dosage forms. The present article focuses on the different analytical methods for the quantitative estimation of Vildagliptin. The present paper




ISBN: 978-81-980623-8-3

accentuates the review of analytical methods including UV/Vis-Spectroscopy, HPLC, RP-HPLC, HPTLC, GC-MS, etc. which involve the estimation of Vildagliptin in pharmaceutical dosage form. The investigatory review may provide comprehensive details of various analytical techniques and their experimental condition to the researchers who are working in the area of analytical research of Vildagliptin. The present studies revealed that the HPLC method combined with UV spectrophotometric has specific advantages and sensitivity for Vildagliptin analysis in pharmaceutical dosage form and biological matrices.

**Keywords:** Vildagliptin, analytical method, RP-HPLC, GC-MS.

**CH-100**

## COCONUT SHELL ASH: A SUSTAINABLE AND AFFORDABLE SOURCE FOR ALKALINE WATER

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A research was conducted to examine the origins and the process of preparation of alkaline ionized water and alkaline mineral water. Although water ionizers can be used to produce alkaline ionized water, they are extremely expensive machines, and the mineral makeup of the treated water are also heavily reliant on the quality of the source water. this study concentrated on the effectiveness of utilising coconut shell ash as a new and eco-sustainable source of obtaining alkaline water. It was studied in terms of the properties of physicochemical character and chemical constituents of coconut shell ash in terms of mineral profile and their uses in increasing the pH of water. To test the changes in pH, mineral enrichment, and safety parameters such as a biocompatibility and a toxicity test of minerals, laboratory experiments were carried out. A controlled human trial was also conducted, to identify the therapeutic and pharmacological usefulness of the coconut shell ash-treated alkaline water. There was an improvement in the level of hydration, reduction of gastric acid, and electrolytes balance in participants using treated water. The results confirm the hypothesis that this natural and inexpensive method has the potential to serve as a viable long-term alternative to costly commercial methods of alkaline water production, and also has health-promoting properties, and low environmental impact.

**Keywords**: Alkaline water, coconut shell ash, pH enhancement, hydration, electrolyte balance, sustainable water treatment, acid-neutralization, pharmacological benefits

**CH-101**

## DEVELOPMENT AND VALIDATION OF UPLC METHOD FOR THE DETERMINATION OF ALPHA LIPOIC ACID IN PHARMACEUTICAL FORMULATION: ADMINISTERED IN THE THERAPEUTIC REGIMEN FOR DIABETIC PERIPHERAL NEUROPATHY

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The goal of the research was to develop a UPLC (Ultra-performance liquid chromatography) method for the determination and validation of Alpha-lipoic acid in API and in pharmaceutical formulation. UPLC is a more advanced technique than HPLC as it offers several advantages making it a better technique in many applications in terms of faster analysis, lower solvent consumption, higher efficiency and much more, so this method was selected. The method was performed using Waters C18 (250×4.6mm,5µ) column using a mobile phase of 0.025M Phosphoric acid and Acetonitrile in the ratio (62:38) at a flow rate of 1ml/min. The injection volume is 20 µL and the detection has been carried out at 274nm by using UV detector. The developed method has been validated as per ICH guidelines (Q2 R1) for Linearity, specificity, precision, accuracy, robustness and system suitability. The method is linear in the drug concentration range of 50-150 µg/ml with a correlation coefficient of 0.9993. The accuracy (recovery) was calculated between 98-102 %. Furthermore, after validating the method and correlating the obtained values with the standard values, satisfactory results were obtained and performed assay. The assay showed consistent retention times, reliable peak performance with a low tailing factor, and excellent precision with % RSD values within limits. It can be concluded that the developed method was simple, precise, accurate, linear and robust for determination of Alpha-lipoic acid in API and in pharmaceutical formulation by UPLC.

**Keywords**: Alpha-lipoic acid; UPLC; Method development; Method validation.

**CH-102**

## AN *IN-SILICO* AND *IN-VIVO* APPROACH: ORCHESTRATING FOOD INTAKE AND ENERGY EXPENDITURE BY TARGETING CNOT6L DEADENYLASE USING DARK CHEMICAL MATTER

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This study aimed to investigate the potential of Dark Chemical Matter (DCM)-derived novel compounds targeting CNOT6L, a key deadenylase subunit of the CCR4-NOT complex involved in post-transcriptional regulation of metabolic genes such as GDF15 and FGF21. Dysregulation of these regulatory pathways contribute to obesity by affecting energy balance and adipocyte function. To identify selective CNOT6L modulators, 1,20,479 compounds from the Dark Chemical Matter (DCM) library were screened in-silico using molecular docking and pharmacophore modelling. DCM compounds are known for their high selectivity and minimal off-target effects, making them promising candidates for drug discovery. Deep learning models based on Directed Message Passing Neural Networks (D-MPNN) were employed to predict ADMET properties. Molecular dynamics (MD) simulations were conducted to evaluate the binding stability of top ligands. Protein-ligand contact analysis highlighted key residues (Asn412, Glu240, His360, Tyr201 and Phe484). AI-guided screening of DCM ligands identified stable CNOT6L binders with favorable pharmacokinetic properties. Top candidates were subsequently evaluated in-vivo using high-fat diet (HFD) induced obese mouse model. Lead compounds significantly reduced weight and improved energy metabolism in obese mice. These findings establish DCM-derived scaffolds as promising modulators of deadenylase activity for obesity therapy, and a valuable source of novel drug-like molecules.

**Keywords**: Dark Chemical matter (DCM), CNOT6L Deadenylase, Obesity, D-MPNN, AI

**CH-103**

## METHOD DEVELOPMENT, VALIDATION AND FORCED DEGRADATION STUDY OF FLUTICASONE FUROATE AND OXYMETAZOLINE HYDROCHLORIDE USING RP-HPLC

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Fluticasone furoate and oxymetazoline hydrochloride are widely used in nasal sprays due to their synergistic effect in treating nasal congestion and allergic rhinitis. Fluticasone furoate, a corticosteroid, provides long-lasting anti-inflammatory action, while oxymetazoline hydrochloride, and α-adrenergic agonist, offers rapid vasoconstriction for symptomatic relief. Despite their frequent combination in marketed formulations, no stability-indicating HPLC assay method has been extensively reported for simultaneous estimation. This study aimed to develop and validate a robust reversed-phase high-performance liquid chromatography (RP-HPLC) method for quantitative analysis of both drugs in nasal spray formulations, in accordance with ICH guidelines. Chromatographic separation was achieved on a C18 column using a gradient elution with phosphate buffer and acetonitrile, with detection at 240 nm. Validation demonstrated excellent linearity for fluticasone furoate (5–42 ppm; $r^2$ = 0.9995) and oxymetazoline hydrochloride (10–75 ppm; $r^2$ = 0.9996). Precision results showed %RSD values below 2.0 for system and method precision, while accuracy studies confirmed mean recoveries within 98–102%. Robustness testing indicated the method's reliability against minor variations in chromatographic conditions. Forced degradation studies under acid, base, oxidative, photolytic, thermal, and humidity stress confirmed the method's specificity and stability-indicating nature, with degradants well resolved from analyte peaks. The validated method proved selective, accurate, precise, robust, and suitable for routine




ISBN: 978-81-980623-8-3

quality control and stability assessment of nasal spray formulations containing fluticasone furoate and oxymetazoline hydrochloride.

**Keywords**: Fluticasone Furoate, Oxymetazoline Hydrochloride, Reversed-Phase HPLC, Validation, Forced Degradations

**CH-104**

## NOVEL MANNICH BASE DERIVATIVES: DESIGN, SYNTHESIS, CHARACTERIZATION, AND ASSESSMENT OF ANTIMICROBIAL AND ANTI-INFLAMMATORY ACTIVITIES

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The chief purpose of this study was to estimate the microbicidal and anti-inflammatory properties of novel mannich base analogues. These analogues were synthesised by condensation reaction between the active hydrogen donating compounds (phenol, Malonic acid, Acetophenone), guanidine and different aldehydes. The synthesised analogues were characterized by FT-IR, 13C-NMR, 1H-NMR and Mass spectroscopy. Later the estimation of biological activities of these analogues was performed on anti-microbial and anti-inflammatory effects by using disc diffusion, insilico docking method, inhibition of protein denatured and membrane stabilizing activity methods. Each compound was shown admirable anti-microbial activities against E. coli, B. subtilis, A. flavus and A. niger. The anti-inflammatory activity result reveals an excellent effect on inhibition of protein denatured and RBC haemolysis was observed. The results obtained are firmly similar to insilico study results. These values were close to the reference drugs.

**Keywords:** Mannich base derivatives, Anti-microbial, anti-inflammatory activity.

**CH-105**

## SIMULTANEOUS HPLC DETERMINATION OF METFORMIN, ALPHA LIPOIC ACID AND DAPAGLIFLOZIN USED IN COMBINED THERAPY FOR TYPE 2 DIABETES

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Metformin (MET), Alpha lipoic acid (ALA) and Dapagliflozin (DAP) is a well-known antidiabetic agents used to control blood glucose levels in type -2 diabetes through different mechanisms. Due to the lack of analytical reports for the simultaneous estimation on Metformin, Alpha lipoic acid and Dapagliflozin in pharmaceuticals, we developed a specific, accurate, precise and reproducible HPLC method and subsequently validated for the simultaneous determination of Metformin, Alpha lipoic acid and Dapagliflozin in commercial tablets with retention time of 3.56 ,7.86 and11.63 respectively. The proposed HPLC method utilizes C18 column (250 mm × 4.6 mm i.d., 5 µm) and mobile phase consisting of methanol-acetonitrile-Potassium dihydrogen phosphate adjusted to pH 3 with ortho phosphoric acid (40:52:8 v/v/v) at a flow rate of 1.00 mL/min. Quantitation was achieved with UV detection at 224 nm. Based on peak area with linear calibration curves at concentration ranges 0.8-1.2µg/ml for metformin, 40-60 µg/ml for alpha lipoic acid and 0.8-1.2µg/mL for dapagliflozin (R2 > 0.993 for all drugs). The method was validated in terms of accuracy, precision, linearity, robustness and there is no interference from the tablet excipients was found. The assay showed consistent retention times, reliable peak performance with a low tailing factor, and excellent precision with % RSD values within limits. Hence, the developed method can be employed for the routine analysis in quality control laboratories.

**Keywords**: Metformin, Alpha lipoic acid, Dapagliflozin; HPLC; Method Validation.

**CH-106**

## NANOSYNTHESIS OF SULFONAMIDE AND THEIR ENHANCED ANTIDIABETIC ACTIVITY

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The advent of nanotechnology has revolutionized the development of sulphonamide-based therapeutics, offering enhanced pharmacological potential. Diabetes mellitus, a major global health concern, is projected to affect over 300 million people by 2025. Traditionally known for their pharmacological properties, sulphonamides have recently gained attention for their antidiabetic activity due to their ability to modulate key enzymes involved in glucose metabolism, such as aldose reductase, carbonic anhydrase, and dipeptidase-4. Nano synthesis enables the fabrication of sulphonamide-loaded nanostructures that improve drug stability, solubility, and targeted delivery. Nanoparticles, liposomes, and polymeric carriers enhance drug absorption and prolong circulation time, thereby increasing therapeutic efficacy. Recent studies have demonstrated that nano synthesized sulphonamides exhibit superior glucose-lowering potential and improved pancreatic β-cell protection compared to conventional forms. Present research investigation focusses on the synthesis and anti-diabetic activity have been successfully carried out and confirmed by HNMR, IR, Mass. This innovative approach not only boosts antidiabetic activity but also minimizes dose-related side effects, presenting a promising platform for future drug development. The integration of nanotechnology into sulphonamide synthesis marks a significant advancement in the treatment of metabolic disorders, particularly diabetes by offering more effective and safer therapeutic options.

**Keywords:** Sulphonamides, Nano synthesis, Antidiabetic Activity, Nanotechnology

**CH-107**

## NETWORK PHARMACOLOGY & MOLECULAR DOCKING BASED PREDICTION OF MOLECULAR TARGET AND SIGNALING PATHWAYS OF PIPERINE IN THE TREATMENT OF PD

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This study examines the therapeutic potential of Piper nigrum, a traditional medicinal herb, for Parkinson's disease (PD) using an integrated network pharmacology and molecular docking approach. Active compounds of Piper nigrum were identified and screened for bioavailability and drug-likeness to highlight pharmacologically relevant molecules. The overlap between compound-related genes and PD-associated genes revealed key targets, including GAPDH, AKT1, EGFR, and ALB, which are involved in critical pathways such as PI3K-Akt, MAPK signaling, and inflammatory regulation. A network analysis demonstrated that bioactive compounds piperine, quercetin, carvacrol, and nerolidol—exert multi-target effects, modulating several genes and pathways linked to PD pathology. Molecular docking confirmed stable and strong binding interactions between these compounds and target proteins, with binding affinities often exceeding those of standard control drugs. ADMET profiling indicated favorable pharmacokinetic and safety features for these compounds, supporting their potential as therapeutic candidates. Functional enrichment analyses further implicated these targets in neuronal apoptosis regulation, immune response, and dopaminergic synapse function. Notably, piperine demonstrated neuroprotective effects in preclinical models, linked to antioxidant, anti-inflammatory, and autophagy-promoting activities. This study provides a comprehensive bioinformatics foundation that deepens understanding of Piper nigrum's mechanisms in PD treatment and highlights multiple molecular pathways for therapeutic intervention. The findings advocate for further experimental and clinical investigations to validate the efficacy and safety of these natural compounds and accelerate the development of Piper nigrum-based therapies for Parkinson's disease. Ultimately, this work supports the growing interest in natural products as multi-targeted agents in the management of neurodegenerative disorders.

**Keywords:** Network Pharmacology, Molecular Docking, Phytoconstitents, PD.

**CH-108**




ISBN: 978-81-980623-8-3

**DEVELOPMENT AND VALIDATION OF A SIMPLE UV SPECTROPHOTOMETRIC METHOD FOR ESTIMATION OF IMEGLIMIN HYDROCHLORIDE**

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Imeglimin hydrochloride is a recently approved oral drug for type 2 diabetes, and having a reliable, simple, and cost-effective method to measure it is important for quality control. In this study, we developed and validated a straightforward UV spectrophotometric method for its estimation in bulk form. Double distilled water was chosen as the solvent since the drug showed good solubility and reproducibility. Samples in the concentration range of 2.5–15 µg/ml were analyzed using three approaches: absorbance maxima at 239 nm, area under the curve between 232–245 nm, and derivative spectrophotometry. The method was validated according to ICH guidelines. The results demonstrated excellent linearity ($R^2$ = 0.999), recovery values close to 100% (99–101%), and precision within acceptable %RSD limits, confirming accuracy and reproducibility. Overall, the method proved to be simple, rapid, and robust, requiring minimal resources, which makes it particularly suitable for routine quality control testing of Imeglimin hydrochloride in pharmaceutical industries and small-scale laboratories.

**Keywords:** Imeglimin hydrochloride, UV spectrophotometry, Derivative method, Area under curve, Validation

**CH-109**

**FABRICATION AND CHARACTERIZATION OF BETA-CYCLODEXTRIN NANOSPONGES LOADED WITH 6-MERCAPTOPURINE**

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The present study focuses on the fabrication and characterization of β-cyclodextrin-based nanosponges loaded with 6-mercaptopurine, an anticancer drug widely used in the treatment of leukaemia, autoimmune disorders, inflammatory bowel diseases, and choriocarcinoma. Owing to its poor aqueous solubility, the drug's dissolution rate and stability were targeted for improvement through nanosponge complexation. Nanosponges, being porous, sponge-like nanostructures, provide an efficient matrix for drug entrapment and release. In this work, five nanosponge formulations were prepared by varying the molar ratio of β-cyclodextrin and diphenyl carbonate as cross-linker, followed by drug loading using the freeze-drying method. The formulations were systematically evaluated for percentage yield, entrapment efficiency, solubility, particle size distribution, zeta potential, scanning electron microscopy (SEM), and subjected to *in-vitro* and *in-vivo* studies. SEM analysis confirmed spherical, nanosized particles with a uniform morphology. Solubility studies revealed a marked enhancement in the aqueous solubility of 6-mercaptopurine from the nanosponge formulations compared to the pure drug. Among the prepared formulations, the best candidate was identified based on entrapment efficiency and *in-vitro* dissolution profile, demonstrating significantly improved drug release characteristics. The porous architecture of nanosponges facilitated controlled release of the drug, while the preparation method was reproducible and efficient. Overall, the results establish β-cyclodextrin nanosponges as a safe and effective nanocarrier system for enhancing solubility, dissolution rate, and therapeutic performance of poorly water-soluble drugs such as 6-mercaptopurine, with promising potential for cancer and autoimmune therapy.

**Keywords:** 6-mercaptopurine, β-cyclodextrin, diphenyl carbonate, freeze drying, nanosponges.

**CH-110**

**DEVELOPMENT OF BIS-CHALCONE DERIVATIVES: POTENTIAL ANTI-INFLAMMATORY AND ANALGESIC COMPOUNDS**

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Inflammation is a complex and essential protective response to tissue injury and external stimuli, characterized by the release of mediators such as prostaglandins and leukotrienes, which often induce pain. Chronic inflammation can result in tissue damage and is a contributing factor to various diseases, including arthritis, cardiovascular disorders, neurodegeneration, and cancer. Chalcones are naturally occurring compounds found in citrus fruits and vegetables (such as butein and naringenin). They serve as precursors in the synthesis of various heterocyclic compounds and have been extensively studied for their broad biological activities, notably their anti-inflammatory effects, mediated through inhibition of cyclooxygenase (COX) and lipoxygenase (LOX) pathways. However, bis-chalcone derivatives, which are structural analogues of chalcones, have received less attention, despite emerging evidence indicating their potentially superior anti-inflammatory properties. The increasing demand for novel anti-inflammatory agents in the treatment of conditions such as arthritis and gout has driven research focused on pain and inflammation management. In the present study, novel α, β-unsaturated carbonyl bis-chalcone derivatives were synthesized via Claisen–Schmidt condensation reactions between aromatic aldehydes and ketones. The synthesized compounds were evaluated for their anti-inflammatory and analgesic activities. All compounds exhibited stability and were characterized by UV spectroscopy, thin-layer chromatography (TLC), nuclear magnetic resonance (NMR), mass spectrometry (MS), and elemental analysis.

**Keywords:** α, β-unsaturated carbonyl compound, bis-chalcone, inflammation, analgesic.

**CH-111**

**LC-MS METHOD FOR DETERMINATION OF BARICITINIB IN PLASMA: AND ITS APPLICATION IN A PHARMACOKINETIC STUDY IN RATS**

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Baricitinib, is a selective and reversible Janus kinase inhibitor, is commonly used to treat adult patients with moderately to severely active rheumatoid arthritis (RA). A fast, reproducible and sensitive method of liquid chromatography-tandem mass spectrometry (LC-MS/MS) for the quantification of baricitinib in rat plasma has been developed. Irbersartan was used as the internal standard (IS). Baracitinib and IS were extracted from plasma by liquid–liquid extraction using a mixture of n-hexane and dichloromethane (1:1) as extracting agent. Chromatographic separation was performed using Acquity UPLC HILIC BEH 1.7 µm 2.1 × 50 mm column with the mobile phase consisting of 0.1% formic acid in acetonitrile and 20 mM ammoniu acetate (pH 3) (97:3). The electrospray ionization in the positive-mode was used for sample ionization in the multiple reaction monitoring mode. Baricitinib and the IS were quantified using precursor-to-production transitions of m/z 372.15 > 251.24 and 429.69 > 207.35 for baricitinib and IS, respectively. The method was validated according to the recent FDA and EMA guidelines for bioanalytical method validation. The lower limit of quantification was 0.2 ng/mL, whereas the intra-day and inter-day accuracies of quality control (QCs) samples were ranged between 85.31% to 89.97% and 87.50% to 88.33%, respectively. Linearity, recovery, precision, and stability parameters were found to be within the acceptable range. The method was applied successfully applied in pilot pharmacokinetic studies.

**Keywords:** baricitinib, UPLC-MS/MS, pharmacokinetic study, irbersartan

**CH-112**

**DEVELOPMENT AND VALIDATION OF QBD APPROACHED ASSAY METHOD FOR PALBOCICLIB BY USING LC-MS/MS**

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This work presents a simple and fast method for the estimation of Palbociclib by using LC-MS/MS method. Samples were evaluated directly by using C18 Column (150 mm x 4.6 mm ID, 5 µm) by using ACN: Orthophosphoric acid as mobile phase with flow rate 1ml/min. The




ISBN: 978-81-980623-8-3

determination of Palbociclib was carried out at 235nm wavelength. Mass Septroscopy method development was carried out by using Quadrupole Analyzer and Electron Spray Ionizer and the Molecular weight of Palbociclib was found 447.533gm/mole. Established the design space by using QbD software by considering two parameters like pH and Organic Phase. The method was validated according to ICH guidelines with respect to Specificity, Precision (System and Method), Ruggedness, Linearity (R2 =0.999), and Accuracy. All the parameters examined were found to be well within the stated guidelines. The present method can be used for the routine analysis.

**Keywords:** Palbociclib, Liquid Chromatography, Mass Spectroscopy, QbD.

**CH-113**

## COMPARATIVE MOLECULAR DOCKING STUDIES OF PHYTOCONSTITUENTS FOR CARISSA CARANDAS FOR ITS LUNG CANCER ACTIVITY

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Globally, Lung cancer is a primary cause of Cancer related mortality in both men and women. accounting for 85% of lung cancer cases. Non-Small Cell Lung Cancer (NSCLC) is the most common subtype, for which various therapies and treatments are available, such as chemotherapy, immunotherapy, radiotherapy, targeted therapy etc., but they carry problems like poor *in vivo* stability, off target toxicity and medication resistance. Plant based metabolites have demonstrated high efficacy and low toxicity when used to treat lung cancer. Carissa Carandas is a promising herbal plant with several reported anti-cancer activities. In this study, total twelve phytochemicals from the plant have been screened for their potential activity specifically against three target proteins of NSCLC namely, EGFR inhibitor, ALK inhibitor and KRAS inhibitor using in-silico molecular docking studies. Lorlatinib, a marketed anticancer drug used in NSCLC was taken as standard drug. ADME studies were also applied to find the pharmacokinetic parameters of phytoconstituents using Swiss ADME software. Pharmacokinetic parameters were found to be comparable with standard drug. Molecular docking results were found to be satisfactory. The selected ligands showed good binding affinity with 8A27 and 8ONV with the highest binding score being -9.6 Kcal/mol and -9.9 Kcal/mol respectively for both the receptors

**Keywords**: In lung cancer, Non-Small Cell Lung Cancer (NSCLC), *in-silico* molecular docking, carissa carandas

**CH-114**

## METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS ESTIMATION OF CABOTEGRAVIR AND RILPIVIRINE IN TABLET DOSAGE FORM BY RP- HPLC

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We developed and validated a simple, efficient, and less time-consuming analytical method for simultaneous estimation of Cabotegravir and Rilpivirine in tablet dosage form by RP-HPLC. A simple, rapid, precise, sensitive and reproducible reverse phase high performance liquid chromatography (RP-HPLC) method has been developed for the quantitative analysis of Cabotegravir and Rilpivirine in pharmaceutical dosage form. Chromatographic separation of Cabotegravir and Rilpivirine was achieved on Waters Alliance-e2695, by using Waters XBridge phenyl, 150x4.6mm, 3.5µm column and the mobile phase containing Ammonium formate pH-3.5/formic acid & ACN in the ratio of 70:30% v/v. The flow rate was 1.0 mL/min; detection was carried out by absorption at 269nm using a photodiode array detector at ambient temperature. The number of theoretical plates and tailing factor for Cabotegravir and Rilpivirine were NLT 2000 and should not more than 2 respectively. % Relative standard deviation of peak areas of all measurements always less than 2.0. The proposed method was validated according to ICH guidelines. The method was found to be simple, economical, suitable, precise, accurate & robust method for quantitative analysis of Cabotegravir and Rilpivirine and study of its stability.

**Keywords:** RP-HPLC, Validation, Cabotegravir, Rilpivirine, ICH guidelines

**CH-115**

## HPTLC METHOD DEVELOPMENT AND VALIDATION FOR QUANTIFYING MARKER COMPOUND EUGENOL IN AYURVEDIC FORMULATION AYUSH KVATHA CHURNA

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The SARS-CoV-2 has posed a serious threat to mankind, affecting millions of people worldwide. A traditional Ayurvedic formulation; Ayush Kwath Churna, known for its immunity-boosting properties, has gained attention during the pandemic. However, concerns regarding the adulteration of this formulation have raised significant issues related to its quality, safety, and efficacy. The aim of the present study was to develop a simple, accurate, and sensitive High-Performance Thin-Layer Chromatography (HPTLC) method for the detection and quantification of the marker compound eugenol, an alkaloid, in the Ayurvedic formulation Ayush Kwath Churna for the purpose of standardization. HPTLC study was done with methanolic extraction Ayush Kwath Churna (AKC) using Eugenol as a marker compound. The analysis was carried out on silica gel 60 F254 HPTLC plates using optimized mobile phase; toluene: chlorofom: methnol: formic acid (4:4:1:0.3) v/v/v/v and detection of amount of eugeol was carried out at lambdamax 282 nm. The method was validated by following the ICH guideline Q2 (R1), covering parameters such as linearity, precision, accuracy, limit of detection (LOD), and limit of quantification (LOQ). The calibration curve exhibited linearity in the range of 100–700 ng/spot for Eugenol, with an Rf value of approximately 0.4 ± 0.018. The LOD and LOQ were determined to be 0.13 µg/spot and 0.40 µg/spot, respectively. The method showed high repeatability with relative standard deviations (RSD) less than 2%. Recovery studies demonstrated good accuracy with results of 97.13% recovery. The Rf of marker compound eugenol was observed at 0.4 ± 0.018 and presence of eugenol in ayush kwath churna formulation was qualified at lambdamax 282 nm. This method can be successfully employed for the standardization and quantitative analysis of eugenol in Ayush Kwath Churna. Furthermore, it may assist researchers in elucidating the significant role of eugenol present in the formulation, thereby contributing to the understanding of its therapeutic potential.

**Keywords:** Eugenol, Ayush Kwatha Churna, Quantification, Standardisation, SARS-CoV-2.

**CH-116**

## NOVEL LC-MS/MS METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS DETERMINATION OF SITAGLIPTIN AND ERTUGLIFLOZIN IN RAT PLASMA AND ITS APPLICATION TO PHARMACOKINETIC STUDY

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The development of bioanalytical LC-MS/MS method is of paramount important analytical tool of choice for both selective and sensitive detection of compounds of interest in pharmaceutical formulations. To develop a novel, rapid and sensitive LC-MS/MS method for the simultaneous determination of Sitagliptin and Ertugliflozin in rat plasma by liquid-liquid extraction method (LLE) using deuterated Sitagliptin (SGd6) and Ertugliflozin (EGd6). Chromatographic separation was carried out on a reverse phase Waters Xetrra C18 (150mm x 4.6mm, 2µm) column using mixture of acetonitrile and orthophosphoric acid buffer (50:50v/v) at a flow rate of 1ml/min in isocratic mode. Quantification was achieved using an electrospray ion interface operating in positive mode, under multiple reaction monitoring (MRM) conditions. The method showed excellent linearity over the concentration range of 5.00-75.00pg/mL for Sitagliptin and 0.75-11.35pg/mL for Ertugliflozin. The intra-batch and inter-batch precision (%CV) was ≤ 4.3% and matrix effect (%CV) was 0.02% and 0.12% for Sitagliptin at HQC and LQC, respectively. Matrix effect (%CV) was 0.08% and 0.33% for Ertugliflozin at HQC and LQC, respectively. The simplicity of the method allows for application in pharmaceutical laboratories presents a valuable tool for pharmacokinetic studies. The developed assay method has been proficiently applying on pharmacokinetic study in rats subjects.




ISBN: 978-81-980623-8-3

**CH-117**

## SYNTHESIS AND CHARACTERIZATION OF 5-ASA-METHOTREXATE AZO PRODRUG FOR COLON-TARGETED DUAL DRUG DELIVERY

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The present study describes the design and synthesis of a colon-targeted drug delivery system employing an azo-based prodrug strategy to achieve site-specific release of two active pharmaceutical ingredients (APIs) while ensuring stability in gastric and intestinal fluids. Methotrexate (MTX), a folate antagonist and established chemotherapeutic agent in colorectal cancer, was selected in combination with 5-aminosalicylic acid (5-ASA), a first-line therapeutic agent for ulcerative colitis. 5-ASA was diazotized in concentrated hydrochloric acid at 0–5 °C using sodium nitrite, and the resulting diazonium salt was coupled with methotrexate under mild alkaline conditions. The reaction mixture was stirred for 24 hrs and monitored by TLC with a hexane: ethyl acetate: methanol: water system (1:3:2:4), while the starch–iodide test confirmed excess nitrite. The crude product was recrystallized with ethanol to yield a yellow azo adduct (45%) with a melting point of 320 °C, Rf value of 0.53, solubility in phosphate buffer (pH 7.4), and insolubility in dilute HCl. Structural characterization by IR, NMR, Mass, and UV spectroscopy confirmed the azo linkage (–N=N–) with a characteristic IR band at 1593 $cm^{-1}$. *In-vitro* release studies using rat fecal material in phosphate buffer (pH 7.4) demonstrated colon specificity, with methotrexate and 5-ASA released at approximately 59.64% and 57.34%, respectively, after 30 min. No acute toxic effects were observed in animals. The synthesized 5-ASA–methotrexate azo adduct shows promise as a colon-specific prodrug for dual-drug delivery, offering improved therapeutic efficacy, dose reduction, minimized adverse effects, and better patient compliance.

**Keywords:** Azo prodrug, 5-ASA–methotrexate adduct, azo reductase, dual-drug therapy, colonic disorders

**CH-118**

## METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS ESTIMATION OF CLOBETASOL PROPIONATE AND SALICYLIC ACID BY RP-HPLC

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A rapid, accurate, and precise reverse-phase high-performance liquid chromatography (RP-HPLC) method was developed and validated for the simultaneous estimation of Clobetasol Propionate and Salicylic Acid in pharmaceutical formulations. The chromatographic separation was achieved using a C18 column with a suitable mobile phase consisting of e.g., Acetonitrile: Sodium Dihydrogen Phosphate], adjusted to a pH of [7.3], at a flow rate of e.g. 1.0 mL/min] Detection was carried out at a wavelength of e.g. 254 nm], with retention times for Clobetasol propionate and Salicylic acid observed at [4.4 min and 2.3 min] respectively. The method was validated as per ICH guidelines for parameters including specificity, linearity, accuracy, precision, limit of detection (LOD), limit of quantification (LOQ), and robustness. The calibration curves for both drugs showed excellent linearity over the concentration ranges of [insert concentration range] with correlation coefficients ($r^2$) greater than 0.999. Recovery studies confirmed the accuracy of the method, with recoveries within acceptable limits. The method demonstrated good precision with %RSD values below 2% . This validated RP-HPLC method is suitable for routine quality control analysis of Clobetasol propionate and Salicylic acid in combined dosage forms, ensuring reliable and efficient quantification in pharmaceutical industries. A neutral pH works well for both acidic and basic compounds analytes remain chemically stable at neutral pH, preventing degradation. Objectives include drug characterization, method development, validation as per ICH guidelines, and greenness assessment using AGREE and BAGI tools. The need arises from limitations of existing methods with high retention times, highlighting the requirement for a simpler, accurate, cost-effective, and eco-friendly approach. This validated RP-HPLC method is suitable for routine quality control analysis of Clobetasol propionate and Salicylic acid in combined dosage forms, ensuring reliable and efficient quantification in pharmaceutical industries.

**Keywords:** RP-HPLC, Clobetasol Propionate, Salicylic Acid, ICH Guidelines, Analytical Method.

**CH-119**

## METHOD DEVELOPMENT AND VALIDATION FOR THE ESTIMATION OF TENELIGLIPTIN IN TABLET DOSAGE FORM BY RP- UPLC

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A novel, simple, precise, and accurate analytical method for the estimation of Teneligliptin in a tablet dosage form was developed and validated using a Reverse-Phase Chromatographic Technique with Ultra-High Performance Liquid Chromatography (UHPLC). The method utilized a Phenomenex Luna C-18 (50 mm x 3.0 mm, 3µm) column with a mobile phase consisting of Buffer and Acetonitrile in a 50:50 ratio at a flow rate of 0.5 ml/min. Detection was performed at 245 nm. The optimized method yielded a sharp peak for Teneligliptin with a retention time of 1.02 minutes and a theoretical plate count of approximately 2100. The method demonstrated excellent linearity in the range of 50% to 150% of the target concentration. The proposed method was validated for several parameters, including system suitability, linearity, precision, accuracy, specificity, robustness, and ruggedness. The results confirmed that the method is specific, with no interference from the placebo, and is highly robust and rugged. The percentage recovery studies were within acceptable limits, indicating the high accuracy of the method. These findings suggest the developed UHPLC method is suitable for the routine and reliable estimation of Teneligliptin in pharmaceutical dosage forms.

**Keywords:** UPLC, Method Development, Teneligliptin

**CH-120**

## SYSTEMIC OPTIMIZATION AND VALIDATION OF RP-HPLC METHOD FOR THE ESTIMATION OF RITONAVIR FROM HYBRID POLYMERIC NANOPARTICLES IN RAT PLASMA

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Hybrid polymeric materials have been in research focus owing to their outstanding progression in drug targeting. A new Quality by Design approach by RP-HPLC was developed and validated to estimate the hybrid polymeric nanoparticles of Ritonavir in rat plasma. The main objective of the present study was to develop and validate a simple, robust, and accurate method for the detection of hybrid polymeric nanoparticles of Ritonavir in plasma. The mobile phase consisting of a mixture of Acetonitrile: HPLC grade water (60:40 v/v), 1.0 ml/min flow rate and UV detection at 240 nm. Critical Analytical Attributes (CAAs) were screened and selected by Taguchi orthogonal array model. Box-Behnken's three-level, the 3- factorial design, was employed to create and analyze a "Design Space" (DoE). This design was statistically analyzed by ANOVA, contour-plot, and 3D response surfaces plots, confirming its significance. The developed method was validated as per the ICH guidelines Q2 (R1). It showed excellent linearity between 100 and 600 ng/mL with good regression (R2>0.998), LOD (10 ng/mL) and LOQ (30 ng/mL). The validation results of the tested parameters were found within the acceptable limit. From the study, it was concluded that QbD driven bioanalytical method is suitable for the *in-vitro* and *in-vivo* estimation of Ritonavir from bulk as well as from hybrid polymeric nanoparticles formulation.

**Keywords:** Design of Experiments (DoE), hybrid polymeric nanoparticles, RP-HPLC Method, Ritonavir, rat plasma.

**CH-121**

## IMPURITY GENERATION AND PREVENTION IN INVESTIGATION AND MITIGATION STRATEGIES IN RAMIPRIL

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ISBN: 978-81-980623-8-3

Impurity profiling is a crucial aspect in safeguarding the safety, stability, and therapeutic performance of Active Pharmaceutical Ingredients (APIs). The present study emphasizes impurity assessment through systematic forced degradation and drug–excipient compatibility investigations. Stress degradation experiments were performed under acidic, alkaline, and oxidative conditions at elevated temperatures (40°C and 60°C) to identify possible degradation pathways. A precise and validated Reverse Phase–High Performance Liquid Chromatography (RP-HPLC) method was developed for simultaneous quantification of the API and its degradation products, employing an optimized mobile phase of acetonitrile and water (70:30, v/v), which enabled effective separation. Compatibility studies carried out using HPLC and FTIR revealed potential interactions with certain excipients, particularly lactose monohydrate, suggesting the likelihood of Maillard-type reactions. The findings highlight the importance of strict impurity control, rational excipient selection, and advanced analytical method development in achieving a stable and safe pharmaceutical formulation. This work provides essential insights to support impurity prevention and management strategies in pharmaceutical product development.

**Keywords:** Impurity profiling, forced degradation, Drug–excipient compatibility, RP-HPLC method validation, Degradation products, Maillard reaction, pharmaceutical formulation development.

**CH-122**

## NETWORK MODELLING AND COMPUTATIONAL INSIGHTS OF THE PHYTOCHEMICALS FROM CLERODENDRUM INERME L. AGAINST PROSTATE CANCER

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Prostate cancer is the world's second most common cancer among men. It accounts for approximately 14.2% of new cancer cases in men, with an age-adjusted incidence rate of 29.4 per 100,000 population. Clerodendrum inerme L. is a medicinal plant with wide therapeutic applications. It contains cardiac glycosides, anthraquinones, phenolics, flavonoids, saponins, tannins, terpenes, steroids, carbohydrates, volatile oils and lignin. In this current research, we examined the efficiency of bioactives of this plant against prostate cancer using a network pharmacology approach. The phytochemicals were retrieved from IMPPAT, Coconut database, Phytohub version 1.4, Medicinal Plants database, The Natural Products Atlas, Dr. Duke's Phytochemical and Ethnobotanical database and KNApSAcK Core system databases. The physicochemical, pharmacokinetic and toxicity profile of the retrieved phytochemicals were predicted by SwissADME, ProTox 3.0 and CardioTOXCSM webservers. The drug score was predicted using OSIRIS Property Explorer and the findings showed the druggable nature of the compounds. The appropriate targets of the phytochemicals were predicted by the network modelling and enrichment analyses, which merely showed that they will be highly active against prostate cancer, i.e., EGFR, AKT1, ESR1, PIK3R1 and SRC. The molecular docking against the predicted targets using Autodock tools was performed and compared with the co-crystallized ligand and standard. Owing to the various computational studies and drug scores, the findings revealed that the compounds Acacetin, Apigenin, Diosmetin, Glutinol, Salvigenin and Tricin were highly active with better binding energies and interaction profiles against the tested targets. Thus, these compounds can be used in prostate cancer management. However, *in vitro* and *in vivo* studies are warranted.

**Keywords:** Prostate Cancer, Clerodendrum inerme L., Computational studies, Network Pharmacology, Molecular docking

**CH-123**

## MOLECULAR DOCKING, SYNTHESIS AND BIOLOGICAL EVALUATION OF NEW BENZIMIDAZOLE-PYRIDINE DERIVATIVES AS POTENTIAL AROMATASE INHIBITOR FOR THE TREATMENT OF CANCER

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Cancer is one of the major global concerns for human health, with its incidence rising due to a variety of factors, Cancer is a leading cause of death worldwide. In 2020, WHO reports estimated 10 million cancer deaths, accounting for nearly one in six deaths globally. The most common cancers are breast, lung, colon and rectum, and prostate cancers. While the therapeutic landscape for cancer treatment has improved significantly in recent decades, there are still several challenges in this area, including the lack of response of some tumor types, resistance to current drugs, and high toxicity to normal cells.This study describes the synthesis of N5-(4-(1H-benzo[d]imidazol-2-yl)phenyl)-N2-phenylpyridine-2,5-diamine derivatives from Orthophenylenediamine (1) and 4-aminobenzoic acid (2) and all the synthesized chemical moieties screened against a panel of cancer cell lines resulted in the identification compound 6a with good anti-cancer potential and a GI50 of 2.95 µM, 3.35 µM, 2.27 µM, 8.46 nM and 1.56 µM against MDAMB-231, MCF-7, A-549, NCI-H23 and A-498 respectively. As the second greatest cause of death globally, cancer continues to pose a serious threat to public health. An essential enzyme called aromatase catalyses the last, rate-limiting step in the production of oestrogens. As a well-researched endocrine therapeutic strategy, aromatase inhibitors (AIs) efficiently block the production of oestrogen, which is necessary for aromatase activity.

**Keywords:** Aromatase · Benzimidazole · Pyridine · Anti-cancer ·Estrogen biosynthesis.

**CH-124**

## STABILITY INDICATING METHOD DEVELOPMENT AND VALIDATION OF LORCASERIN HYDROCHLORIDE BY RP-HPLC

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Lorcaserin hydrochloride is a selective serotonin 2C receptor agonist approved for chronic weight management. Stability-indicating analytical methods are critical for regulatory compliance and quality assurance because they allow you to accurately quantify the drug in the presence of degradation products. Develop and validate a simple, precise, accurate, and stable RP-HPLC method for estimating Lorcaserin hydrochloride in bulk and tablet dosage forms. The method was developed using a symmetry ODS (C18) RP Column (250 mm x 4.6 mm, 5µm) with a mobile phase of Phosphate Buffer (0.02M): Acetonitrile = 60:40 v/v (pH-2.8) at a flow rate of 1.0 mL/min. Detection was carried out at 225 nm using a UV detector. Forced degradation studies (acidic, alkaline, oxidative, photolytic, and thermal) were performed as per ICH guidelines to assess method specificity. The method was validated for linearity, precision, accuracy, robustness, LOD, and LOQ according to ICH Q2 (R1). Lorcaserin hydrochloride showed linearity in the concentration range of 10–50 µg/mL ($R^2$ = 0.999). The method demonstrated recovery in the range of 99.5–101.5%, intra-day and inter-day %RSD < 2%, and LOD/LOQ values of 0.07 µg/mL and 0.21 µg/mL respectively. Forced degradation confirmed the method's ability to separate drug peaks from degradation products, ensuring specificity. The developed RP-HPLC method is simple, accurate, precise, and indicates stability, making it appropriate for routine quality control and stability testing of Lorcaserin hydrochloride in pharmaceutical formulations.

**Keywords**: Lorcaserin hydrochloride, Stability indicating method, RP-HPLC, Method validation, ICH guidelines

**CH-125**

## *IN SILICO* ANALYSIS OF TRIAZOLE DERIVATIVES AS POTENTIAL PARP-1 INHIBITORS FOR CANCER THERAPY

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PARP-1, a key enzyme in DNA repair, plays a crucial role in treating BRCA-mutated cancers through its inhibition. Triazole derivatives demonstrate significant anticancer potential, and *in silico* methods offer cost-effective insights into their efficacy as PARP-1 inhibitors, advancing drug discovery. This study aims to accelerate the drug discovery process by identifying potent PARP-1 inhibitors through molecular docking and ADMET analysis. A library of approximately 240 1,3,4-triazole derivatives was designed using diverse aldehydes. Molecular docking studies with the




ISBN: 978-81-980623-8-3

4ZZZ.pdb structure identified the top 10 compounds with high binding affinities. These compounds were then assessed through ADMET profiling and MM-GBSA analysis for further validation. Molecular docking identified 10 triazole derivatives with high binding affinities to PARP-1 (PDB ID: 4ZZZ), with scores ranging from -5.5 to -9.2 kcal/mol. ADMET analysis revealed favourable pharmacokinetic properties, including high absorption, low toxicity, and good metabolic stability. MM-GBSA calculations showed binding free energies between -45 and -65 kcal/mol, confirming strong interactions with the PARP-1 active site. Molecular dynamics simulations further validated the stability of the protein-ligand complexes. These findings suggest that the top compounds are promising PARP-1 inhibitors for cancer therapy. The identified inhibitors, showing potential as PARP inhibitors, provide a foundation for further validation and contribute to advancements in targeted cancer therapies through computational drug discovery approaches.

**Keywords:** Triazole derivatives, PARP-1 inhibitors, Molecular docking, Binding affinity, MM-GBSA, Cancer Therapy.

**CH-126**

## FORMULATION AND SIMULTANEOUS ESTIMATION OF ATORVASTATIN AND ATENOLOL BY STABILITY INDICATING RP-HPLC METHOD

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This study aimed to formulate bilayer tablet and to develop stability indicating RP-HPLC method for simultaneous estimation of Atorvastatin and Atenolol in bulk and formulation. Atorvastatin is used to treat hyperlipidemia and it is a lipid-regulating HMG CO-A inhibitor, Atenolol is a beta blocker. Bilayer tablets were formulated where, Atorvastatin was in immediate release layer and Atenolol was in sustained release layer. Pre-formulation and post-formulation studies were carried out for all six formulations. RP-HPLC technique is used to estimate Atorvastatin and Atenolol using Waters (SunFire C18 Column, 100Å, 5 µm, 4.6 mm X 250 mm) column. Mobile phase selected was Phosphate Buffer: Acetonitrile: Methanol (35:5:60 v/v) with the flow rate of 1.2 ml/min and 10µl injection volume. Retention time was detected to be 6.539 for Atorvastatin and 3.731 for Atenolol with PDA detector. Validation for both the drugs was carried our according to ICH guidelines. Forced degradation for both the drugs was conducted with RP-HPLC. This currently developed method can be applied at industrial and research laboratories for effective and reproducible simultaneous estimation of Atorvastatin and Atenolol in bilayer tablet dosage form for their day-to-day regular analysis.

**Keywords:** Atorvastatin, Atenolol, cardiovascular diseases, RP-HPLC, Angina, Bilayer table, Formulation etc.,

**CH-127**

## METHOD DEVELOPMENT AND VALIDATION OF NITRATE, NITRITE IN FOOD, DRUGS AND ITS EXCIPIENTS BY ION CHROMATOGRAPHY

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Ion chromatography (IC) application, an analytical method that separates and quantifies ionic species based on their interaction with a resin-packed column under controlled eluent conditions. This study focuses on the quantitative detection of nitrate and nitrite in microcrystalline cellulose. A thorough sample preparation procedure was developed, which included centrifugation, filtration using 0.22 µm nylon syringe filters, aqueous extraction using Milli-Q water, and homogenization. A linear concentration range of 5-100 µg/L was covered by the carefully prepared calibration standards, which were made from certified stock solutions of nitrate and nitrite. The chromatographic separation, which was performed in isocratic mode with a mobile phase of 20 mM NaOH at a flow rate of 1.0 mL/min, was performed using a DIONEX IonPac AS19 analytical column and a corresponding AG19 guard column. A DIONEX ASRS 300 suppressor facilitated detection with a 50-mA current. The method's validation revealed good linearity (R2=0.99957-1), acceptable limits of detection (LOD 1.67 µg/L, LOQ: 5 µg/L), high recovery (91.54%-94.28%), and good repeatability (RSDr: 13.75%) and reproducibility (RSD: 13%). Internal Quality Control (IQC) characteristics that satisfied the established acceptance criteria guaranteed the method's dependability. The extended measurement uncertainty at 50 µg/kg was calculated to be between 6.89 and 7.769 µg/kg. Overall, the validated IC method provides a sensitive, accurate, and reliable approach for routine monitoring of nitrate and nitrite in pharmaceutical excipients.

**Keywords:** Ion Chromatography, Microcrystalline cellulose, Nitrate, Nitrite, Sample preparation, Calibration curve, Method validation, Internal quality control

**CH-128**

## SEPARATION AND QUANTIFICATION OF PHENAZOPYRIDINE HYDROCHLORIDE USED IN GENITO - URINARY THERAPY AND ITS IMPURITIES: OPTIMIZATION OF CHROMATOGRAPHIC SYSTEM EMPLOYING CENTRAL COMPOSITE DESIGN.

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A new RP-HPLC method for simultaneous determination of Phenazopyridine HCl (PZP); along with its three impurities namely 2,6-diamino-5-phenyl-3-phenazopyridine (Imp A); 3,5-bis(phenylazo)-2,6-diaminopyridine (Imp B); and 2,6 – Diaminopyridine (Imp C) was developed. The method was developed using Thermo Hypersil C18 column in Shimadzu HPLC system (Tokyo, Japan) with LC10AD and LC10 ADvp with UV detector (SPD-10A). The mobile phase comprising of Acetonitrile (ACN): 10 mM Potassium di-hydrogen Ortho-Phosphate (60:40) delivered at a flow rate of 1 mL min-1 and monitored at a wave length of 254nm. The method developed was optimized using a chemometric tool, Central Composite design, to optimize the factors (ACN, Buffer concentration and Flow rate) effecting and interacting with the responses (tf1, Rs2,1 and tR4). The analysis time is 12.8 (<13 min). The method developed was validated according to ICH Q3A(R2) guidelines and confirmed the linearity, accuracy, precision and specificity. The LOD and LOQ were found to be 1.822 and 5.521 ng/mL for PZP; 1.380 and 4.1823ng/mL for Imp A; 0.973 and 2.95 ng/mL for Imp B; 2.346 and 7.11 ng/mL for Imp C; The method developed is of high sensitive of detecting 0.01% traces of impurities and aptness of the method was recognized by applying to assay the commercially available formulation Pyridium 200mg, confirmed applicability for routine analysis.

**Keywords:** HPLC, CCD, Phenazopyridine HCl, 2,6 – Diaminopyridine,2,6-diamino-5-phenyl-3-phenazopyridine,3,5-bisphenylazo)-2,6-diaminopyridine.

**CH-129**

## FERMENTATION OF D-LIMONENE TO BIOACTIVE METABOLITES BY ASPERGILLUS NIGER AND ASPERGILLUS FUMIGATES; IDENTIFICATION OF METABOLITES BY GC-MS

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The aim of this study was to identity the metabolites that is produced by converting D-limonene to bioactive metabolites by Aspergillus niger and Aspergillus fumigates. To 250 ml of conical flask containing 50 ml of full growth of culture (Aspergillus niger and Aspergillus fumigates), D-limonene (1%v/v) was added as a substrate by using sterile technique. The flasks were incubated in a dark room at 25°C in an incubator shaker (120 rpm) for 5 days. By centrifugation the extraction of bio transformed product of D-limonene was obtained (12800 rpm at 5oc, 10min). The supernatant was extracted with ethyl acetate (3x25ml). The solvent was removed under reduced pressure to obtain crude reaction product. Gas chromatography-Mass spectroscopy is used to identify metabolites. For the first time, α-terpineol and neodihydrocarveol (Aspergillus niger) have been reported as biotransformed products of d-limonene. Trans-p-mentha 2, 8 dienol, trans-p-2, 8 menthadien-1-ol, 4-piperidinemethamine, and dihydrocarveol have been identified as the D-


ISBN: 978-81-980623-8-3

limonene metabolites (Aspergillus fumigates). D-limonene was transformed into a number of significant molecules with applications in pharmacology and medicine. However, more research is required to determine the pharmacological activity of biotransformed compounds as well as to separate and purify the isolated biotransformed products.

**Keywords:** Biotransformation, D-Limonene, metabolites, GC-MS, Aspergillus niger, Aspergillus fumigates.

**CH-130**

**GREEN SYNTHESIS OF BOVINE SERUM ALBUMIN CONJUGATED SILVER NANOPARTICLES FROM THE AQUEOUS LEAF EXTRACT OF JATROPHA GLANDULIFERA ROXB. (EUPHORBIACEAE) AND EVALUATION OF ANTI-MICROBIAL ACTIVITIES**

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Nanotechnologies exhibit significant potential in the field of medicine, including in imaging techniques and diagnostic tools, implants, tissue-engineered constructs. Nanoparticles are involved in the targeted drug delivery system, where the medicament is selectively targeted or delivered only to its site of action. Albumin protein found in human blood has no immunogenicity as an endogenous protein and ensure its biocompatibility for albumin-based nanoparticles. The present study reports the green synthesis of Bovine serum albumin (BSA), Conjugated silver nanoparticles (SNPs) using aqueous leaf extract of Jatropha glandulifera roxb with silver nitrate solution as an antiseptic and cauterizing agent, where albumin solution as a plasma volume expander and oncotic agent. For this purpose, SNPs are prepared by the bio reduction method and allowed to interact with the native BSA to form protein-conjugated nanoparticles. Specifically, they are a type of metal-based nanoparticle. The synthesized BSA conjugated SNPs were analyzed through UV-Visible, FT-IR spectroscopy, NMR and FESEM. They were spherical in shape with an average size of 50-90 nm. Different *in-vitro* antimicrobial activities of the synthesized Nano composites of Jatropha glandulifera were carried out. The diameter of inhibition zones around the disc of two gram positive and one-gram negative bacterial strains viz Staphylococcus aureus, Bacillus subtilis, Escherichia coli. and antifungal activity of candida vulgaris has highest antimicrobial activity. It is concluded that the green synthesis of BSA conjugated SNPs creates a stabilized Nano bio- conjugate which has high plasma protein binding capacity that shows maximal bioavailability with minimal concentration without any side effect.

**Keywords:** Silver nanoparticles, bovine serum albumin, Jatropha glandulifera roxb, UV; FT-IR; NMR; FESEM, antimicrobial activity.

**CH-131**

***IN-SILICO* DESIGN, SYNTHESIS, CHARACTERIZATION AND BIOLOGICAL EVALUATION OF NOVEL 8-PYRAZOLINYL COUMARIN DERIVATIVES**

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Pyrazolinyl coumarins are an important class in heterocyclic and medicinal chemistry because of their various pharmacological benefits. Pyrazoles have a five-membered ring with two adjacent nitrogen atoms and are known for their analgesic, anti-inflammatory, antiarthritic, cytotoxic, and antiproliferative properties. Coumarins, meanwhile, are recognized for their anti-HIV, antituberculosis, anticancer, antioxidant, and anti-inflammatory effects. Combining a pyrazole core with a coumarin structure is expected to create synergistic effects, improving potency beyond what each part can achieve alone. In this study, we synthesized 8-pyrazolinyl coumarin derivatives by refluxing hydrazine hydrate with an intermediate made from condensing 8-acetyl-7-hydroxycoumarin and various aromatic aldehydes. The target compounds, known as 7-hydroxy-4-methyl-8-(substituted phenyl-4,5-dihydro-1H-pyrazol-3-yl)-2H-1-benzopyran-2-one derivatives, were tested for their biological potential. Previous studies show these derivatives as promising agents against cancer, fungi, and bacteria. Additionally, activity prediction using PASS online software suggested significant probabilities (Pa ~0.7) for these biological effects. We also screened all synthesized compounds for drug-likeness using Lipinski's rule of five and conducted molecular docking studies to evaluate their anticancer potential. Derivatives that achieved the highest docking scores underwent experimental validation through trypan blue staining assays. The results indicate that 8-pyrazolinyl coumarins could serve as a promising framework for developing new bioactive agents with improved therapeutic effects and fewer side effects.

**Keywords**: 8-Pyrazolinyl coumarin, 8-acetyl-7-hydroxycoumarin, PASS, Lipinski, Anti-cancer

**CH-132**

**EVALUATION OF GENOTOXIC POTENTIAL OF IMPURITIES IN AN ANTINEOPLASTIC CHEMOTHERAPEUTIC AGENT**

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Genotoxicity refers to the ability of chemical agents to damage cellular genetic material, potentially leading to mutations. Understanding genotoxicity is increasingly important in genetics, where it helps reveal how DNA damage occurs, how cells repair such damage, and how mutations influence health and disease. Both *in vitro* and *in vivo* genotoxicity studies are essential for identifying the harmful effects of chemical compounds and understanding their impact on genome stability. These studies also have future applications in areas like gene therapy, mutation modelling, and precision medicine. Regulatory bodies such as the FDA and EMA currently monitor genotoxic impurities in pharmaceuticals, highlighting the need for stringent evaluation to protect genetic integrity in therapeutic contexts. Several assays are used to assess genotoxicity, including the Ames test, the Screen test, and Potato disk test. The Ames test, standardized by OECD, is one of the most widely used methods. It employs strains of Salmonella typhimurium to detect mutations induced by chemical exposure, serving as a key tool in evaluating mutagenic potential. A recent study using the Ames test demonstrated the mutagenicity of cytosine, a process impurity found in gemcitabine hydrochloride, a chemotherapeutic agent. Such findings not only support drug safety but also contribute to broader genetic research by identifying mutation-inducing agents and potential genetic vulnerabilities. As genetics continues to advance, genotoxicity testing will play a growing role in guiding safe drug development, understanding mutation-driven diseases, and advancing personalized medicine.

**Keywords:** Genotoxicity, Mutagenicity, Ames Test, Genetic Integrity

**CH-133**

**MECHANISM EXPLORATION OF ALLICIN IN THE TREATMENT OF ATHEROSCLEROSIS BASED ON THE MOLECULAR DOCKING STUDY**

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Atherosclerosis is a chronic inflammatory and metabolic disorder characterized by progressive arterial narrowing due to lipid deposition and plaque formation, leading to vascular dysfunction and increased cardiovascular risk. Targeting molecular regulators such as cholesteryl ester transfer protein (CETP), adenosine monophosphate-activated protein kinase (AMPK), and tumor necrosis factor (TNF) represents a key therapeutic strategy. Allicin, a sulfur-containing bioactive compound derived from Allium sativum, exhibits lipid-lowering, antihypertensive, and anti-inflammatory properties, thereby offering potential as a natural therapeutic candidate. This study investigated into the pharmacological significance of allicin in treating atherosclerosis using *in silico* techniques. The SwissADME model for pharmacokinetic profiling validated satisfactory ADME characteristics, while ZINCPharmer for pharmacophore modeling enabled structural analysis. Molecular docking studies performed with AutoDock Vina demonstrated strong binding affinities of -6.2, -6.5, and -6.1 kcal/mol for CETP, AMPK, and TNF respectively, these results suggesting that effective modulation of lipid metabolism and inflammatory cascades. Toxicity prediction using ProTox-II indicated a favorable safety profile with minimal toxicological risks. Collectively, these computational findings highlight allicin as a promising natural lead compound for the therapeutic management of




ISBN: 978-81-980623-8-3

atherosclerosis. However, further *in vitro* and *in vivo* studies are required to validate its efficacy and pharmacological potential.

**Keywords:** Allicin, Atherosclerosis, Molecular docking, CETP, AMPK.

**CH-134**

## *IN-SILICO* STUDIES, SYNTHESIS AND CHARACTERISATION OF NOVEL PYRAZOLINE DERIVATIVES

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Heterocyclic compounds with benzo fused nitrogen have been shown to exhibit anticancer action. Researchers have identified a number of heterocyclic derivatives containing nitrogen that have been shown to have anticancer properties in earlier studies. In order to develop more effective anticancer compound, 116 novel N-(substitutedphenyl)-2-(3-(4-hydroxy/methoxy-1-methyl/phenyl -2-oxo-1,2-dihydroquinolin-3-yl) -5-phenyl-4,5-dihydro-1H-pyrazol-1-yl) acetamide molecules were created. *In silico* tests, including molecular docking, ADME, and toxicity were conducted using Schrodinger (2024, 3.0), SwissADME, and ProTox-3.0, respectively, to verify their efficacy. All designed derivates on molecular docking with Epidermal Growth Factor Receptor tyrosine kinase domain with 4-anilinoquinazoline inhibitor erlotinib (PDB ID: 1m17) and AZD9291 complex with wild type EGFR (PDB ID: 4ZAU) were found to have promising docking score. Compared to regular bosutinib and doxorubicin, the majority of the developed compounds had superior docking findings. All compounds had a good ADME profile. Amongst all the designed derivatives, best 12 compounds were selected for further synthesis and were characterised using IR, 1H NMR, 13C NMR and mass spectroscopy.

**Keywords:** Anticancer, molecular docking, ADME, toxicity, characterisation.

**CH-135**

## DIETARY BIOACTIVE ARACHIDONIC ACID TARGETS NF-KB: MOLECULAR DOCKING STUDY FOR NEURODEGENERATIVE DISEASE MODULATION

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Arachidonic acid, a polyunsaturated fatty acid commonly found in fish, meat, and eggs, plays a crucial role in inflammatory signaling. Its dysregulation has been implicated in the activation of nuclear factor kappa B (NF-κB), a transcription factor strongly associated with neuroinflammation and the progression of neurodegenerative disorders. This study aimed to explore the molecular binding interactions of arachidonic acid with NF-κB using molecular docking and interaction mapping, thereby elucidating its potential role in modulating neuroinflammatory pathways. Structure-based molecular docking was employed to evaluate the binding affinity of arachidonic acid with NF-κB, and 2D interaction diagrams were generated to identify key amino acid residues contributing to the ligand–protein complex stability. Arachidonic acid exhibited a strong binding affinity towards NF-κB with a docking score of –7.56 kcal/mol, indicating stable interactions. The 2D interaction analysis revealed that amino acid residues such as GLY-64, VAL-62, PHE-82, LEU-100, LEU-104, LEU-112, LEU-118, and VAL-116 were involved in hydrophobic and hydrogen-bond interactions, thereby stabilizing the complex. These interactions highlight the critical role of hydrophobic residues in the binding mechanism and potential inhibitory modulation of NF-κB signaling. The findings suggest that arachidonic acid, a dietary bioactive compound, can effectively interact with NF-κB and may influence its regulatory role in neuroinflammatory processes. This supports its potential relevance in the prevention or management of neurodegenerative diseases. However, further *in vitro* and *in vivo* studies are necessary to validate these computational insights.

**Keywords:** Arachidonic acid, NF-κB, neurodegenerative diseases, molecular docking, amino acid interactions, neuroinflammation.

**CH-136**

## OPTIMIZED METHOD DEVELOPMENT AND VALIDATION FOR ESTIMATION OF PARACETAMOL AND NEFOPAM HCL BY HPLC USING CENTRAL COMPOSITE DESIGN

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Optimization for the estimation of drug combinations by HPLC is essential and superior in terms of efficient, cost, accuracy and regulatory compliance comparing normal method development making it high quality pharmaceutical analysis. Optimization by Central Composite Design is highly significant due to its advanced and systematic approach of multiple variables evaluation and their interaction providing minimal number of experimental runs by giving an accurate mathematical models like Response surface method which predicts method performance under various conditions. The present study uses Paracetamol and Nefopam HCl in their combined tablet dosage forms for method development and validation using CCD as an Optimization tool by HPLC. Nefodol formulation containing 325 mg of Paracetamol and 30 mg of Nefopam HCl was used. For Optimization, Acetonitrile concentration as mobile phase, pH of the ammonium acetate buffer and flow rate were selected as factors with chosen responses from capacity factor, retention time and resolution between the peaks. The results obtained from CCD experiments were presented as perturbation and response surface plots to get visual representation of individual and multiple factors. Overall, the method gets a desirability value of 0.845 indicating best method performance. Retention time of Paracetamol and Nefopam HCl were 5.066 minutes and 7.211 minutes using Acetonitrile and 0.05M ammonium acetate buffer buffer in the ratio 45:55 %V/V and pH of 4.2 at a flow rate 1.3ml/min at a detection wavelength of 220 nm. Validation parameters according to ICH guidelines were done and found to be within limits. The method may be adopted for routine analysis of these drugs in pharmaceutical industry.

**Keywords:** Optimization, Central Composite design, HPLC, Validation, ICH guidelines

**CH-137**

## SYNTHESIS OF NOVEL 1, 5-DIHYDROBENZOTHIAZEPINE DERIVATIVES BY CONVENTIONAL AND MICROWAVE IRRADIATION METHODS AND THEIR PHARMACOLOGICAL ACTIVITIES

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This study reports the synthesis of novel 1,5-dihydrobenzothiazepine derivatives using both conventional reflux condensation and microwave irradiation techniques. The synthesis involved the reaction of 1,3-diarylprop-2-enones with o-aminothiophenol, followed by purification through recrystallization and chromatography. Microwave-assisted synthesis resulted in rapid and efficient product formation within minutes at 180 watts. The pharmacological properties of the compounds were evaluated by assessing their antibacterial and antifungal activities using the minimum inhibitory concentration method and their *in vitro* cytotoxicity via the MTT assay. Several synthesized derivatives demonstrated notable antibacterial and antifungal effects, and most compounds showed the highest cytotoxic activity against prostate cancer cell lines (DU-145), albeit less potent than standard drugs. These findings suggest that the newly synthesized benzothiazepines are promising for further exploration as antimicrobial and anticancer agents with potential application in other microbes and cancer cell lines.

**Keywords:** Benzothiazepines, microwave assisted synthesis, antibacterial activity, antifungal activity, cytotoxicity

**CH-138**

## SYNTHESIS AND PRELIMINARY CHARACTERIZATION OF HALLOYSITE-DERIVED MESOPOROUS SILICA NANOPARTICLES FOR DRUG DELIVERY APPLICATIONS

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ISBN: 978-81-980623-8-3

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Halloysite nanotube (HNT)-derived mesoporous silica nanoparticles (MSNs) were synthesized using a modified sol-gel process with cetyltrimethylammonium bromide (CTAB) as a soft template and tetraethyl orthosilicate (TEOS) as the silica precursor. The synthesis involved pre-calcination to remove impurities and final calcination to eliminate the surfactant and develop mesoporous structure. Fourier-transform infrared spectroscopy (FTIR) confirmed the formation of Si–O–Si bonds and reduction in Al–OH groups, indicating successful silica deposition. X-ray diffraction (XRD) revealed the disappearance of crystalline HNT peaks, confirming the transition to amorphous silica. Scanning electron microscopy (SEM) demonstrated a transformation from tubular HNT morphology to partially coated mesoporous surfaces, while transmission electron microscopy (TEM) visualized ordered mesopore arrangements along the nanotube structure. BET analysis recorded a specific surface area of 977 $m^2/kg$ with a pore diameter of 2–4 nm, indicating effective template removal and mesoporosity generation. Zeta potential shifted from –20.6 mV (HNT) to –30.9 mV (MSN), suggesting improved surface charge and dispersion stability. These findings confirm the successful conversion of HNT into MSNs with high surface area, controlled pore size, and enhanced stability, making them promising candidates for drug delivery and biomedical applications.

**Keywords:** Mesoporous silica nanoparticles, Halloysite nanotubes, Sol-gel synthesis, BET surface area, Zeta potential

**CH-139**

## SYNTHESIS AND BIOLOGICAL EVALUATION 1, 5-BENZOTHIAZEPINES AS POTENTIAL ANTICONVULSANT AGENTS

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1,5-Dihydrobenzothiazepines have gained considerable attention in drug research due to their clinical relevance in both cardiovascular and central nervous system disorders. The first clinically used molecule in this class was diltiazem, followed by clentiazem for cardiovascular applications, and thiazesim, clothiapine, and quetiapine for CNS-related conditions. This has led to the development of numerous synthetic approaches for these compounds. In the present study, chalcones derived from p-fluoroacetophenone and o-amino thiophenol were used to synthesize benzothiazepines. The reaction was carried out in methanol using piperidine as a base, followed by the addition of glacial acetic acid and overnight incubation at 25°C, leading to the formation of yellow benzothiazepine crystals, which were recrystallized in methanol. The synthesized compounds, labeled Bp-1 to Bp-15, were evaluated for their anticonvulsant activity using the Maximal Electroshock Seizure Test (MES) at a dose of 200 mg/kg body weight intraperitoneally. Several compounds demonstrated significant anticonvulsant activity, notably Bp-3 (4-chlorophenyl substitution), Bp-5 (2,4-difluorophenyl), Bp-14 (3,2-bromofurfuryl), and Bp-15 (4-dimethylaminophenyl), all of which showed complete protection with 0% mortality. These findings suggest that 1,5-dihydrobenzothiazepines, particularly those with specific substitutions at the second and fourth positions, hold promise as potential anticonvulsant agents.

**Keywords:** 1,5-dihydrobenzothiazepines, Maximal Electroshock Seizure Test, anticonvulsant activity

**CH-140**

## DESIGN AND SYNTHESIS OF NEW THIAZOLO[3,2-A] PYRIMIDINE DERIVATIVES AS SSRIS FOR ANTIDEPRESSANTS

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Depression is a chronic mental health disorder with a significant global burden. Selective serotonin reuptake inhibitors (SSRIs) are first-line therapies but have limitations such as delayed onset and side effects. The thiazolo[3,2-a] pyrimidine scaffold has shown promising biological activities, including affinity for the selective serotonin reuptake inhibitors (SSRIs). This work integrates AI-driven drug design with chemical synthesis to develop novel thiazolo[3,2-a] pyrimidine derivatives with potential antidepressant properties. Computational tools such as molecular docking, predictive ADME-Tox models, and AI-based lead optimization were employed to identify promising candidates. The optimized derivatives were synthesized, structurally characterized, and evaluated for antidepressant activity. Results indicate strong predicted binding affinities, good drug-likeness, and favorable pharmacokinetic profiles. This approach demonstrates the synergy between synthetic medicinal chemistry and artificial intelligence in novel antidepressant development. The synthesized derivatives showed significance antidepressant activity as compare to standard drug Fluoxetine.

**Keywords:** Antidepressant, Selective serotonin reuptake inhibitors (SSRIs), Fluoxetine, Thiazolo[3,2-a] pyrimidine Derivatives, CADD, etc.

**CH-141**

## QBD-DRIVEN ANALYTICAL METHOD DEVELOPMENT FOR HPTLC QUANTIFICATION OF SPIRONOLACTONE AND HYDROCHLOROTHIAZIDE IN PHARMACEUTICAL DOSAGE FORM

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The present study examines simultaneous multiple response optimization using Derringer's desirability function for the development of an HPTLC method to detect sprinolactone and hydrochlorothiazide in pharmaceutical dosage form. Central composite design (CCD) was used to optimize the chromatographic conditions for HPTLC. The independent variables used for the optimization were the acetone content in the mobile phase, the wavelength, and the distance travelled. HPTLC separation was performed on aluminium plates pre-coated with silica gel 60 F254 as the stationary phase using toluene: methyl acetate: acetone (5:3:2% v/v/v) as the mobile phase. Quantification was achieved based on a densitometric analysis of spironolactone and hydrochlorothiazide over the concentration range of 50–175 µg/ml for both analytes, at 229 nm. The method yielded compact and well-resolved bands at Rf of $0.71 \pm 0.03$ and $0.41 \pm 0.02$ for spironolactone and hydrochlorothiazide, respectively. The linear regression analysis for the calibration plots produced $r2 = 0.9994$ and $r2 = 0.9991$ for spironolactone and hydrochlorothiazide, respectively. The precision, accuracy, robustness, specificity, limit of detection, and limit of quantitation of the method were validated according to the ICH guidelines. The factors evaluated in the robustness test were determined to have an insignificant effect on the selected responses. The results indicate that the method is suitable for the routine quality control testing of marketed tablet formulations.

**Keywords:** Spironolactone, Hydrochlorothiazide, Central composite design, Validation.

**CH-142**

## QBD-DRIVEN CENTRAL COMPOSITE DESIGN IN DUAL ANALYTICAL METHOD DEVELOPMENT: SIMULTANEOUS ESTIMATION OF OLANZAPINE AND SAMIDORPHAN BY HPLC AND HPTLC

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The current study represents the development and validation of HPLC and HPTLC methods for the simultaneous estimation of Olanzapine and Samidorphan in their combined formulation by using the design of experiments (DoE). In the RP-HPLC method, three independent factors, like Organic solvent composition, flow rate, and wavelength, were




ISBN: 978-81-980623-8-3

employed. HPTLC method factors like developing distance, Chamber saturation time, and methanol content in the mobile phase. Central composite design (CCD) was applied and also to study the response surface methodology. Capacity factor, Retention time, and Resolution were simultaneously optimized by using the Desirability function for the HPLC method and the Rf value for both drugs as responses in the HPTLC method. The proposed RP-HPLC method, the optimized and predicted data consisted of mobile phase acetonitrile: phosphate buffer (pH 6.8 with 1ml orthophosphoric acid) in the ratio of 45: 55%v/v respectively, at a flow rate of 0.8 ml/min and wavelength of 261 nm. By applying these optimum conditions with the Solar C18 column baseline partition of both drugs had good resolution and run time of 4.623 min for olanzapine and 7.767 min for Samidrophan. In HPTLC, separations were performed on silica gel 60 F254 using acetonitrile: glacial acetic acid: methanol (5: 4.5: 0.5%v/v/v) as mobile phase. The Rf value was found to be 0.48 for Olanzapine and 0.87 Samidrophan were scanned at 236 nm. Both methods optimized conditions were validated according to International Council for Harmonization guidelines (ICH). The proposed methods can be routinely employed in quality control for the analysis of Olanzapine and Samidorphan in the pharmaceutical dosage forms.

**Keywords**: Design of experiment, Central composite design, Olanzapine, Samidorphan

**CH-143**

## SPECTROPHOTOMETRIC STUDY OF METAL COMPLEXES BY JOBS METHOD OF CONTINOUS VARIATION

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The application of Job's method which is the method of continuous variation to metal-ligand complexes is explored in the context of a ligand that has n equivalent and independent binding sites. In this study, we selected cephalosporin antibiotics from all generations, specifically Cefotaxime (CFX), Cefpodoxime (CPD), Cefuroxime (CFO), Cefdinir (CDR), Cefepime (CFP), and Cefadroxil (CFD). Three transition metals—zinc, nickel, and copper—were chosen along with one alkaline earth metal, calcium, to compare their effectiveness in binding. Job's method is a continuous variation technique that employs solutions with varying mole fractions. The selected wavelength (lambda max) is chosen so that it does not correspond to either the metal or the ligand solutions, but rather to the complex formed by the interaction between the metal and the ligand. Absorbance measurements are taken at this specified lambda max, and a curve of mole fraction/volume against absorbance is plotted to determine the value of n. By comparing the n values, we can estimate the amount of metal bound to the ligand. It is important to keep the total concentrations of metal and ligand relatively high compared to the dissociation constant in order to obtain a reliable estimate of the stoichiometry of the complex.

**Keywords:** Cephalosporin antibiotics, Jobs method, continuous variation, metal complexes

**CH-144**

## STRUCTURE-BASED VIRTUAL SCREENING AND MOLECULAR DYNAMICS ANALYSIS OF CLINICALLY-APPROVED NEUROPROTECTIVE COMPOUNDS TARGETING MULTIPLE ALZHEIMER'S DISEASE PATHWAYS

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Alzheimer's disease involves multiple pathological mechanisms, with acetylcholinesterase (AChE), glycogen synthase kinase-3β (GSK-3β), and beta-site amyloid precursor protein cleaving enzyme 1 (BACE-1) representing critical therapeutic targets. This study investigates computational repurposing of clinically-approved neuroprotective compounds as multi-target inhibitors. Eight neuroactive agents—Agomelatine, Apomorphine, Cariprazine, Mirdametinib, Pomalidomide, Risdiplam, Tianeptine, and Vortioxetine—underwent structure-based virtual screening. Molecular docking using AutoDock Vina evaluated binding affinities within AChE, GSK-3β, and BACE-1 active sites. Risdiplam was selected for 100-nanosecond molecular dynamics simulations on AChE and GSK-3β targets based on superior docking performance. Docking analysis revealed favorable binding affinities across all three targets. AChE interactions involved catalytic triad residues, GSK-3β binding occurred at the ATP-binding pocket, and BACE-1 showed active site interactions. MD simulations confirmed Risdiplam's exceptional stability for AChE and GSK-3β complexes, maintaining low RMSD values and stable intermolecular contacts throughout trajectories. This investigation demonstrates successful repurposing potential of neuroactive drugs as multi-target AD inhibitors. Risdiplam exhibited favorable binding across all targets with confirmed structural stability for AChE and GSK-3β, positioning it as a promising candidate for experimental validation in comprehensive Alzheimer's therapeutic strategies.

**Keywords:** Acetylcholinesterase inhibition, GSK-3β targeting, BACE-1 inhibition, Risdiplam, Neuroprotective compounds

**CH-145**

## *IN-SILICO* CHARACTERIZATION, ADMET PREDICTION, AND MOLECULAR DOCKING STUDIES OF CALIFORNIA ALMONDS AGAINST THE ALZHEIMER'S DISEASE

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Alzheimer's disease is a progressive neurologic disorder that causes the brain to shrink (atrophy) and brain cells to die. Alzheimer's disease is the most common cause of dementia - a continuous decline in thinking, behavioral and social skills that affect a person's ability to function independently. The bitter almond is used in Alzheimer's disease for the treatments. The major chemical constituents of California almonds were study for molecular docking by using the software. Protein Data Bank (PDB) file of cholinesterase inhibitor with the code 5oug and its co-crystallized ligand rivastigmine (docking score -6.4), donepezil (docking score -8.9) were used for this purpose. The binding affinity and interactions with amino acids of phytochemicals were evaluated. Protein homology modelling of target protein was carried out, and protein structure validation and energy minimization were performed. Phytochemicals mentioned in literature having Alzheimer's disease properties were studied for absorption, distribution, metabolism, excretion, and toxicity (ADMET) properties and that passed ADMET filters were further carried for comparative *in silico* docking analysis along with the standard drug. Preliminary docking analysis was carried out using AutoDock Vina, and the results obtained were validated using Auto Dock 4.2.6 and Swiss Dock.

**Keywords:** Alzheimer's Disease, Dementia, ADMET prediction and Docking Studies.

**CH-146**

## HPTLC FINGERPRINTING AND QUANTIFICATION OF SCOPOLETIN AS A MARKER COMPOUND IN CONVOLVULUS PLURICAULIS

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Analytical techniques such as chromatography, spectroscopy, titration, and gravimetric analysis are widely used in scientific research to identify and quantify chemical compounds. Chromatographic methods, in particular, play a crucial role in the analysis of medicinal plants due to their ability to separate and characterize bioactive constituents. The present study aimed to develop a simple, accurate, and precise high-performance thin layer chromatography (HPTLC) method for the estimation of Scopoletin in the hydroalcoholic extract of Convolvulus pluricaulis. HPTLC fingerprinting was carried out using aluminum plates pre-coated with silica gel 60F254. The extract and standard scopoletin were developed in a mobile phase of toluene:ether (1:1). Following development, densitometric scanning was performed at 254 nm using a Camag TLC Scanner III. Scopoletin was distinctly detected at an Rf value of 0.41 under the optimized conditions. In addition to scopoletin, three other fluorescent spots showing bluish fluorescence characteristic of coumarins were observed at Rf values of 0.49, 0.54, and 0.58, indicating the presence of additional coumarin derivatives in the extract. The developed HPTLC method provides a reliable and reproducible approach




ISBN: 978-81-980623-8-3

for the simultaneous detection of scopoletin in C. pluricaulis. The presence of multiple coumarins highlights the phytochemical richness of the plant, while scopoletin serves as a key marker compound for standardization and quality control.

**Keywords:** Convolvulus Pluricaulis, Scopoletin, Coumarins and Chromatographic Methods.

**CH-147**

**EXPLORING PURINE DERIVATIVES: A COMPREHENSIVE STUDY OF QSAR, DOCKING AND MOLECULAR DYNAMICS FOR BENZODIAZEPINE RECEPTOR INHIBITION**

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Benzodiazepines (BDZs) are common in the treatment of anxiety disorders, sleep disorders, and epilepsy by acting on the benzodiazepine receptor (BzR) of GABAA receptors. The use of these drugs in therapy is usually restricted by the side effects including sedation and dependency. During this research, 6,9-disubstituted purine derivatives have been studied as a possible alternative through computational techniques such as Quantitative Structural Activity Relationship (QSAR), molecular docking, and molecular dynamics (MD) simulations. We developed field-based QSAR models for a dataset of purine derivatives. These models allowed us to predict the inhibitory activity against BzR. The high-predicted activity compounds were docked to the GABAA receptors protein (PDB ID: 8BGI). Of these, compound A50 was more tightly bound (Glide score = -6.0) to the binding site than flumazenil (reference ligand). Moreover, MD simulations of the A50-receptor complex at 100 ns showed that the complex was stable with reasonable RMSD values (1–3 Å), which makes it a promising lead molecule. These results indicate that the purine derivatives, especially A50 are potential agents in developing benzodiazepine receptor inhibitors, and they should be synthesized further and tested in experiments to determine their effect on receptor inhibition to develop a possible therapy.

**Keywords:** Purine derivatives, QSAR, Docking, Molecular dynamics, Benzodiazepine receptor

**CH-148**

**A NOVEL APPROACH TO PARTICLE POLLUTION CONTROL: ELECTROSTATIC PRECIPITATION WITH SPRAYING CORONA DISCHARGES**

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Airborne particulate matter (PM), especially fine and ultrafine particles, is one of the most harmful pollutants affecting air quality and human health. Traditional electrostatic precipitators (ESPs) are widely employed to remove particulates from industrial flue gases, yet their efficiency declines significantly when handling nanosized particles or when particle re-entrainment occurs. To overcome these limitations, this study proposes a novel electrostatic precipitation approach using spraying corona discharges (ETP-SCD). In this system, corona discharge is employed to ionize the gas and impart charges to suspended particles. Simultaneously, liquid sprays are introduced, which promote particle agglomeration and growth, making collection more effective. The discharge electrodes are grounded while the collecting electrodes are connected to a high voltage, ensuring efficient particle migration and deposition. Compared with conventional ESPs, ETP-SCD offers distinct advantages, including enhanced capture of PM2.5 and nanosized particles, suppression of re-entrainment due to wet deposition, reduced operating voltage, and broad applicability across industries such as power generation, cement, metallurgy, and chemicals. The results suggest that ETP-SCD combines the strengths of electrostatic charging and spray-assisted precipitation, providing a more sustainable and effective technique for charged particle pollution control under modern environmental standards.

**Keywords:** Electrostatic precipitation, spraying corona discharge, particle removal, air pollution control.

**CH-149**

**PREPARATION OF NEEM EXTRACT CARBON QUANTUM DOTS FOR PHARMACEUTICAL APPLICATION**

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Carbon quantum dots (CQDs) were synthesized from neem (Azadirachta indica) leaves and their excitation-dependent photoluminescence was tuned by hydrothermal temperature. Fresh leaves collected from the Kappatagudda region (Karnataka, India) were washed, homogenized in double-distilled water, clarified by sequential filtration (muslin, Whatman paper, 0.22 µm), and hydrothermally treated in a Teflon-lined autoclave at 150 or 180 °C for 5 h. Formation of fluorescent nanodots was first verified under UV illumination and subsequently characterized using a Shimadzu RF-6000 spectrofluorometer across multiple excitation wavelengths. CQDs prepared at 150 °C exhibited bright blue emission with maxima near 468 nm (λ_ex 280 and 360 nm) and \~460 nm (λ_ex 320 nm), with intensity increasing with excitation and peaking at 360 nm. In contrast, CQDs obtained at 180 °C showed red-shifted emission (\~488, \~482, and \~507 nm for λ_ex 280, 320, and 360 nm, respectively) and markedly reduced intensity. These trends indicate temperature-driven changes in core size and surface states: moderate carbonization (150 °C) favors effective passivation and radiative recombination, whereas harsher treatment (180 °C) introduces non-radiative pathways. Overall, neem-derived CQDs synthesized at 150 °C deliver stronger, more stable luminescence for blue-emission applications, while 180 °C products may suit longer-wavelength windows and diagnostics

**CH-150**

**STUDY ON THE EFFECT OF VARIOUS HYDROTROPIC AGENTS ON THE WATER SOLUBILITY OF RIFABUTIN AND DEVELOPMENT OF A GREEN SPECTROPHOTOMETRIC METHOD**

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Rifabutin, a potent antimycobacterial agent, presents challenges in aqueous solubility, limiting its effective spectrophotometric analysis without organic solvents. This study explores hydrotropic solubilization as a green and efficient alternative for enhancing its solubility. Seven hydrotropic agents—citric acid, sodium benzoate, urea, ammonium acetate, sodium tartrate, potassium acetate, and sodium citrate were screened for their solubilizing potential. Among them, 2M citric acid exhibited the highest solubility enhancement (~67-fold) and was selected for method development. A green UV-visible spectrophotometric method was successfully developed and validated at 279 nm, with a linearity range of 2–10 µg/ml and correlation coefficient $R^2$ = 0.9983. The method was applied to Rifabutin capsule formulation and yielded accurate results consistent with label claim. This study demonstrates the potential of hydrotropic solubilization as a safe, eco-friendly, and cost-effective approach for enhancing solubility and enabling green analytical methods for poorly water-soluble drugs.

**Keywords:** Rifabutin, Hydrotropy, Solubility Enhancement, Green Analytical Method, Citric Acid, UV-Visible Spectrophotometry

**CH-151**

**ISOLATION, IDENTIFICATION AND CHARACTERIZATION OF 3,4,5 TRIMETHOXY CINNAMIC ACID FROM ETHANOLIC LEAF EXTRACT OF AVICENNA MARINA BY LC-MS AND EVALUATION OF ANTIEPILEPTIC ACTIVITY**

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The Current study reveals the anti-epileptic activity of Avicenna marina, a mangrove plant, ethanolic leaf extract of Avicenna marina was obtained by Soxhlet extraction and performed phytochemical screening followed by Chromatographic separation using silica gel column chromatography was performed for Isolation of 3,4,5-trimethoxycinnamic acid. Structural elucidation through liquid




ISBN: 978-81-980623-8-3

chromatography mass spectrometry revealed a Rt of 6.8 minutes and a molecular ion peak at m/z 225.1, with fragmentation peaks at m/z 193 and 165. TMCA's antiepileptic activity was evaluated in Swiss albino mice using MES and PTZ-induced seizure models. TMCA was administered intraperitoneally at doses of 25, 50, and 100 mg/kg, with valproate of 200 mg/kg as the reference standard. In the MES model, TMCA at 100 mg/kg significantly reduced tonic hind limb extension duration of 8.7 ± 1.1 sec compared to control at 22.3 ± 1.8 sec. In the PTZ model, TMCA delayed seizure onset at 210.4 ± 15.6 sec compared to control at 115.2 ± 12.3 sec and reduced mortality rate was found to be 16.7% and control was 66.7%. This study reveals TMCA exert antiepileptic effects through GABAergic or sodium channel modulation, its potential as a novel epilepsy therapy.

**Keywords:** Trimethoxycinnamicacid (TMCA), Maximal Electroshock Seizure (MES), Pentylenetetrazole (PTZ), Liquid Chromatography- Mass Spectroscopy (LC-MS).

**CH-152**

**BIOANALYTICAL STABILITY INDICATING METHOD DEVELOPMENT AND VALIDATION FOR THE ESTIMATION OF LOBEGLITAZONE SULPHATE IN HUMAN PLASMA BY USING RP-HPLC METHOD.**

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A simple, rapid, reliable, precise, accurate, sensitive and selective analytical method for the estimation of lobeglitazone. In human plasma and using as an internal standard (IS). Lobeglitazone is a novel thiazolidinedione (TZDs) based peroxisome proliferator-activated receptor (PPAR) agonist, used for the management of type-2 diabetes. The chromatographic separation was achieved on a Rubitas C18 Column (250 mm 4.6mm, 5 µm particle size) and the mobile phase was a combination of Acetonitrile: Methanol (60:40 v/v). The flow rate was set at 1.0 mL/min, and detection of the effluents occurred at 248 nm. Results: The retention time for Lobeglitazone was determined to be 5.945±0.164 min. The drug exhibited linearity within the concentration range of 0.1-5 µg/mL, the correlation coefficient was established to be 0.9924. The LQC, MQC, HQC were found to be 0.5 µg/ml, 2µg/ml, 4µg/ml. The accuracy of the method was considered satisfactory and the mean recovery percentage is found to be in the acceptable range of 93.87-97.07%. The HPLC method was successfully developed, validated as per ICH guidelines. The proposed method was simple, precise, sensitive, rapid, robust for the estimation of Lobeglitazone Sulphate.

**Keywords:** Lobeglitazone, Method development, Validation, RP-HPLC.

**CH-153**

**COMPREHENSIVE ANALYTICAL PROFILING OF BIO FUEL DERIVED FROM MADHUCA LONGIFOLIA RESIDUE PYROLYSIS**

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This study investigates the properties of biofuel derived from the pyrolysis of Madhuca longifolia residues, chosen for their high volatile matter content. Slow pyrolysis was carried out in a fixed-bed reactor at temperatures ranging from 350 to 600 °C, and the resulting pyrolysis oil, char, and gas were characterized using various analytical techniques. The influence of temperature on product yield was first evaluated, with the highest oil yield of 44.2 wt% obtained at 475 °C. Corresponding yields for char and gas were 22.1 wt% and 33.7 wt%, respectively. Thermogravimetric analysis (TGA) and Fourier-transform infrared spectroscopy (FT-IR) confirmed the suitability of the feedstock as a potential energy source. Comprehensive characterization of the pyrolysis products was performed using FT-IR, gas chromatography-mass spectrometry (GC-MS), and gas chromatography (GC). The pyrolysis oil was found to be a viscous liquid with a lower heating value compared to conventional diesel. FT-IR and GC-MS analyses revealed a high concentration of oxygenated compounds, including acids and phenolic derivatives. The char exhibited both aromatic and aliphatic hydrocarbons, along with elevated carbon content, indicating its potential use as a solid fuel. GC analysis of the pyrolysis gas confirmed the presence of combustible compounds, supporting its application as a gaseous fuel.

**CH-154**

**COMPLEXATION STUDIES ON CEPHALOSPORINS AND THEIR IMPACT ON ANTIMICROBIAL EFFICACY.**

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The susceptibilities of complexes formed by complexation of metal salts with cephalosporin antibiotics were evaluated against various both Gram positive and gram-negative organisms. The selected cephalosporin antibiotics represent all four generations based on their spectrum of activity: Cefotaxime (CFX), Cefpodoxime (CPD), Cefuroxime (CFO), Cefdinir (CDR), Cefepime (CFP), and Cefadroxil (CFD). For this study, three transition metals—zinc, nickel, and copper—were chosen, along with one alkaline earth metal, calcium, to compare their effectiveness. The organisms tested included E. coli, S. aureus, B. subtilis, and P. aeruginosa. The Minimum Inhibitory Concentration (MIC) was determined for each complexed antibiotic, allowing for the calculation of the MIC 99 values, which indicate the minimum concentration required to inhibit the growth of 99% of the bacteria. These values were then compared to the non-complexed antibiotics. Mueller-Hinton broth and agar were used as culture media, while saline was utilized for dilutions. The bacterial strains were incubated for 24 hours prior to testing. The study found that nickel-complexed antibiotics demonstrated more promising activity compared to their non-complexed counterparts. Additionally, some zinc complexes exhibited notable effectiveness. Comparative studies across the different metal complexes were conducted and found to be significant, as evaluated through SEM and one-way ANOVA analyses.

**Keywords:** Complexation, Cephalosporin antibiotics, MIC 99, Antimicrobial activity.

**CH-155**

**DESIGN, SYNTHESIS AND BIOLOGICAL EVALUATION OF SOME IMIDAZO[1,2-a] PYRIDINE DERIVATIVES AS ANTI-TUBERCULAR AGENTS**

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Tuberculosis (TB) is a serious infectious disease caused by Mycobacterium tuberculosis (Mtb) that affects millions of people worldwide. The emergence of drug-resistant strains of Mtb poses a major challenge for the development of effective anti-TB drugs. Imidazo[1,2-a] pyridine derivatives are a class of heterocyclic compounds that have shown promising anti-TB activity. Analogs of imidazo[1,2-a] pyridine fused ring system were designed using molecular docking on InhA, a vital enzyme involved in the cell wall synthesis of M.tb. Compounds (5a-5o) showing promising docking scores were synthesized. All the synthesized compounds were evaluated for their *in-vitro* anti-tubercular activity against H37Rv strain by Alamar Blue assay method. Most of the synthesized compounds displayed potent anti-tubercular activities. The most potent compound was further evaluated against am MDR-TB strain. To assess the stability of the protein-ligand complex of two most potent compounds, molecular dynamics simulations were conducted for duration of 100 ns. All these results indicate that the synthesized compounds could prove to be potential leads for further development of new potent anti-tubercular agents.

**Keywords:** Imidazo[1,2-a] pyridine, Mycobacterium tuberculosis, Anti-TB, Molecular docking studies and Molecular dynamics simulations

**CH-156**

**SCALING UP OF PHOTO BIOREACTOR DESIGN, OPTIMIZING THE PRODUCTION PARAMETERS FOR HIGH YIELD OF OMEGA 3 FATTY ACIDS FROM MARINE MICROALGAE**

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ISBN: 978-81-980623-8-3

This is aimed at scaling up of photo bioreactor , optimizing the production parameters for high yield of omega 3 fatty acids from marine micro algae , Omega – 3 (ω-3) fatty acids (EPA and DHA) are polyunsaturated fatty acids and are essential components that provide significant health benefits to the human population, particularly in reducing cardiac diseases such as thrombosis, arrhythmia, stroke, high blood pressure[2,3] breast and lung cancer, alzheimer's disease etc. Most of the global health organizations (WHO, NIH USA UK, GERMANY) are recommending the regular intake of (ω-3) fatty acids. These fatty acids regular consumption as a part of diet may reduce the risk of cardiovascular diseases specially atherosclerosis by reducing the triglycerides. Many people across the world are taking (ω-3) fatty acids regularly along with other nutritional supplements. So, there is a great demand for the production of (ω-3) fatty acids to meet the daily requirements of the people globally. So many food sources like fish, flax seeds, chia seeds, algal oil etc are there for these healthy fats. At present many countries like USA, European countries established the (ω-3) fatty acids production from marine microalgae. In India it is yet to be established. In this context we are aiming for scaling up high quality good yield production of (ω-3) fatty acids from marine microalgae in a pilot scale Photo bioreactor.

**CH-157**

## QSAR ANALYSIS OF ANTIVIRAL COMPOUNDS FOR COVID-19 DRUG REPURPOSING

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Quantitative Structure–Activity Relationship (QSAR) modelling offers a strategic and time-efficient approach for identifying antiviral candidates suitable for drug repurposing against COVID-19. This study aimed to develop predictive QSAR models to evaluate structural features influencing the antiviral activity of diverse compounds previously approved or investigated for other therapeutic indications. A curated dataset of molecules with reported activity against SARS-CoV-2 or related viral targets was compiled and subjected to descriptor calculation, including physicochemical, topological, electronic, and hydrophobic parameters. Multiple linear regression, partial least squares, and machine learning-based algorithms were employed to construct models capable of correlating molecular characteristics with antiviral potency. Model performance was assessed through internal and external validation using statistical indicators such as $R^2$, $Q^2$, RMSE, and predictive residuals to ensure robustness, reliability, and minimal overfitting. Significant descriptors identified in the best performing models highlighted the importance of molecular flexibility, hydrogen-bonding capacity, lipophilicity, and electron distribution in modulating antiviral effects. Virtual screening of larger repurposing libraries using validated QSAR models enabled rapid selection of promising candidates with predicted high activity and favourable drug-like profiles. Several molecules demonstrated strong theoretical potential for SARS-CoV-2 inhibition, warranting further evaluation through docking studies, molecular dynamics simulations, and *in-vitro* assays. The study underscores the value of QSAR-guided screening as an efficient computational tool for accelerating COVID-19 drug repurposing efforts. By providing mechanistic insights into structural determinants of antiviral activity, these models support rational prioritization of compounds for experimental testing and contribute to the ongoing search for effective therapeutic options.

**Keywords:** QSAR, Antiviral Compounds, COVID-19, Drug Repurposing, SARS-CoV-2, Molecular Descriptors, Virtual Screening, Predictive Modelling, Computational Drug Discovery, Structure–Activity Relationship.

**CH-158**

## METHOD DEVELOPMENT AND VALIDATION FOR THE SIMULTANEOUS ESTIMATION OF PIPERINE AND UMBELLIFERON IN A POLYHERBAL AYURVEDIC FORMULATION USING RP-HPLC

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A simple, sensitive, precise, and accurate RP-HPLC method was developed and validated for the simultaneous estimation of Piperine and Umbelliferone in the polyherbal ayurvedic formulation hingwashtaka churna. Chromatographic separation was achieved using a Kromasil 100 C18 column (250 × 4.6 mm, 5 µm) with an isocratic mobile phase of methanol and 10 mM ammonium acetate buffer (pH 4.7) in the ratio of 70:30 v/v. The flow rate was 0.9 mL/min, with UV detection at 324 nm and a run time of 20 minutes. Umbelliferone and Piperine were eluted at retention times of 4.375 and 13.085 minutes, respectively. Validation was performed as per ICH Q2(R1) guidelines, confirming specificity, linearity (2–10 µg/mL), accuracy (98.34–101.57%), precision (%RSD < 2%), LOD (0.1193 µg/mL for Umbelliferone and 0.1117 µg/mL for Piperine), and LOQ (0.3616 µg/mL and 0.3385 µg/mL respectively). Two extraction techniques were evaluated, with ultrasonication-assisted liquid-liquid extraction yielding higher efficiency: 515.22 µg/g for Umbelliferone and 2778.42 µg/g for Piperine. The developed method proved effective for the quantitative analysis and standardization of Piperine and Umbelliferone in hingwashtaka churna.

**Keywords:** RP-HPLC, Piperine, Umbelliferone, Hingwashtaka Churna, Simultaneous Estimation

**CH-159**

## *IN SILICO*-BASED IDENTIFICATION OF LEADS FROM THE LEAF EXTRACTS OF NERIUM OLEANDER TARGETING PLASMODIUM PROTEASES AS THERAPEUTIC DRUG TARGETS FOR DEVELOPMENT OF ANTIMALARIAL AGENTS

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Resistance to conventional antimalarial drugs, particularly in Plasmodium falciparum, necessitates the search for alternative therapies, including plant-based remedies. Nerium oleander (Apocynaceae), a traditionally used medicinal plant, has shown various biological activities, but its potential as an antimalarial remains underexplored. This study investigates the phytoconstituents of N. oleander leaves and their potential to inhibit P. falciparum via molecular modelling targeting the threonine protease (PfHs1V or ClpQ). Phytochemical screening revealed the presence of alkaloids, carbohydrates, flavonoids, catechins, glycosides, and steroids. Twelve major plant-derived molecules were selected for molecular docking studies, alongside two known PfHs1V inhibitors (Bortezomib and Gitotoxin) as positive controls. All compounds were prepared using LigPrep and docked into the most active binding site of PfHs1V, identified via the Sitemap module. Docking was performed using the GLIDE-XP algorithm, and binding affinities were assessed based on G-scores. Among test compounds, quercetin showed the highest docking score (-6.610 kcal/mol), equivalent to that of the positive control Bortezomib, indicating strong binding affinity. Digitoxigenin and sitosterol also exhibited favorable scores of -6.514 and -6.392 kcal/mol, respectively. Interaction analysis revealed key amino acids (Thr25, Ala47, Val26) at the active site formed hydrogen bonds, π-cation, and π-π interactions, particularly in the quercetin complex. These findings highlight quercetin's potential as a lead compound against P. falciparum, warranting further *in vitro* and *in vivo* validation to support its role in antimalarial therapy.

**Keywords:** Plasmodium falciparum, quercetin, Molecular docking, Nerium oleander

**CH-160**

## SYNTHESIS, CHARACTERIZATION AND *IN VITRO* ASSESSMENT OF ANTI-INFLAMMATORY ACTIVITY OF NOVEL CHALCONE LINKED 1,3,4-OXADIAZOLE DERIVATIVES

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1,3,4-oxadiazoles, one of the heterocyclic compounds and chalcones, a group natural compounds possesses diverse therapeutic properties




ISBN: 978-81-980623-8-3

including anti-inflammatory activity. Conjugation of chalcones with other pharmacologically interesting molecules enhances its therapeutic property. With this view, the present study was focused on design, synthesis and *in vitro* anti-inflammatory evaluation of novel chalcone linked 1,3,4-oxadiazole derivatives. In this study, ACD Lab Chemsketch 12.0 was used for the three-dimensional drawing of the proposed compounds. Molinspiration cheminformatics software was used to analyze whether the proposed derivatives obey the Lipinski's rule of five or not. The selected compounds were synthesized through a series of four steps. Purity of the synthesized compounds was ascertained by TLC and melting point determination by open capillary tube method. The synthesized compound were characterized by IR, 1HNMR, 13CNMR and Mass spectral methods. Anti-inflammatory activity was evaluated *in vitro* by TNFα and IL-6 inhibition. The results indicated that 15 derivatives out of 50 designed were obeying the Lipinski's rule of five. Among the 15 derivatives, two compounds viz, (E)-1-(4-hydroxyphenyl)-3-[3-[4-[5-(3-hydroxyphenyl)-1,3,4-oxadiazol-2-yl]phenoxy]phenyl]prop-2-en-1-one and (E)-1-(4-aminophenyl)-3-[4-[4-[5-(3-aminophenyl)-1,3,4-oxadiazol-2-yl]phenoxy]phenyl]prop-2-en-1-one, named as, OXC 29 and OXC 30 respectively were randomly selected for the synthesis. After ascertaining the purity and characterization by spectral study, the synthesized compounds were evaluated for the anti-inflammatory activity *in vitro*, the results strongly supported the anti-inflammatory activity of the tested compounds. These findings are helpful for future research and may provide a new specific lead in the anti-inflammatory category.

**CH-161**

## DESIGN, COMPUTATIONAL STUDY, SYNTHESIS AND ANTI-DIABETIC EVALUATION OF NOVEL GLITAZONE DERIVATIVES

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Diabetes mellitus remains a critical global health challenge, with type 2 diabetes mellitus (T2DM) accounting for approximately 95% of all cases worldwide. Thiazolidinediones (TZDs), also known as glitazones, are a well-established class of insulin-sensitizing agents used in the management of T2DM. In the present study, a series of N-substituted glitazone derivatives were rationally designed and subjected to *in silico* ADME profiling and toxicity prediction using online computational tools. Molecular docking studies were performed to evaluate their binding affinity toward the peroxisome proliferator-activated receptor gamma (PPAR-γ) target. Ten promising derivatives were synthesized, recrystallized, and purified. Their chemical structures were confirmed by IR, 1H NMR, 13C NMR, and mass spectrometric analyses. *In vitro* antidiabetic activity was assessed using a glucose uptake assay, which revealed that the N-substituted derivatives significantly enhanced glucose uptake. Notably, compound PB-TZD-1 demonstrated the highest activity, increasing glucose uptake by 36.00%, outperforming both pioglitazone and insulin, suggesting a superior insulin-sensitizing effect potentially via robust PPAR-γ activation or enhancement of the insulin signaling pathway. Compounds PB-TZD-3 (34.30%) and PB-TZD-6 (33.53%) also exhibited greater activity than the standard drug pioglitazone, indicating promising antidiabetic potential. Cytotoxicity evaluation using the MTT assay confirmed that all derivatives exhibited $IC_{50}$ values above 275 µM, indicating low cytotoxicity. *In vivo* antidiabetic evaluation in STZ-induced diabetic rats further supported these findings, with PB-TZD-3 producing the most significant reduction in fasting blood glucose, decreasing from 269.0 ± 3.62 mg/dL to 124.5 ± 2.63 mg/dL after 28 days of treatment. Overall, these results suggest that the synthesized N-substituted glitazone derivatives, particularly PB-TZD-1 and PB-TZD-3, are promising candidates for the development of safer and more effective antidiabetic agents.

**Keywords:** Type 2 diabetes mellitus, thiazolidinediones, glitazone derivatives, PPAR-γ, antidiabetic.

**CH-162**

## DESIGN, MOLECULAR DOCKING, SYNTHESIS, TOXICITY EVALUATION, AND HYPOGLYCEMIC ACTIVITY OF NOVEL N-SUBSTITUTED GLITAZONE DERIVATIVES

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Diabetes mellitus continues to pose a significant global health burden, especially in low- and middle-income countries, where the prevalence of type 2 diabetes mellitus (T2DM) is steadily increasing. Thiazolidinediones (TZDs), commonly known as glitazones, are established insulin-sensitizing agents used in T2DM management. In this study, a new series of N-substituted glitazone derivatives was designed to develop safer and more effective TZD analogues. The compounds were first screened using *in silico* ADME profiling and toxicity predictions via online computational tools. Molecular docking studies were performed to predict their binding affinity and interaction with the peroxisome proliferator-activated receptor gamma (PPAR-γ), a key target in glucose metabolism. Eight derivatives were successfully synthesized, recrystallized, and purified. Their chemical structures were confirmed through IR, 1H NMR, 13C NMR, and mass spectrometric analysis. The *in vitro* antidiabetic potential was assessed using a glucose uptake assay, while cytotoxicity was evaluated by MTT assay. Six of the synthesized derivatives exhibited a higher percentage of glucose uptake than the standard drug pioglitazone. Among these, PB-TZD-20 showed the most promising activity, enhancing glucose uptake by 36.00%, surpassing both pioglitazone and insulin. This suggests a stronger insulin-sensitizing effect, possibly due to enhanced PPAR-γ activation or modulation of the insulin signaling pathway. Additionally, all compounds demonstrated $IC_{50}$ values above 250 µM, indicating low cytotoxicity *in vitro*. *In vivo* antidiabetic evaluation of PB-TZD-20 in STZ-induced diabetic rats revealed a substantial reduction in fasting blood glucose levels, decreasing from 276.0 ± 4.97 mg/dL to 114.67 ± 1.50 mg/dL over the treatment period. This reduction was more pronounced than that observed with pioglitazone. These findings highlight PB-TZD-20 as a promising lead compound with significant potential for further development as a safer and more effective therapeutic option for T2DM.

**Keywords:** Type 2 diabetes mellitus, thiazolidinedione derivatives, glitazone analogues, PPAR-γ, molecular docking, glucose uptake assay.

**CH-163**

## WATER PURIFICATION AND PUBLIC HEALTH: EVALUATING TECHNOLOGIES, ECOLOGICAL SOURCES, AND SUSTAINABILITY CHALLENGES IN A GLOBAL AND REGIONAL CONTEXT

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In order to assess the nutritional value of different water purification technologies, including reverse osmosis (RO), ultraviolet (UV) treatment, activated carbon filtration, and novel methods like solar desalination, this review looks at their wider health implications. Unintended consequences, like the removal of vital minerals and the production of brine waste, are given special attention. Along with evaluating surface water (rivers, lakes, and ponds), groundwater (aquifers), rainwater harvesting systems, and desalinated seawater, the study also highlights the availability, ecological roles, as well as associated challenges of these global water sources. With case studies of effective implementations and government programmes advancing sustainability, the review delves deeper into the function of rainwater harvesting in water-scarce nations like BRICS. Another important tactic in the fight against freshwater scarcity, particularly in arid and coastal areas, is desalination. Despite technologies like RO and thermal distillation offer practical answers, their high energy requirements and prospective long-term environmental effects are causes for concern. The objective is to present a comprehensive perspective on how public health outcomes, source sustainability, and water purification technologies interact with one another. A comprehensive search for literature using databases like PubMed, Scopus, Dovepress, MDPI and Google Scholar, with a particular focus on research conducted within the last 15 years, served as the foundation for this narrative review. To alleviate water scarcity and protect ecosystem integrity, future research should concentrate on improving energy efficiency, optimising purification systems to retain vital minerals, and developing sustainable practices like solar desalination and rainwater harvesting.




ISBN: 978-81-980623-8-3

**Keywords:** Groundwater, surface water, desalination, public health, Cauvery River, waterborne diseases.

**CH-164**

**MOLECULAR DOCKING STUDY OF SYNTHESIZED SUBSTITUTED TRIAZOLE DERIVATIVES AS AN ANTI-INFLAMMATORY AGENTS**

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Inflammation is a complex defense response triggered by pathogens, irritants, or damaged cells. It may be acute or chronic. Over 50% of all deaths coming from chronic inflammatory disorders, these conditions are widely acknowledged as the world's largest cause of mortality. Nowadays many FDA approved treatments are available but problems such as drug resistance, selectivity and high cost of treatment remain promising, hence it is necessary to develop the new medications with fewer side effect. In present study series of 1, 2, 4-triazoles-1, 3, 4-oxadiazoles incorporating piperine moiety (4-(5-(4-(benzo[d][1,3]dioxol-5-yl)butyl)-1,3,4-oxadiazol-2-yl)-5-phenyl-4H-1,2,4-triazole-3-thiol) were synthesized and structurally characterized using infrared (FTIR) spectroscopy, proton nuclear magnetic resonance (1HNMR) and mass spectrometry. In addition, in-silico studies were conducted including pharmacokinetic profiling which indicated that the compound exhibited remarkable bioavailability and drug likeness properties. Molecular docking studies revealed that all synthesized derivatives demonstrated stronger binding affinities as the standard anti-inflammatory drug, which exhibited binding energies of -8.9 to -10.89 kcal/mol. The binding energy of standard anti-inflammatory drug was found to be -10.83 kcal/mol. The interaction studies were performed using PDB ID 1CX2 {Cyclooxygenase-2 (Prostaglandin synthase-2), SC-558}, showing effective binding of compound with target enzyme. Among the tested derivatives compounds 1c, 2c, 3c, 4c, 5c, 6a and 7c exhibited significant binding energies for anti-inflammatory activity. In particular compounds 1c (p-NO2), 2c (p-NH2) and 7c (p-OCH3) derivatives demonstrated highest binding affinities with docking scores are -10.89, -10.06 and -9.97 kcal/mol indicating as strong potential as anti-inflammatory agents.

**Keywords:** Inflammation, 1, 2, 4-triazoles-1, 3, 4-oxadiazoles-piperine, molecular docking, anti-inflammatory activity.

**CH-165**

***IN-SILICO* IDENTIFICATION OF FLAVONOID-BASED INHIBITORS FOR BREAST CANCER: INSIGHTS FROM MOLECULAR DOCKING, DYNAMICS AND ADMET STUDIES**

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Breast cancer is a leading health concern all over the world and standard procedures of treatment are either exhausted due to drug resistance and adverse effects. The Therapeutic effects of three flavonoids- Apigenin, Curcumin and Hesperidin will be studied in this paper through in- silico molecular docking, dynamic simulations and ADMET. Molecular docking indicated that these three flavonoids exhibit strong binding affinity towards potential breast cancer related proteins with Apigenin having a better potential. Simulations of molecular dynamics was conducted and the results confirmed that Apigenin stayed consistent and Curcumin and Hesperidin retains a much looser connection. The effectiveness of gastrointestinal absorption, toxicity and bioavailability of these flavonoids were checked using ADMET analysis that revealed that Apigenin exhibits good gastrointestinal absorption, least toxicity and good bioavailability. Curcumin and Hesperidin showed a prospect but had limitations with regard to the blood-brain barrier penetration and a bioavailability profile. Such results indicate the interest of Apigenin as the best flavonoid in treating breast cancer, but more studies should be conducted to maximize its usage in the clinical setting.

**Keywords:** Apigenin, Breast cancer, Molecular docking, Molecular dynamics & ADMET analysis

**CH-166**

**DEVELOPMENT AND VALIDATION OF STABILITY INDICATING RP-HPLC METHOD FOR DETERMINATION OF NIRAPARIB IN BULK DRUG AND ITS PHARMACEUTICAL DOSAGE FORM**

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Niraparib was FDA approved in the year 2020 for employed preliminary to mitigate ovarian, fallopian tube, or peritoneal cancer. Objective of current research study was to develop and validate simple, rapid, precise, accurate and robust RP-HPLC method for quantitative determination of niraparib in bulk drug and formulation. Chromatographic separation was achieved Agilent Zorbax Bonus-RP column (4.6 mm× 250 mm, 5µm particle size). Mobile phase consisted of 0.1% trifluoroacetic acid (TFA) in water and acetonitrile in a 75:25 v/v ratio, delivered in isocratic mode at flow rate of 1.0 mL/min. Detection wavelength was 240 nm and injection volume 20 µL. Niraparib peak eluted at 5.18 minute with good peak symmetry. Method validation was done as per ICH guideline (Q2R1). Method revealed linearity in concentration range of 40–60 µg/mL with r2 0.999. LOD was 1.42 µg/mL and LOQ 4.30 µg/mL. %RSD less than 2% for intra- and inter-day precision were within appropriate limits, mean recovery 99.95%. Forced degradation study was performed on niraparib drug such as acidic, alkaline, oxidation, thermal and photolytic, which showed that no degradant peak interferes with niraparib peak. Novel method having certain advantages simple mobile phase preparation, shorter run time compare to reported method and transfer to LC-MS instrument due to buffer in volatile nature. Developed RP-HPLC method was simple, accurate, precise, sensitive, robust and specific. Thus, it adopts for regular quality control analysis of niraparib in bulk drug and pharmaceuticals formulation.

**Keywords:** Niraparib, Method development, validation**,** forced degradation study.

**CH-167**

**DESIGN AND DEVELOPMENT OF N-HETEROCYCLIC ACACETIN HYBRIDS AS POTENTIAL ANTIDEPRESSANT AGENTS: BY USING EXPERIMENTAL AND COMPUTATIONAL APPROACHES**

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Depression is a widespread mental health issue that frequently has adverse drug effects and varies in responsiveness to treatment. A novel set of 7- [(substituted nitrogen-containing heterocyclic molecule) alkoxy] hybrids was designed and evaluated for possible antidepressant efficacy in mouse models using acacetin, a precursor of bioactive chemicals. In the presence of potassium carbonate and dimethylformamide, acacetin interacted with 1,4-dibromobutane to produce 4'-methoxy-5-hydroxy flavones (F1-F7), which were then modified with various N'-heterocycles. Spectral and elemental investigations were used (UV, MS, NMR, IR) to confirm the structure. Insilico studies were performed to determine binding affinities against 5HT2AR via molecular docking followed by ADMET analysis. Antidepressant potential was evaluated computationally using PASS analysis and experimentally using the Tail Suspension Test (TST) and Modified Forced Swim Test (MFST) to examine in-vivo efficacy. Docking scores, pharmacokinetic parameters, PASS analysis, and toxicological profiles were all favourable for all synthesized compounds. The highest docking score was -9.76 Kcal/mol. Interestingly, at a dosage of 10 mg/kg, most of the hybrids (F1-F3 and F5) showed noticeably more antidepressant action than acacetin. Hybrids F1–F4 dramatically decreased immobility time and frequency in the TST and MFST, indicating strong antidepressant-like effects that are probably related to serotonergic pathways and reminiscent of fluoxetine.

**Keywords:** Flavonoid, Flavone, Acacetin, Antidepressant, Modified Forced Swimming Test, Tail Suspension Test, 5-HT2AR

**CH-168**

**RP-HPLC TECHNIQUE DEVELOPMENT AND VALIDATION FOR QUANTIFICATION OF IRBESARTAN AND CHLORTHALIDONE FROM THE FORMULATIONS**


ISBN: 978-81-980623-8-3

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Chromatographic methods are characterized due to their efficient ability for the separation of complex mixtures. Also, efforts are being made to improve preciseness, robustness in the current chromatographic techniques. RP-HPLC technique was developed for simultaneous estimation of water insoluble drugs Irbesartan (IST) and Chlorthalidone (CTD) from dosage form. Chromatographic system RP-HPLC equipped with RP - C18 column (× i.d. 5-µm particle size) and UV detector was employed for analytical technique. Optimized mobile phase [Acetonitrile: Methanol: water pH 4.7 (pH adjusted with acetic acid)] was pumped at a flow rate of 0.8 ml/min in the ratio of 50:30:22 % v/v and the eluents were monitored at 245 nm. The method was successfully applied for quantitative estimation of both drugs from their combined dosage form. The method was validated as per ICH guidelines and US FDA guidelines. The linearity of both drugs was ascertained over the conc range 2 to 40µg/ml for IST and 1 to 6µg/ml for CTD. The retention time of IST and CTD was found 4.724 and 3.418 mins respectively. The method was validated for accuracy and precision, LOD and LOQ. The assay was found 101.07% w/w for CTD and 101.12% w/w for IST within the limits given in the official book. SD was found 1.0922 for CTD and 0.5404 for IST in accuracy study and RSD was obtained within prescribed limits in precision study. Resolution was proper and chromatogram with well resolved peaks is sign of methods efficiency. The developed method is suitable for routine quality control tests for this solid dosage form. The method is rapid as both drugs were eluted within 5 mins and no interference of excipients was observed during estimation.

**Keywords:** Irbesartan, Chlorthalidone, validation, ICH guidelines, RP-HPLC

**CH-169**

## DEVELOPMENT AND VALIDATION OF AN RP-HPLC METHOD FOR ESTIMATING PROCESS-RELATED IMPURITIES IN ANTIDIABETIC DRUGS

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There has been ever increasing interest in impurities present in Active Pharmaceutical Ingredient's (API's). Nowadays, not only purity profile but also impurity profile has become mandatory according to the various regulatory authorities. The study aimed to develop and validate a reverse-phase high-performance liquid chromatography (RP-HPLC) method for the simultaneous estimation of process-related impurities in Dapagliflozin, Vildagliptin, and Sitagliptin. The method was optimized using various mobile phases and validated according to ICH guidelines for parameters including linearity, accuracy, precision, robustness, LOD, and LOQ. The optimized method employed an Agilent Poroshell C18 column (150 mm × 4.6 mm, 5 µm), with a mobile phase of acetonitrile and 0.05% orthophosphoric acid in water (30:70, v/v), at a flow rate of 1.0 mL/min, and detection at 210 nm. The method exhibited good linearity ($r^2 > 0.998$), accuracy (recovery within 98–102%), and precision (RSD < 2%). The method is suitable for routine quality control of impurities in antidiabetic formulations. Regulatory bodies across the globe have established comprehensive guidelines to ensure that impurity profiling is rigorously conducted during the development and manufacturing of pharmaceuticals. These guidelines are designed to protect public health by setting acceptable limits for impurities and mandating robust analytical methods for their detection and quantification. Thus, impurity profiling is a cornerstone of pharmaceutical development, ensuring that drug products are safe, effective, and of high quality. Regulatory guidelines such as FDA (Food and Drug Administration, USA), EMA (European Medicines Agency), Pharmacopoeias etc. The presence of impurities can accelerate the degradation of drug products, thereby reducing their shelf life and stability. Stability studies are conducted to understand how impurities develop over time and under various storage conditions, which is essential for establishing appropriate storage guidelines and expiration dates.

**Keywords:** FDA, EMA, API, shelf life

**CH-170**

## NEW IMPROVED RP-HPLC VALIDATED METHOD FOR SIMULTANEOUS ESTIMATION OF THEOPHYLLINE AND ETOFYLLINE FROM SOLID DOSAGE FORM

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Liquid chromatography is extensively used in separation and detection of components from complex matrix. A simple and improved economical RP-HPLC method for combined drug estimation Theophylline (TPE) and Etofylline (EFE) have been developed. Chromatographic method was developed for estimation of both drugs, with system RP-HPLC, using RP - C18 column equipped with UV detector. The mobile phase [Methanol: water pH 8.4 (pH adjusted with KOH AR grade)] was pumped at a flow rate of 0.8 ml/min in the ratio of 46:54 % v/v and the eluents were monitored at 273 nm. The method was successfully studied for quantitative estimation of both drugs from their combined dosage form. The method was studied as per ICH guidelines and US FDA guidelines. The linearity of both drugs was ascertained in the conc range 2 to 20µg/ml for TPE and 4 to 40µg/ml for EFE. The retention time of TPE and EFE was found to be 3.152 and 5.478 mins respectively. The method was validated for accuracy, precision and LOD and LOQ etc. The assay was found 102.87% w/w for TPE and 98.67% w/w for EFE in the range given stated in the official book. SD was found 0.7984 for EFE and 1.3954 for TPE and RSD data in precision study was within given criteria. Resolution was proper and chromatogram with well resolved peaks was sign of methods efficiency. The developed method is suitable for routine quality control tests for the solid dosage form. The method is economical as both drugs were eluted within 6 mins and no interference of excipients was observed during estimation.

**Keywords:** Etofylline, Theophylline, RP-HPLC, validation, ICH guidelines

**CH-171**

## SYNTHESIS, ANTICANCER ACTIVITY, MOLECULAR DOCKING STUDIES OF N-[(4-METHYLPHENYL) SULFONYL]-N'-SUBSTITUTED UREA

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Cancer remains a significant global health challenge due to its complex etiology and limited therapeutic specificity. Sulphonylureas, traditionally known for antidiabetic applications, have recently gained attention for their potential anticancer activities. Synthesis of some N-[(4-methylphenyl) sulfonyl]-N'-substituted urea derivatives were synthesized by general methods. These were purified and characterised spectroscopy. The cytotoxic potential was evaluated *in vitro* against the MCF-7 breast cancer cell line via MTT assay. Compound SS-4 showed the most promising $IC_{50}$ value of 0.49 µM. Molecular docking was carried out using AutoDock Vina targeting VEGFR2 (PDB ID: 3WZE), and binding interactions were compared with a known standard drug, Sorafenib. QSAR analysis was performed between pIC50 and physicochemical descriptors (logP, HBA, HBD, MR). The results revealed a negative contribution of lipophilicity for inhibitory activity. This study provides valuable insights into the development of sulphonylurea-based potential anticancer agents.

**Keywords:** Sulphonylureas, Anticancer, MCF-7, Molecular docking, QSAR

**CH-172**

## INTEGRATING NETWORK PHARMACOLOGY WITH MOLECULAR DOCKING AND *IN VITRO* MTT ASSAY TO RATIONALIZE THE USE OF CLEOME VISCOSA FOR THE TREATMENT OF PROSTATE CANCER

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Prostate cancer remains a leading cause of cancer-related mortality in men, with current treatments often fraught with severe side effects and drug resistance, necessitating the discovery of novel therapeutic agents. Cleome viscosa, a plant with documented anticancer activity against




ISBN: 978-81-980623-8-3

liver and breast cancer cell lines, was investigated for its potential against prostate cancer in this study.This study aimed to comprehensively explore and rationalize the anticancer potential of Cleome viscosa against prostate cancer by integrating network pharmacology, molecular docking simulations, and *in vitro* MTT assay. Fresh Cleome viscosa plants were extracted with methanol after collection, drying, and pulverization. Standard qualitative tests confirmed the presence of various phytochemicals. Network pharmacology analysis was then performed by identifying bioactive compounds from public databases, assessing their drug-likeness (ADMET), and predicting their molecular targets. Prostate cancer-related genes were curated from databases, and overlapping targets between compound predictions and disease genes were identified using the Venny tool, yielding 15 common targets including AR, MAPK8, EGFR, and PIK3CA. Compound-target and protein-protein interaction networks were constructed followed by pathway and functional enrichment analyses to delineate affected signaling pathways. Key targets were then used for molecular docking, with protein structures sourced from the Protein Data Bank. Docking simulations using PyRx evaluated binding affinities and interactions. For experimental validation, human prostate cancer PC-3 cells were treated with various doses (25-200 µg/ml) of the methanolic extract for 24 hours, and cytotoxicity was assessed via the MTT assay. The study successfully demonstrated the anticancer potential of Cleome viscosa phytochemicals. Molecular docking revealed strong binding interactions; notably, Bazedoxifene exhibited an identical high binding affinity of -8.2 kcal/mol with both Quercetin and Naringenin, indicating favorable and stable interactions. The *in vitro* MTT assay on PC-3 cells confirmed a dose-dependent reduction in cell viability, with an $IC_{50}$ of 166.22 ± 0.41 µg/ml after 24 hours. These integrated findings suggest that Cleome viscosa contains compounds with promising therapeutic effects against prostate cancer, acting through multiple molecular targets.

**Keywords:** Prostate cancer, Cleome viscosa, Network pharmacology, Molecular docking, MTT assay, Phytochemicals

**CH-173**

## METHOD DEVELOPMENT AND VALIDATION OF A GAS CHROMATOGRAPHY TECHNIQUE FOR RESIDUAL SOLVENTS IN BORTEZOMIB

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Residual solvents in pharmaceutical products pose potential health risks, making their accurate quantification essential for ensuring drug safety and regulatory compliance. Bortezomib, a potent anticancer drug, requires stringent quality control to minimize residual solvents levels as excessive residues can affect drug efficacy and patient safety. A validated gas chromatography (GC) method with a flame ionization detector (FID) can provide a reliable approach for detecting and quantifying residual solvents.Separation was achieved using a DB-624 capillary column (30 m x 0.53 mm id x 30 µm film thickness) with helium as the carrier gas. The total run time was 25 min. The developed method underwent comprehensive validation for system suitability, specificity, linearity, range, LOD, LOQ, precision, stability of test solution, ruggedness, and robustness, making it suitable for precise quantification.The method shows good linearity in concentration ranges from LOQ to 150%. The proposed method is a reliable and validated approach for residual solvent analysis in bortezomib. Its accuracy and precision make it well-suited for quality control and regulatory compliance in pharmaceutical manufacturing.

**Keywords**: Bortezomib, residual solvents, carrier gas, direct injection method, capillary column.

**CH-174**

## METHOD DEVELOPMENT AND VALIDATION OF SELECTIVE ANTIHYPERTENSIVE DRUGS IN THEIR COMBAINED TABLET DOSAGE FORM BY USING REVERSE PHASE HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

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The present work describes a validated reverse phase high performance liquid chromatographic method for simultaneous estimation of Irbesartan chlorthalidone and cilnidipine in tablet dosage form. The quantification was carried out using C18 column (250 x 4.6mm, 5µm) and mobile phase comprised of Buffer, Acetonitrile and TEA in a proportion of 80:20:0.1 %v/v/v. The flow rate was 1.0 ml/min and the eluent was monitored at 222 nm. The selected chromatographic conditions were found to effectively separate Irbesartan Chlorthalidone and cilnidipine were 3.807 min, 4.667 min, and 6.887 min respectively. Linearity was found to be in the range of 30-90 µg/ml, 1.25-3.75 µg/ml and 1-3 µg/ml for Irbesartan Chlorthalidone and cilnidipine respectively. The percentage recoveries of all the drugs were found to be 99.27-99.81%, 99.57-99.99% and 99.22-99.44% for Irbesartan, chlorthalidone, and cilnidipine. The proposed method was found to be fast, accurate, precise, and reproducible and can be used for simultaneous estimation of these drugs in a tablet.

**Keywords:** Irbesartan, chlorthalidone and cilnidipine, Reversed-phase HPLC.

**CH-175**

## DESIGN, SYNTHESIS, AND ANTICANCER EVALUATION OF NEW SCHIFF BASES CONTAINING A 1,2,4-TRIAZOLE CORE VIA A ONE-POT APPROACH

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A series of ten novel Schiff bases incorporating a 1,2,4-triazole core were designed, synthesized, and evaluated for their anticancer potential. The synthesis was carried out via a green and convenient one-pot method using phenyl hydrazine, ethyl acetoacetate, and formic acid, with lemon juice employed as a natural catalyst to generate the triazole intermediate. This intermediate was subsequently condensed with various substituted aromatic aldehydes to yield the target Schiff bases (A1–A10). The structures of all synthesized compounds were confirmed by IR, $^{1}H$ NMR, $^{13}C$ NMR, and mass spectrometry. *In silico* molecular docking studies were performed against the PARP-1 enzyme (PDB ID: 4ZZZ), a key target in anticancer therapy. Compounds A2, A3, and A5 exhibited strong binding affinities with Glide scores comparable to the reference drug Olaparib. ADME predictions further supported their drug-likeness and suitability as lead candidates. The *in vitro* anticancer activity of all compounds was assessed against human breast cancer cell lines MCF-7 and MDA-MB-231 using the MTT assay. Notably, compounds A3 and A5 demonstrated significant cytotoxicity, with $IC_{50}$ values in the low micromolar range, closely aligning with Olaparib. The remaining compounds showed moderate activity, indicating a structure-activity relationship (SAR) influenced by the nature of the aldehyde substituents. Overall, the findings highlight compounds A3 and A5 as promising PARP-1 inhibitors with potential for further development in anticancer drug discovery.

**Keywords:** Schiff bases, 1,2,4-Triazole, PARP-1 inhibitors, green synthesis, Anticancer activity, Molecular docking

**CH-176**

## DESIGN, SYNTHESIS, AND ANTICANCER EVALUATION OF NEW SCHIFF BASES CONTAINING A 1,2,4-TRIAZOLE CORE VIA A ONE-POT APPROACH

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A series of ten novel Schiff bases incorporating a 1,2,4-triazole core were designed, synthesized, and evaluated for their anticancer potential. The synthesis was carried out via a green and convenient one-pot method using phenyl hydrazine, ethyl acetoacetate, and formic acid, with lemon juice employed as a natural catalyst to generate the triazole intermediate. This intermediate was subsequently condensed with various substituted aromatic aldehydes to yield the target Schiff bases (A1–A10). The structures of all synthesized compounds were confirmed by IR, $^{1}H$ NMR, $^{13}C$ NMR, and mass spectrometry. *In silico* molecular




ISBN: 978-81-980623-8-3

docking studies were performed against the PARP-1 enzyme (PDB ID: 4ZZZ), a key target in anticancer therapy. Compounds A2, A3, and A5 exhibited strong binding affinities with Glide scores comparable to the reference drug Olaparib. ADME predictions further supported their drug-likeness and suitability as lead candidates. The *in vitro* anticancer activity of all compounds was assessed against human breast cancer cell lines MCF-7 and MDA-MB-231 using the MTT assay. Notably, compounds A3 and A5 demonstrated significant cytotoxicity, with $IC_{50}$ values in the low micromolar range, closely aligning with Olaparib. The remaining compounds showed moderate activity, indicating a structure-activity relationship (SAR) influenced by the nature of the aldehyde substituents. Overall, the findings highlight compounds A3 and A5 as promising PARP-1 inhibitors with potential for further development in anticancer drug discovery.

**Keywords:** Schiff bases, 1,2,4-Triazole, PARP-1 inhibitors, green synthesis, Anticancer activity, Molecular docking

**CH-177**

## CENTRAL COMPOSITE DESIGN ASSISTED HPLC METHOD DEVELOPMENT FOR HIGH-THROUGHPUT ANALYSIS OF TELMISARTAN, CHLORTHALIDONE AND METOPROLOL SUCCINATE

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Optimization for the estimation of drug combinations by HPLC is essential and superior in terms of efficient, cost, accuracy and regulatory compliance comparing normal method development making it high quality pharmaceutical analysis. Optimization by Central Composite Design is highly significant due to its advanced and systematic approach of multiple variables evaluation and their interaction providing minimal number of experimental runs by giving an accurate mathematical models like Response surface method which predicts method performance under various conditions. The present study uses Telmisartan, Chlorthalidone and Metoprolol Succinate. In their combined tablet dosage forms for method development and validation using CCD as an Optimization tool by HPLC. For Optimization, acetonitrile concentration as mobile phase, pH of the phosphate buffer and flow rate were selected as factors with chosen responses from capacity factor, retention time and resolution between the peaks. The results obtained from CCD experiments were presented as perturbation and response surface plots to get visual representation of individual and multiple factors. Overall, the method gets a desirability value of 0.770 indicating best method performance. Retention time of Telmisartan, Chlorthalidone and Metoprolol Succinate. were 5.239, 7.692- and 10.623-minutes using acetonitrile and 0.05M phosphate buffer in the ratio 30:70 %V/V and pH of 6.2 at a flow rate 1.0 ml/min at a detection wavelength of 215 nm. Validation parameters according to ICH guidelines were done and found to be within limits. The method may be adopted for routine analysis of these drugs in pharmaceutical industry.

**Keywords:** Optimization, Central Composite design, HPLC, Validation, ICH guidelines

**CH-178**

## NOVEL ZINGERONE-DERIVED CHALCONES AS POTENTIAL NEUROPROTECTIVE LEADS: SYNTHESIS, *IN SILICO* DOCKING, AND *IN VITRO* EVALUATION

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Chalcones are open-chain flavonoids with antioxidant and neuroprotective potential. Zingerone, a phenolic alkanone from Zingiber officinale, has demonstrated beneficial neuroprotective effects. This study reports the synthesis of novel Zingerone-derived chalcones, their structural characterisation, *in silico* docking, and evaluation of neuroprotective activity. A series of six Zingerone-derived chalcones were synthesised via Claisen–Schmidt condensation using substituted benzaldehydes. Structures were confirmed by FT-IR, 1H/13C NMR, and mass spectrometry. *In silico* docking was performed against acetylcholinesterase (AChE), monoamine oxidase-B (MAO-B), and GSK-3β using AutoDock Vina. ADMET profiles were predicted *in silico*. Neuroprotective effects were evaluated in SH-SY5Y neuronal cells exposed to $H_2O_2$-induced oxidative stress, using MTT, ROS, caspase-3, and mitochondrial potential assays. The synthesised chalcones exhibited good yields (62–83%). Docking scores ranged from −7.8 to −10.2 kcal/mol for AChE and −7.1 to −9.4 kcal/mol for MAO-B, with the methoxy-substituted derivative (C4) showing the best binding (−10.2 kcal/mol for AChE). ADMET analysis predicted BBB penetration, logP values between 2.5–3.8, and no hepatotoxicity or mutagenicity risk. In SH-SY5Y cells, $H_2O_2$ reduced viability to 48 ± 3.2%, whereas pretreatment with chalcones (10 µM) restored viability to 78–91% ($p < 0.01$). ROS generation decreased by 65%, caspase-3 activity was reduced by 45%, and mitochondrial membrane potential was preserved at 82% of control levels compared to 51% in untreated stressed cells. Zingerone-derived chalcones display favourable drug-likeness, strong binding affinity to neurodegeneration-related targets, and significant neuroprotective effects *in vitro*. These findings suggest their potential as leads for developing novel therapeutics against neurodegenerative disorders.

**CH-179**

## SYNTHESIS, CHARACTERIZATION, AND BIOLOGICAL EVALUATION OF 2-PHENYL-1,3-OXAZOL-5-ONE DERIVATIVES AS POTENTIAL BREAST CANCER THERAPEUTICS: A COMBINED APPROACH OF MICROWAVE SYNTHESIS, MOLECULAR DOCKING, AND CYTOTOXIC STUDY

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Oxazolone derivatives have gained significant attention due to their wide spectrum of biological activities, particularly anticancer potential. Breast cancer continues to be a leading cause of mortality among women, necessitating the development of novel therapeutic agents. In this study, 36 derivatives of 2-Phenyl-1,3-Oxazol-5-One were designed as potential PARP-1 inhibitors. Molecular docking against PARP-1 (PDB ID: 4UND) revealed that several compounds exhibited favourable binding affinities, with strong hydrogen bonding and hydrophobic interactions comparable to standard drugs such as niraparib, veliparib, and Olaparib. Three top-ranking derivatives (OV1, OV2, and OI30) were synthesized using an efficient microwave-assisted method involving hippuric acid and substituted benzaldehydes. Structural confirmation was achieved through FT-IR, $^1$H-NMR, and mass spectrometry. Biological evaluation by MTT assay demonstrated dose-dependent cytotoxicity, with certain derivatives showing moderate to potent activity against breast cancer cells. In addition, *in silico* ADME profiling indicated favourable drug-likeness and pharmacokinetic potential. The present work establishes 2-Phenyl-1,3-Oxazol-5-One derivatives as promising scaffolds for anticancer drug discovery targeting PARP-1. The combination of rational design, docking validation, eco-friendly microwave-assisted synthesis, spectral characterization, and preliminary biological evaluation highlights their potential as lead candidates. Further optimization and pharmacological studies are warranted to advance these oxazolone derivatives toward breast cancer therapy.

**Keywords:** 2-Phenyl-1,3-Oxazol-5-One, Oxazolone derivatives, PARP-1 inhibition, Microwave-assisted synthesis, Anticancer agents

**CH-180**

## ANTIMICROBIAL POTENTIAL OF NOVEL 3,5-DISUBSTITUTED 1,3,4-OXADIAZOLE-2-THIONE DERIVATIVES: AN IN-SILICO AND *IN-VITRO* APPROACH

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Infectious diseases remain a significant health concern, accounting for approximately 41% of the global disease burden. One of the main causes of this problem is bacterial resistance to antibiotics. The current antibiotic therapies are often accompanied by a range of toxic effects. Antimicrobial drugs may produce adverse effects like an allergic reaction and hypersensitivity upon consumption. Additionally, a major concern is




ISBN: 978-81-980623-8-3

that some antimicrobial drugs have triggered multiple drug resistance in hosts, thus, attention is now being shifted towards biologically active components of many synthetic origins. A series of novel 3,5-disubstituted 1,3,4-oxadiazole-2-thione derivatives (1e, 2e, 3e, 4e, and 5e) synthesized from different substituted aromatic acids. The identification of functional groups and structure determination were made on the basis of IR, 1H NMR, and Elemental analysis, respectively. Further, the newly synthesized 1,3,4-oxadiazole derivatives were studied for the antimicrobial activity against various gram-positive and gram-negative bacteria. Among all the tested compounds, 1(e) and 5(e) showed minimum inhibitory concentration (MIC) at 100 µg/ml compared with 4(e) & 3(e) at 200 µg/ml against specific organisms. The ortho and para substitution of the aromatic ring in the oxadiazole derivative with nitro, hydroxy, chloro, and alkyl substitution may hold the responsibility to enhance the cytotoxicity against the tested microorganisms, which extends the scope of research to develop potent molecules for the treatment of microbial infections. Molecular docking studies were performed to explore the binding interactions of synthesized 1,3,4-oxadiazole compounds with receptor proteins to justify their antimicrobial potential, which has been compared with the standard drug methicillin.

**Keywords:** Antimicrobial activity; 1,3,4-oxadiazoles; in-silico; Methicillin; Ligand preparation; Molecular docking

**CH-181**

## RP-HPLC METHOD DEVELOPMENT AND VALIDATION FOR QUANTITATIVE ESTIMATION OF ABAMETAPIR IN BULK DRUG FORM

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A novel, simple, and reproducible reverse-phase high-performance liquid chromatography (RP-HPLC) method was developed and validated for the quantification of Abametapir in bulk drug. Chromatographic separation was achieved using a C18 column with a mobile phase of methanol:water (90:10 v/v), at a flow rate of 1.0 mL/min, and detection at 254 nm. A distinct retention time for Abametapir was observed at 7.41 min, with sharp peak symmetry. The developed method exhibited excellent linearity over the concentration range of 200–1000 µg/mL ($r^2$ = 0.9984). Validation was performed in accordance with ICH Q2(R1) guidelines. The method demonstrated high accuracy, with percentage recovery ranging from 99.17% to 100.02% across 50%, 100%, and 150% levels. Precision studies showed %RSD values below 1% for both intra-day and inter-day analyses, confirming method reliability. The limit of detection (LOD) and limit of quantification (LOQ) were found to be 8.93 µg/mL and 27.06 µg/mL, respectively. System suitability parameters, including tailing factor (1.17) and theoretical plates (3434.2), were within acceptable limits.This validated RP-HPLC method provides a reliable, cost-effective tool for routine quality control of Abametapir, ensuring analytical consistency and regulatory compliance.

**Keywords:** Abametapir, RP-HPLC, ICH Q2(R1), Photodiode Array Detector, Empower Software.

**CH-182**

## DEVELOPMENT AND VALIDATION OF AN HPLC METHOD FOR THE QUANTIFICATION OF STIGMASTEROL AND NEUROPROTECTIVE POTENTIAL OF ALPINIA CALCARATA AGAINST CISPLATIN-INDUCED NEUROPATHY IN A RAT MODEL

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The current study aims to develop and validate a high-performance liquid chromatography (HPLC) method for the quantification of stigmasterol and the neuroprotective Potential of ethanolic extract of Alpinia calcarata (EEAC) rhizome against Cisplatin-Induced neuropathy in a rat model. Cisplatin (CDDP) is a platinum-based anticancer drug widely used as a cytotoxic chemotherapeutic agent. In the present study, the neuroprotective effect of EEAC was investigated in cisplatin-induced (2 mg/kg i.p. once weekly for five weeks) peripheral neuropathy in rats. After 5 weeks of EEAC treatment, the degree of neuroprotection was determined by measuring body weight, behavioural and histopathological properties. Acetonitrile: Orthophosphoric acid (90:10v/v) was found to have good symmetry and the lowest Rt (3.64) min and a sharp peak, and a wavelength of 220 nm. The linearity range, regression coefficient and LOD and LOQ of the stigmasterol solution were obtained. Accuracy and precision were determined for stigmasterol and RSD values, respectively. The % RSD was < 2. The peak retention time was found to be 3.6 min, and the number of theoretical plates in all standard injections for stigmasterol was ≥ 2000. The tailing factor was recorded as 0.99. The developed method was applied for the quantification of stigmasterol in EEAC. It was found that stigmasterol shows retention at 3.58, and the area under the peak was found to be 4088.86. The amount of stigmasterol detected in the extract was 12.61 µg. EEAC showed improvement in b.w. Cisplatin-induced behavioural changes were seen to be reverted back to normal to a significant extent. Histopathological analysis revealed reduced nerve damage along with improved preservation of myelin and axonal structures in the treatment groups.

**Keyword:** Alpinia calcarata rhizome, HPLC, ICH guidelines, Method Validation, Cisplatin, Neuropathy

**CH-183**

## FORMULATION AND EVALUATION OF A SEMI-SYNTHETIC CREAM FOR THE TREATMENT OF SHINGLES (HERPES ZOSTER)

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The Varicella-zoster virus (VZV), also known as human herpes virus 3, is a neurotropic alpha herpes virus responsible for causing both chickenpox (varicella) and shingles (herpes zoster). This study focuses on herpes zoster, which commonly occurs as a reactivation of VZV, particularly in older adults. Herpes zoster is more prevalent in the elderly and in individuals with low immune systems due to factors such as stress, infections like HIV, COVID-19, or immunosuppressive conditions. Shingles is characterized by painful rashes and blisters. Though antiviral drugs are standard treatment, there is growing interest in herbal therapies for symptom relief and faster healing. This research involves the development and assessment of a new semi-synthetic cream formulated with herbal ingredients known for their antiviral, anti-inflammatory, and analgesic properties specifically, extracts of walnut, tulsi, fenugreek, dracena trifasciata, black beans and rose water. A randomized controlled trial was conducted with patients diagnosed with shingles. The herbal cream was applied topically to affected areas, and outcomes were measured in terms of pain reduction, lesion healing, and overall symptom improvement over a set period. Initial findings suggest that the cream is effective, showing significant pain relief and faster recovery compared to the control group. The formulation was well tolerated with no reported side effects. In summary, this herbal-based cream demonstrates promise as a complementary or alternative treatment for shingles, supporting both symptom relief and healing. Further research is encouraged to confirm these results and investigate the cream's mechanisms of action.

**Keywords:** Varicella-zoster virus; Herpes zoster; epidemiology; complications; treatment; prevention

**CH-184**

## DESIGN, SYNTHESIS OF 9-ANILINOACRIDINE DERIVATIVES AND EVALUATION OF ANTI-BREAST CANCER ACTIVITY

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The prevalence of breast cancer is increased globally; there is need of promising drugs without side effects. So, we can design drugs against various breast cancer targets like ER, HER-2, CDK 4, PARP etc. 9-anilinoacridines play an important role as antitumor DNA-intercalating agents, due to their antiproliferative properties. Several anticancer agents with 9-anilinoacridines such as amascrine and nitracrine have




ISBN: 978-81-980623-8-3

been developed. In the present study, for identification of potential ligands of 9-anilino acridines as selective ERα inhibitors (2IOG.pdb) targeting breast cancer by using Schrodinger suit-2024-2, Maestro 14 version. Docking was performed by Glide module, in-silco ADMET screening by qikprop module, free binding energy was calculated by Prime-MMGBSA module and MD simulation by Desmond Module. The selective compounds are synthesized, Characterized and evaluated for *in-vitro* anti-breast cancer activity against MCF-7 cells. The 9-anilinoacridine derivatives 4a-j have good binding affinity with Glide score in the range of --8.11 to -12.64 Kcal/mol when compared with the standard Nitracrine (-5.61) and tamoxifen (-7.81). The ADMET screening of the designed molecules are within the recommended values. MM-GBSA binding results of most potent inhibitor displayed stable and favorable. A 100ns MD simulation study also confirms the stability of docking complex. The compounds with good Glide scores are synthesized, characterized and evaluation of Anti-breast Cancer activity against MCF-7 Cell lines also performed Two of the synthesized compounds 4f & 4j had shown good IC50 values 123.3µM and 164µM. ER binding assay and gene expression by RT-PCR method had also proven that these compounds are good antagonist to estrogen receptor. The results reveal that, this study provides evidence for consideration of valuable ligands in 9-anilinoacridine derivatives as potential ERα inhibitor and the compounds, 4f & 4j have significant anti-breast cancer activity and are useful as drugs after further refinement.

## CH-185

### MOLECULAR DOCKING-BASED INSIGHTS INTO THE INHIBITORY POTENTIAL OF VITAMIN E AGAINST MAPK8 (JNK1) IN DISEASE PATHWAYS

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Vitamin E is a naturally occurring fat-soluble antioxidant that plays a crucial role in maintaining cellular integrity by reducing oxidative stress and preventing free radical–induced damage. Beyond its nutritional value, Vitamin E has been reported to possess therapeutic potential in various pathological conditions, including cancer, rheumatoid arthritis, and inflammatory disorders. The mitogen-activated protein kinase 8 (MAPK8), also known as c-Jun N-terminal kinase 1 (JNK1), is a key regulator of stress-induced signaling pathways that contribute to apoptosis, inflammation, and tumor progression. In this study, we aimed to investigate the inhibitory potential of Vitamin E against MAPK8 using molecular docking approaches. The three-dimensional crystal structure of MAPK8 was retrieved from the Protein Data Bank (PDB) and validated using UniProt, while the ligand structure of Vitamin E was obtained from the PubChem database. Molecular docking simulations were performed using Biovia Discovery Studio to predict the binding orientation, interaction energy, and key amino acid residues involved in the Vitamin E–MAPK8 complex. The docking analysis revealed a favorable binding energy of −7.89 kcal/mol, suggesting strong interaction and stability of the ligand–protein complex. Vitamin E was found to form hydrophobic contacts and hydrogen bond interactions with critical residues in the MAPK8 active site, potentially interfering with its kinase activity. These results highlight the ability of Vitamin E to modulate MAPK8 signaling through direct binding, providing computational evidence for its therapeutic relevance in MAPK8-associated diseases. Further *in vitro* and *in vivo* validation is warranted to establish Vitamin E as a potential natural inhibitor of MAPK8.

**Keywords**: Vitamin E, MAPK8 (JNK1), Molecular docking, Cancer, Computational drug discovery

## CH-186

### NETWORK MODELING, DFT AND COMPUTATIONAL INSIGHTS OF QUINOXALINE MEDIATED PYRAZOLINES AS ANTI-BREAST CANCER AGENTS

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Heterocyclic compounds play a vital role in the treatment of various ailments. Network pharmacology is an emerging technique for investigating the molecular effects of compounds. In this current research, novel quinoxaline-mediated pyrazoline derivatives were designed and evaluated for their potential using the network pharmacology approach. The mechanistic pathway and the prominent targets were identified using network pharmacology and enrichment analyses. These analyses merely showed that the designed compounds would be highly active against breast cancer by targeting the Estrogen signaling pathway. The gene survival analysis exhibited that the targets (ESR1 and ERBB2) were significant. The physicochemical, pharmacokinetic and toxicity parameters of the designed compounds were evaluated and the findings of these studies showed the druggable nature of the compounds. The drug score in the range of 0.1-0.7 was observed, calculated using the OSIRIS Property Explorer. The molecular docking using Autodock 4.2 against the selected targets was performed, which was compared with the co-crystallized ligands and standards. Among them, derivative 7Q was found to be highly active with binding energies of -9.8 Kcal/Mol and -10.6 Kcal/Mol against ESR1 and ERBB2, respectively. The binding interactions of this compound are also higher compared to other derivatives and superimposable with the co-crystallized ligand, which will be suitable for molecular dynamics simulations. Further, the compounds 7N, 7O, 7AO and 7AP were also found to be active, according to various computational studies. The graph theoretical studies at the DFT level and molecular modelling of the lead-like molecules confirmed the stability and potency of the compounds. Thus, these derivatives can be effectively used in the management of breast cancer. However, biological studies are warranted.

**Keywords:** Quinoxaline, Pyrazoline, Network Pharmacology, DFT, Computational studies.

## CH-187

### *INSILICO* SCREENING OF BIOACTIVE COMPOUNDS DERIVED FROM BACOPA MONNIERI AGAINST ARTHRITIS

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Bacopa monniera (synonyms Herpestis monniera, Bacopa monnieri), commonly known as water hyssop or “Brahmi,” is a prominent herb in the Ayurvedic medicine recognized for its neuroprotective, antioxidant, and cognition-enhancing properties. The present study utilized an in-silico approach to assess the pharmacological potential of its major phytoconstituents, namely bacopaside II, bacopaside I, and kaempferol. Molecular docking analyses were conducted by using PyRx software, with ligand structures obtained from PubChem and receptor coordinates retrieved from the Protein Data Bank (PDB). Receptor interactions were evaluated with supporting the structural insights from PDB-SUM and BioDiscovery tools. Three neurologically relevant protein targets—3LXK, 4JKV, and 5XRA—were selected due to their association with the signaling pathways and neurodegenerative disorders. Docking simulations enabled the prediction of optimal binding orientations, interaction energies, and pharmacokinetic properties for each evaluated compound. Among the tested ligands, bacopaside II demonstrated the highest binding affinity across all receptors, indicating a more favorable interaction profile compared with bacopaside I and kaempferol. These results highlight the superior therapeutic potential of bacopaside II and reinforce its relevance for central nervous system modulation. Overall, the study underscores the value of in-silico methodologies as cost-effective, time-efficient strategies for prioritizing bioactive molecules prior to *in-vitro* and *in-vivo* validation.

**Keywords:** –Bacopa monnieri, Arthritis, Docking, PDB, *In silico*

## CH-188

### DESIGN AND DEVELOPMENT OF NATTOKINASE-LOADED NANOCARRIERS FOR SENOSTATIC THERAPY

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Aging is characterized by progressive cellular and physiological decline, mainly caused by the buildup of senescent cells with a pro-inflammatory senescence-associated secretory phenotype. Senotherapeutics, including senolytics and senostatics, have emerged as promising approaches to reduce age-related dysfunction. Nattokinase, a fibrinolytic serine protease derived from Bacillus subtilis natto, has shown senostatic and antioxidant activity by modulating senescence markers and inflammatory cascades. However, its therapeutic use is limited by enzymatic breakdown, instability, and poor absorption in the gastrointestinal tract. In this study, Nattokinase was encapsulated into liposomes using the thin film hydration method after confirming drug–excipient compatibility through FTIR analysis. Optimization via Box–Behnken Design produced an optimal batch (F7) with a mean particle size of 189 ± 1.92 nm, which increased to 287 ± 0.32 nm after Eudragit–chitosan coating. The zeta potential improved from 22.3 ± 1.0 mV (uncoated) to 32.6 ± 1.3 mV (coated), indicating enhanced colloidal stability. Entrapment efficiency also rose from 77.02 ± 0.30% to 81.82 ± 0.40% following coating. *In vitro* release studies showed sustained Nattokinase release, with the coated liposomes providing slow and controlled drug release. The DPPH assay confirmed notable dose-dependent antioxidant activity. Further *in vivo* tests revealed that Nattokinase nanocarriers reduced senescence-associated β-galactosidase activity in the liver, spleen, and hippocampus, while decreasing oxidative stress markers in the liver, plasma, and brain. These results suggest that Eudragit–chitosan coating liposomal Nattokinase nanocarriers are a stable, bioavailable, and effective platform for senostatic therapy, emphasizing their potential as next-generation treatments for aging related conditions.

**Keywords:** Nattokinase, Aging, Senostatic, Liposomes

**CH-189**

## EVALUATION AND OPTIMIZATION OF EXTRACTION EFFICIENCY AND HPTLC ANALYSIS OF ANDROGRAPHOLIDE IN ANDROGRAPHIS PANICULATA

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Andrographolide, the principal bioactive constituent of Andrographis paniculata, demonstrates diverse pharmacological properties, including anti-inflammatory, antiviral and hepatoprotective activities. The present study reports development and optimization of High-Performance Thin-Layer Chromatography (HPTLC) method for detection and quantification of andrographolide in plant extracts. Comparative analyses were performed using standard and newly optimized mobile phase systems (Chloroform: Methanol: Toluene, C:M: T, 5:2:3) to assess their efficiency in resolving andrographolide. A total of 25 g of powdered raw drug was divided into two sets for extraction. The first set underwent solvent extraction with ethanol, methanol, acetone, and ethyl acetate (250 mL each) without solubility enhancers. The second set was extracted in the same solvent supplemented with compatible solubility enhancers: methanol with PEG 400, ethanol with PVP K30, ethyl acetate with Span 80 and acetone with sodium lauryl sulphate. Extracts were quantitatively analyzed via HPTLC to determine andrographolide yield. Results indicate that solubility enhancers significantly enhance extraction efficiency and yield. The optimized mobile phase yielded improved resolution, sharper peaks, and superior Rf value with reproducibility. This method provides a reliable, accurate and reproducible approach for the standardization and quality control of herbal formulations containing andrographolide.

**Keywords:** Andrographolide, HPTLC, standardization, extraction efficiency

**CH-190**

## ANALYTICAL METHOD DEVELOPMENT AND VALIDATION OF LINAGLIPTIN IN HUMAN PLASMA USING LC-ESI-MS/MS

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Linagliptin, a dipeptidyl peptidase-4 (DPP-4) inhibitor, is widely prescribed for the treatment of type 2 diabetes mellitus. Accurate and sensitive quantification of linagliptin in human plasma is essential for pharmacokinetic and bioequivalence studies, yet many previously reported assays suffer from limited sensitivity and reproducibility. This study aimed to develop and validate a highly sensitive and robust liquid chromatography–electrospray ionization–tandem mass spectrometry (LC–ESI–MS/MS) method for the determination of linagliptin in human plasma, in accordance with USFDA and EMA guidelines. The method employed liquid–liquid extraction using clopidogrel carboxylic acid as the internal standard. Chromatographic separation was achieved with a mobile phase of 0.1% formic acid in water (A) and acetonitrile (B) under gradient conditions. The mass spectrometer operated in positive ion mode with multiple reaction monitoring (MRM) for selective quantification. The calibration curve was constructed over the range of 0.16–20 ng/mL. Validation parameters including specificity, sensitivity, accuracy, precision, recovery, stability, and matrix effects were systematically evaluated. The method demonstrated excellent linearity ($r^2 > 0.999$) with an LLOQ of 0.16 ng/mL. Intra- and inter-day accuracy and precision were within regulatory acceptance limits. Recovery exceeded 85% for linagliptin and 90% for the internal standard, with negligible matrix effects. Stability studies confirmed the analyte's integrity under short-term, long-term, freeze–thaw, and autosampler conditions. The validated LC–ESI–MS/MS method is highly sensitive, selective, and reproducible, making it suitable for application in clinical pharmacokinetic and bioequivalence studies of linagliptin.

**Keywords:** Linagliptin; LC–ESI–MS/MS; Bioanalytical Method; Pharmacokinetics; Validation.

**CH-191**

## DEVELOPMENT AND VALIDATION OF RP-HPLC METHOD FOR SIMULTANEOUS ESTIMATION OF DAPAGLIFLOZIN, VILDAGLIPTIN AND METFORMIN HYDROCHLORIDE IN COMBINE DOSAGE FORM ALONG WITH GREENNESS ASSESSMENT

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The simultaneous quantification of dapagliflozin, vildagliptin, and metformin hydrochloride in fixed-dose combinations is critical for ensuring pharmaceutical quality and therapeutic efficacy. Reverse-phase high-performance liquid chromatography (RP-HPLC) remains the preferred analytical technique for such multi-component formulations due to its precision and reproducibility. To develop and validate a selective, accurate, and precise RP-HPLC method for the concurrent determination of dapagliflozin, vildagliptin, and metformin hydrochloride in combined dosage forms in accordance with ICH Q2(R2) guidelines. Chromatographic separation was achieved on a Finepak SIL C18T-5 column (250 mm × 4.6 mm) using a gradient elution of 0.1% orthophosphoric acid and acetonitrile, with detection at 215 nm. Validation parameters assessed included specificity, linearity, accuracy, precision, and robustness.
The method demonstrated linearity for metformin (40–140 µg/mL), vildagliptin (8–28 µg/mL), and dapagliflozin (0.8–2.8 µg/mL) with correlation coefficients ($r^2$) ≥ 0.99. Recovery values ranged from 98% to 102%, and intra- and inter-day %RSD values were <2%. The validated RP-HPLC method exhibits high specificity, accuracy, and reproducibility, rendering it suitable for routine quality control analysis of dapagliflozin, vildagliptin, and metformin hydrochloride in fixed-dose combinations.

**Keywords:** RP-HPLC, dapagliflozin, vildagliptin, metformin hydrochloride

**CH-192**

## FABRICATION AND CHARACTERIZATION OF NANOSPONGES LOADED WITH AN ANTINEOPLASTIC AGENT

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ISBN: 978-81-980623-8-3

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The present work is to fabricate and characterize nanosponges loaded with an antineoplastic agent. The nanosponge was formulated by incorporating the drug into the particles. Doxorubicin Hydrochloride has a wide anticancer activity. The activity of Doxorubicin Hydrochloride can be improved and its toxicity can be diminished by enhancing the relative specific accumulation in the tumor regions. The potential of the drug to be incorporated into the dosage form was analyzed by preformulation studies such as FTIR study, solubility studies and organoleptic properties. The formulation was carried out using Emulsion solvent diffusion method. In this method an organic phase consisting of the drug and polymer in dichloromethane is added to the aqueous phase consisting of PVA in water. The mixture was stirred using a magnetic stirrer at 1000rpm. The formulation was evaluated by Percentage yield, Entrapment efficiency, SEM, Zeta potential, Particle size distribution, Differential Scanning Calorimetry, *In-vitro* dissolution study. The SEM images showed that the particles are spherical and nano-sized. The best formulation was selected based on the results of Entrapment efficiency, *In-vitro* dissolution study etc. Nanosponges are commonly developed as a topical dosage form but this study can be used as a model to develop controlled or targeted drug delivery systems that are cheap, effective and easily affordable to the patients. This study resulted in porous nature of nanosponges which provides a channel for the release of the drug and the method is quick and reproducible.

**Keywords:** Doxorubicin Hydrochloride, FTIR study, organoleptic properties, Emulsion solvent diffusion, SEM.

**CH-193**

## DESIGN OF EXPERIMENTS-BASED RP-HPLC METHOD DEVELOPMENT AND VALIDATION FOR EZETIMIBE DETERMINATION

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The present research aims to develop and validate a simple and accurate RP-HPLC method for the determination of Ezetimibe by using the Design of Experiments Approach. This approach was useful for multivariate optimization of the method. The critical method parameters (CMPs) were optimized using the Box-Behnken design. Minitab software was equipped for the study. Chromatographic separation was done on Phenomenex C18 column with specifications 150 mm × 4.6 mm × 5 µm at 30°C. The predicted and optimized data from the software consisted of mobile phase 0.02 N Ortho phosphoric acid (OPA) and Acetonitrile (53:47% v/v), pumped at a flow rate of 0.96 ml/min brought the desirability function of 1. The UV detector was adjusted at 232.6 nm. The developed method was shows linearity with a correlation coefficient of 0.999. The optimized chromatographic method was validated as per the guidelines of ICH Q2 (R1). The stability of drug was forcibly studied under different stress conditions. Keywords: Ezetimibe; Design of Experiments Approach; Box-Behnk.

**Keywords:** Ezetimibe; Design of Experiments Approach; Box-Behnken design; ICH Q2 (R1).

**CH-194**

## UPLC METHOD DEVELOPMENT FOR SELECTED ANTIPSYCHOTIC DRUG.

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Liquid chromatography of selected Antipsychotic drug was carried out on a Waters Acquit UPLC with a photodiode array detector (DAD/PDA). The output signal was monitored and processed using empower software. The chromatographic column used Acquity UPLC BEH C-18 100-mm, 2.1-mm, and 1.7-µm particle sizes. Separation was achieved using a gradient method. Mobile phase A contained a mixture of 20 mM NaH2PO4, H2O and 2.0 mL of triethylamine (TEA) buffer (pH of 6.8), acetonitrile, and methanol in a ratio of 50:20:30 (v/v/v), respectively. Mobile phase B contained a mixture of water and acetonitrile in a ratio of 10:90 (v/v), respectively. The flow rate of the mobile phase was 0.3 mL/min. The UPLC gradient program (T/%B) was set as 0.01/0, 5.0/20, 6.5/90, 8.0/100,9.0/0 and 10.0/0. The column temperature was maintained at 27 ◦C, and the detection was monitored at a wavelength of 250 nm. The injection volume was 1.0 µL. Method was developed successfully and validated for parameters like Precision, Accuracy, Limit of detection (LOD) and limit of quantification (LOQ), Robustness, Solution stability and mobile phase stability.

**Keywords:** UPLC**,** Antipsychotic drug, Gradient method, Validation, Precision**,** Accuracy

**CH-195**

## PHARMACOLOGICAL EVALUATION OF NEUROPROTECTIVE AND HEPATOPROTECTIVE EFFECTS OF ALBIZIA AMARA IN WISTAR RATS

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Albizia amara, a deciduous member of the Leguminosae family native to India, is a medicinally significant plant whose pharmacological properties remain inadequately explored. The present study was aimed to investigate the novel neuroprotective and hepatoprotective activities of Albizia amara leaves in Wistar rats. Leaves were subjected to Soxhlet extraction with a hydroalcoholic solvent, and the active fraction was isolated using ethyl acetate. Preliminary phytochemical screening of the leaf extract revealed the presence of flavonoids, alkaloids, tannins, saponins, and terpenoids, which may be responsible for the observed pharmacological activities. Healthy adult male Wistar rats (150–200 g) were randomly allocated to control (n = 6) and experimental (n=24) groups. Neurotoxicity was induced by scopolamine (1 mg/kg, i.p.), whereas hepatotoxicity was produced by acetaminophen overdose (single high dose, p.o.). The Albizia amara leaf fraction was administered orally at 200 and 400 mg/kg for 8 consecutive days. Neuroprotective activity was evaluated via behavioral and cognitive performance tests using donepezil (5 mg/kg, p.o.) as the standard. Hepatoprotection was assessed by serum transaminases and oxidative stress markers compared against N-acetylcysteine as the reference treatment. Albizia amara markedly attenuated scopolamine-induced memory deficits and improved biochemical indices in the acetaminophen model, suggesting potent neuroprotective and hepatoprotective properties. These findings provide evidence towards Albizia amara therapeutic promising nature for neurological and hepatic disorders and warrant further mechanistic studies.

**Keywords:** Albizia amara, neuroprtotection, hepatotoxicity, scopolamine and wistar rats.

**CH-196**

## NOVEL UPLC METHOD FOR CONCURRENT ESTIMATION AND PHARMACOKINETIC ANALYSIS OF FAVIPIRAVIR AND MOLNUPIRAVIR IN RAT PLASMA

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To establish a rapid and sensitive UPLC method to estimate Molnupiravir and Favipiravir in rat plasma using Nirmatrelvir as internal reference. The separation was performed on Waters Acquity UPLC BEH C18 (100mm x 2.1mm, 1.7µm) by isocratic elution. A buffer with 1 mL of formic acid in 1 litre of water made up the mobile phase. The mobile phase was a 70:30 mix of buffer and acetonitrile, and the flow rate was 0.3 mL/min at ambient temperature. The analysis was completed in 3 minutes for Favipiravir and Molnupiravir, with a linear concentration range of 100ng/mL to 4000ng/mL (r2 = 0.9999 ± 0.018 and r2 = 0.9998± 0.006, respectively). Favipiravir and Molnupiravir's extraction recoveries, matrix effect, precision, and recovery research findings were determined to be within an acceptable range. The method was successfully applied to pharmacokinetic studies, extracting the drugs from rat plasma using liquid-liquid extraction.

**Keywords:** Favipiravir, Molnupiravir, UPLC, Validation, ICH guidelines.

**CH-197**




ISBN: 978-81-980623-8-3

**SYNTHESIS, CHARACTERIZATION & EVALUATION OF SOME PYRIMIDINE CONTAINING DERIVATIVE OF NICOTINIC ACID AS AN ANTICANCER AGENT**

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Cancer therapy continues to demand novel therapeutic agents with enhanced efficacy and reduced toxicity profiles. Pyrimidine derivatives have emerged as privileged scaffolds in anticancer drug development due to their structural similarity to nucleic acid bases and ability to interfere with critical cellular processes. This study focuses on the synthesis, comprehensive characterization, and anticancer evaluation of novel pyrimidine ring-containing derivatives of nicotinic acid. The target compounds were synthesized through cyclization reactions of 2-aminonicotinic acid derivatives. Structural confirmation was achieved using FT-IR spectroscopy, $^{1}H$ NMR, $^{13}C$ NMR, and mass spectrometry, revealing characteristic absorption bands and chemical shifts confirming successful synthesis. Anticancer and antibacterial evaluation was performed using the *in vitro* cell viability count method and Allium assay. Almost all synthesized compounds displayed dose-dependent anticancer activity compared to the standard drug Methotrexate. The percent cell inhibition was found to be the following decreasing order P2, P3, P5, P6>P4>P1. Altogether, pyrimidine derivatives of 2-aminonicotinic acid open a new area for the development of novel anticancer and antibacterial agent, however further experiments are needed to confirm the same.

**Keywords:** Pyrimidine derivative, Nicotinic acid, Anticancer activity, Antibacterial activity, FT-IR, Mass spectroscopy, Cell viability assay, Drug discovery.

**CH-198**

**GREEN HPLC METHOD FOR SENSITIVE BIOANALYSIS OF IBRUTINIB IN SPIKED RAT PLASMA: DEVELOPMENT, VALIDATION, AND APPLICATION TO PHARMACOKINETIC STUDIES**

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Ibrutinib (IBR) is a covalent inhibitor of Bruton's tyrosine kinase (BTK), which is used in management of B-cell malignancies. Accurate IBR quantification in plasma is important for pharmacokinetic assessment and therapeutic drug monitoring (TDM). In this study, a sensitive, robust and sustainable bioanalytical method of HPLC was developed and validated for IBR. The method utilises a simple protein precipitation technique for sample preparation, avoiding more hazardous or solvent-intensive procedures. Chromatographic separation was carried out in a Kromacil C18 (250 × 4.6 mm id,5µm,100 Å) using an isocratic mode. The mobile phase comprises of acetonitrile and phosphate buffer (pH adjusted to 6.70 with triethylamine) mixed in a 1:1 ratio (v/v), and delivered at 1.0 mL/min flow rate. Detection was performed at 260 nm on a Shimadzu LC-2010CHT equipped with a dual-wavelength UV detector coupled to a photodiode array (SPD-M20A). The technique demonstrated excellent linearity over 25–15,000 ng/mL range ($r^2$ = 0.9997). Intra and inter-day precision and accuracy complied with ICH M10 bioanalytical validation guidelines, with %RSD values below 2% and recoveries ranging from 97±0.2 to 101±0.3%. Stability under all relevant conditions was confirmed. Environmental sustainability was evaluated using AGREE and GAPI tools, an approach not previously applied to IBR bioanalysis, highlighting its novelty and sustainable design for routine use. Thus, a validated bioanalytical HPLC method for IBR quantification in plasma was successfully developed, and is suitable for routine pharmacokinetic and therapeutic drug monitoring applications.

**Keywords:** Ibrutinib, Bioanalytical Method, HPLC, Rat plasma.

**CH-199**

**DESIGN, SYNTHESIS, MOLECULAR DOCKING, CHARACTERIZATION, *IN SILICO* ADME ASSESMENT OF QUINOLINE BASED HETEROCYCLIC COMPOUNDS**

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The present research work deals with the *in silico* docking, synthesis and characterization of quinolin-2(1H)-one derivatives. Based on the recent review of literature novel nitrogen heterocyclic compounds were designed and in-silico molecular docking studies were performed to establish the validity and scope of current research work using schrodinger(2024, 3.0). Docking of the designed compounds with EGFR-Tyrosine kinase enzyme (PDB: 1M17) exhibited well conserved hydrogen bonds with one or more amino acid residues in the active pocket. From all the designed compounds first 12 best docked compounds were synthesized and were characterized by IR, 1H-NMR, 13C-NMR, and mass spectral data. In-silico-ADMET studies were carried out using SwissADME and it revealed that all the synthesized compounds had optimal physicochemical parameters. All the synthesized compounds were tested for their toxicity profile using ProTox 3.0 which showed good toxicity profile

**Keywords:** Docking, Swiss-ADME, ProTox2.0

**CH-200**

**QBD BASED RP-HPLC METHOD DEVELOPMENT AND VALIDATION FOR DETERMINATION OF ABACAVIR SULPHATE**

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Abacavir sulphate (ABS) was developed and validated in its formulation using a reversed-phase high-performance liquid chromatography (RP-HPLC) technique based on quality-by-design (QbD). A medication called ABS is an antiretroviral medication used to treat HIV infections. A QbD methodology was used to optimize key method parameters as part of the method development process. Using a mobile phase consisting of methanol: phosphate buffer (pH-6) 70:30 v/v and a detection wavelength of 287 nm, chromatographic separations were accomplished on an Agilent ZORBAX SB-C18 (4.6 x 250 mm) column run isocratically. The injection volume was 20 µl, and the flow rate was 1 ml/min. To find the best conditions for the separation and quantification of ABS, a design of experiments (Box-Behnken Design) technique was used to investigate how these parameters affected the chromatographic response. The method that was explained was linear. (r2 = 0.99). The values for precision, robustness, and ruggedness were similarly within the expected ranges (less than 1% for system precision and less than 2% for other metrics). By improving comprehension of the method's performance and facilitating its optimization, the QbD technique used in this study guarantees the consistently high quality of the medicine under analysis.

**Keywords**: Quality by Design (QbD); RP-HPLC; Abacavir sulphate; Method development; Box-Behnken Design; Validation; Chromatographic optimization

**CH-201**

**FORCED DEGRADATION STUDY ON NICOTINE BASED PRODUCTS BY HPLC**

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The behavior of nicotine in solid-state drug degradation is the main focus of the current investigation. Choosing an RP-HPLC method for drug estimation and method validation is part of the study design. Using an isocratic pump (LC 10ADVP) and a UV detector, the Ultimate HPLC 3000 series chromatography was used to analyze nicotine for stress degradation in nicotine polacrilex pouches, a solid dose form. The analysis was conducted using a Hypersil BDS Phenyl C18 column (4.6 mm × 250 mm × 5 µm) and water. 0.25M sodium acetate The mobile phase is sodium dodecyl sulfate: Acetonitrile in the following ratio: 68.5: 20: 7.5: 4 v/ v/ v. The medication has a strong peak at the 254 nm wavelength, where the analysis was conducted at a flow rate of 1.5




ISBN: 978-81-980623-8-3

mL/min. The analysis was conducted using the isocratic pump mode with an injection volume of 20 µl. As a diluent, mobile phase is employed. The suggested method was shown to be linear over the concentration range of 4 to 14 µg/mL. In a dark control, stress degradation was performed at temperatures of 40°C and 60°C for hydrolytic degradation and 25°C and 60°C for oxidative degradation. For photolytic degradation, use UV and white light; for thermal degradation, use 60ºC at 75% and 90% relative humidity. The outcome showed that nicotine was stable under photolytic and heat conditions but unstable under hydrolytic and oxidative circumstances. Since it was demonstrated to be robust, specific, and selective, the suggested approach was successfully applied for its test, drug degradation (stress degradation).

**Keywords:** Nicotine; RP-HPLC; Stress degradation; Solid dosage form; Method validation; Stability studies; Chromatographic analysis

**CH-202**

## DESIGN, SYNTHESIS AND BIOLOGICAL EVALUATION OF ABCB1 INHIBITORS

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The recurrence of cancer and patient mortality are often associated with chemotherapy-induced drug resistance. The ATP-binding cassette subfamily B member 1 (ABCB1) transporter is overexpressed in tumors, contributing to this resistance. However, most ABCB1 inhibitors have been ineffective in clinical trials. In this study, we propose a novel approach to developing ABCB1 inhibitors. The ZINC database, which contains millions of small molecules, was screened, and 641 compounds with structural and shape similarity to Zosuquidar were identified using Lipinski's rule and shape similarity criteria. These compounds were selected for multiple ligand simultaneous docking, which provided the means of simultaneously dock two zinc compounds at the drug binging site and at the adjacent access tunnel. A molecular docking study provided insights into the interactions between the compounds and the target protein (7A6F). The docking process yielded several compounds with higher binding energies. Ultimately, 82 hits with higher binding energies than Zosuquidar were selected. Subsequently, using the Langevian Rotametically Induced Perturbation (LRIP) method (a non-equilibrium MD approach aimed at identifying slow conformational changes in a binding site) the conformations of ABCB1 varying in the binding site residues were generated and used in ensemble docking of 82 hits on 23 rotamers of ABCB1. The re-ranking of docked hits identified top 20 hits having lower and better binding free energies than the Zosuquidar. Based on docking scores, 82 compounds with superior binding energies were shortlisted. From these, 18 top hits were selected for molecular dynamics (MD) simulations to assess the stability and behavior of ligand-protein interactions over time. The synthesis of the most promising hit molecule and its characterization is currently in Progress.

**Keywords:** Multidrug resistance, ABCB1/P-glycoprotein, Zosuquidar analogues, database virtual screening, molecular docking, LRIP, molecular dynamics.

**CH-203**

## GREEN SYNTHESIS OF SILVER NANOPARTICLES USING HIBISCUS ROSA SINENSIS AND SENNA AURICULA

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The present work reports a simple, safe, non-toxic, cost-effective, and eco-friendly method for the synthesis of silver nanoparticles using plants like *Hibiscus rosa sinensis* and *Senna auriculata*. The extracts of each plant were prepared, and the formation of silver nanoparticles (AgNPs) was identified by color changes due to surface plasmon resonance. The Characterization was done using UV-Vis spectroscopy, Transmission Electron Microscopy (TEM), Dynamic Light Scattering (DLS), and Fourier Transform Infrared Spectroscopy (FTIR). The antimicrobial activity was tested against Gram-positive bacteria (*Staphylococcus aureus*) and Gram-negative bacteria (*Escherichia coli* and *Klebsiella pneumoniae*). The results suggest that biologically synthesized AgNPs are promising candidates for the development of new antimicrobial drugs.

**Keywords**: Green synthesis, Silver Nanoparticles, FTIR, Antimicrobial activity.

**CH-204**

## GREEN SYNTHESIS OF NIOBIUM OXIDE NANOPARTICLES: A SUSTAINABLE STRATEGY TO COMBAT MULTI -DRUG RESISTANT PATHOGENS

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Bauhinia purpurea (Fabaceae) has been traditionally used for treating fever, digestive disorders, and wounds due to its anti-inflammatory and antimicrobial properties attributed to flavonoids, alkaloids, glycosides, and phenolic acids. In this study, nanoparticles were synthesized by combining flower extract with niobium pentachloride to produce niobium oxide nanoparticles via a green synthesis approach. The nanoparticles were subjected to physicochemical characterization using UV–Visible spectroscopy, FTIR spectroscopy, SEM, EDX, and DLS to confirm their formation and stability. The objective of this work was to develop a niobium oxide nanoparticle-coated biofilm wound dressing, especially aimed at diabetic patients who are highly susceptible to microbial infections due to delayed wound healing. The synthesized nanoparticles were evaluated for antimicrobial activity against multi-drug resistant (MDR) bacterial strains using well diffusion assay, minimum inhibitory concentration (MIC), minimum bactericidal concentration (MBC), and time-kill assay. These studies confirmed significant antimicrobial efficacy, highlighting the potential of niobium oxide nanoparticles as a novel wound-healing material. The findings suggest that green-synthesized niobium oxide nanoparticles may serve as an innovative and sustainable surgical aid in wound management, particularly in diabetic care where infection control and regeneration are critical.

**Keywords**: Bauhinia purpurea, Niobium oxide, Green synthesis, Antimicrobial, Multi drug-resistant bacteria, Wound healing

**CH-205**

## SYNTHESIS, INSILICO EXPERIMENTS AND BIOLOGICAL EVALUATION OF DITHIOCARBAMATE DERIVATIVES AS CHEMOTHERAPEUTIC AGENTS

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Dithiocarbamates are considered as an important motif owing to its extensive biological applications in medicinal chemistry. Recent advance study shows that they have anticancer, Antifungal, antibacterial, anti-Alzheimer, antitubercular, anti-glaucoma, anti-cholinergic, anti-inflammatory activities which elaborated with notable examples. The synthesis of this framework can easily be achieved via a one-pot reaction of primary/secondary amines, CS2, and alkyl or aralkyl halides. Present research work focuses on synthesis, Insilco drug design and evaluation of new dithiocarbamate derivatives as antimicrobial agents. All designed compounds were synthesized and characterized by using different spectroscopic techniques. Subsequently, subjected to Molsoft, Molinspiration, Swissadme, PkCSM to predict their molecular properties which are important for drug candidate. Simultaneously docking studies were performed using Autodock Vina software to evaluate biological activity. The results exhibited that, compounds stratified to Lipinski's,rule, this proves them as safe administrable drugs and establishes their pharmacological activity. Results also indicating that synthesized compounds are more selective for antibacterial activity rather than antifungal activity. The binding energies of the antifungal target (3IDS) indicating, none of the compounds are active when compare to the standard Fluconazole except 4e. The docking results




ISBN: 978-81-980623-8-3

suggest that the hydrophobic interactions are important for antimicrobial activity rather than hydrogen bond interactions.

**CH-206**

**STRUCTURE AND LIGAND BASED DESIGN, SYNTHESIS AND BIOLOGICAL EVALUATION OF DUAL INHIBITORS OF SELECT KINASE TARGETS**

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Cyclin-dependent kinase 4/6 (CDK4/6) inhibitors and FMS-like tyrosine kinase-3 (FLT3) have been proven to play a significant role in tumour therapy. The present study aimed to generate 2D QSAR model to predict the CDK4/6 and FLT3 activity. A dataset of molecules with affinity for both the CDK4/6 and FLT3 was taken from the literature. The genetic algorithm based multiple linear regression (GA- MLR) approach was used to generate highly predictive models using Padel descriptors available in QSARINs program. The 2D-QSAR models were developed and validated using internal and external validation criteria R2: 0.8152 and Q2loo: 0.7136 for CDK4 inhibitory activity and R2: 0.8388 and Q2loo: 0.7175 for FLT3 inhibitory activity, with good external predictivity. The most active compound 23K (Potent dual acting FLT3 and CDK4 inhibitors) was taken further for the shape and multi-feature based (Lipinski's rule, TPSA, and LogP) virtual screening of Zinc database. The CDK4 and FLT3 inhibitory activity was predicted for filtered zinc compounds by using developed 2D QSAR models. Hit selection against FLT3 and CDK4 was finally achieved. Further, the comparative binding affinity assessment, against CDK4 and FLT3 targets, for the dataset compounds and selected hits from the ZINC database, was obtained from the molecular docking studies. Binding energies and protein–ligand interactions were analysed. Top six hit compounds each for CDK4 and FLT3, identified through molecular docking, were selected for molecular dynamics (MD) simulations, where 100 ns MD simulations employing Gromacs 2020.4 was performed. The results of the QSAR studies, molecular docking insights and binding affinity evaluations and stability of respective CDK4, FLT3 complexes will be presented. The synthesis of identified hit molecules belonging to 1,2,5 trisubstituted 1,3,4-triazoles is currently in progress and will be appropriately showcased.

**Keywords:** CDK4/6-FLT3 dual inhibitors, 2D QSAR, virtually screening, molecular docking, molecular docking

**CH-207**

**DEVELOPMENT AND VALIDATION OF RP-HPLC METHOD FOR THE ESTIMATION OF POSACONAZOLE IN API AND TABLET FORMULATION BY QBD APPROACH**

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In the pharmaceutical field, the quality by design (QbD) approach is crucial for developing and improvement of analytical techniques. This method evaluates the influence of crucial parameters on important quality attributes and aids in the identification and optimization of these parameters during method development. The purpose of this work was to validate and develop a rapid, accurate, and precise RP-HPLC by QbD approach for the determination of posaconazole in bulk as well as pharmaceutical dosage form. A VWD detector-equipped Agilent 1220-Infinity II was the instrument utilized for separation with a mobile phase of methanol-phosphate buffer pH 3.6 (80:20 v/v), flow rate of 1.085 mL/min, and detection wavelength of 262nm. Critical variables selected for method optimization were methanol percentage and flow rate, determined using central composite design (CCD). Posaconazole's retention time was 4.7 minutes, with precise, accurate, and linear signals ($R^2$ = 0.999). The method is simple, fast, cost-effective, and ideal for routine quality control. The ICH guidelines were followed in the development of the method and the execution of all validation parameters, yielding results that satisfied the acceptance criteria. After validation, the suggested approach was shown to be precise, reliable, robust, repeatable, and suitable for quantitative analysis. Its ease of use, low cost, and short processing time make it a useful tool for estimating the dosage forms of posaconazole. The process described above can be used with ease to the analysis of medicinal products.

**Keywords:** Posaconazole (PSZ), RP-HPLC, Method Validation, ICH guidelines, and QbD.

**CH-208**

**MOLECULAR DOCKING AND ADME ANALYSIS OF ISOFLAVONE-BASED DERIVATIVES TARGETING NUCLEAR FACTOR-KB IN THE CONTEXT OF CANCER**

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The NF-κB pathway plays a pivotal role in regulating cell proliferation, angiogenesis, and resistance to apoptosis, and its aberrant activation has been implicated in cancers such as lymphoma, breast and colorectal malignancies. Thus, targeting this transcription factor represents an attractive therapeutic strategy. In this study, *in silico* molecular docking was employed to evaluate isoflavone structural derivatives as potential NF-κB inhibitors. Initially, the derivatives were designed in ChemDraw using isoflavone as the parent nucleus and their structures were further optimized through energy minimization in Avogadro. The minimized structures were then converted into SDF format for subsequent molecular docking studies. Docking simulations were performed with AutoDock Vina 4.0 against NF-κB to assess binding efficiency. To evaluate their drug-likeness, physicochemical and pharmacokinetic properties of the derivatives were predicted using the SWISS ADME server. Parameters such as lipophilicity, solubility, and absorption profiles were analyzed to assess suitability for oral administration. The results demonstrated that the designed ligands exhibited favorable affinities toward the target protein, with docking scores ranging between -6.04 to -7.04 kcal/mol. Detailed analysis indicated stable interactions within the binding pocket, suggesting that structural modifications of isoflavone enhance its inhibitory potential. The favorable ADME characteristics, together with the docking outcomes, support the potential of these compounds as scaffolds for the development of novel therapeutic agents. In conclusion, this computational investigation highlights isoflavone derivatives as promising candidates for NF-κB inhibition, offering a basis for preclinical validation in inflammatory and cancer-related disorders.

**CH-209**

**GRAPHENE OXIDE-INTEGRATED ZEIN/GELATIN NANOFIBROUS SCAFFOLDS FOR ENHANCED WOUND HEALING**

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Burn wounds are complex injuries requiring advanced healing strategies due to their susceptibility to infection. Conventional therapies often fall short in managing these wounds effectively. There is a growing need for wound dressing materials that combine strong antimicrobial action, biocompatibility, and enhanced tissue regeneration. Graphene oxide (GO), known for its antimicrobial and regenerative properties, and natural biopolymers like zein and gelatin, offer promising alternatives for wound care. In the current research, GO nanoparticles were synthesized using a modified Hummer's method and optimized via a Box-Behnken Design considering variables such as amount of oxidizing agent, reaction time, and temperature. Optimized GO dispersion of zeta potential -17.2 and particle size of 626.8 nm was then incorporated into electrospun nanofibrous scaffolds composed of zein and gelatin using electrospinning technique. The pre-processed solution was evaluated for its clarity and viscosity. The nanofiber scaffolds from optimized batch was assessed for *in-vitro* tests such as thickness, folding endurance, SEM, swelling index, adhesion and hydration studies. Electrospun nanofiber scaffolds demonstrated desired film-forming property and flexibility. Burn wound induction was carried out using Mason Walker burn model in Swiss albino mice to assess the wound healing efficiency. In-vivo studies showed enhanced wound contraction by day 10, and histopathological analysis indicated improved tissue regeneration in GO-loaded scaffolds compared to control group. GO-loaded zein/gelatin




ISBN: 978-81-980623-8-3

nanofibrous scaffolds promoted wound healing, making them a viable alternative to conventional wound care solutions.

**Keywords:** Nanoparticles, Box-Behnken Design, Burn model, Scaffolds

**CH-210**

**INTEGRATED ANALYTICAL QUALITY BY DESIGN APPROACH FOR THE DEVELOPMENT&VALIDATIONOFLIQUIDCHROMATOGRAPHYMETHOD FOR SIMULATANEOUS ESTIMATION OF SULFADOXANE AND PYRIMETHAMINE**

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This Research work presents a comprehensive evaluation of the chromatographic resolution of Sulfadoxine & Pyrimethamine using a validated method. Aquadratic model was identified as the most suitable for analyzing retention times, yielding significant results ($p < 0.0001$). System suitability parameters demonstrated compliance with regulatory standards, indicating adequate resolution, theoretical plates, and tailing factors for both compounds. The method's validation included assay, linearity, precision, intermediate precision, accuracy, LOD, & LOQ. The assay results for Sulfadoxane and Pyrimethamine were 99.79% and 99.52%, respectively. Linearity was confirmed with correlation coefficients of 0.9996 for Sulfadoxane and 0.9993 for pyrimethamine. The method exhibited excellent precision (%RSD < 1), accuracy (mean recovery within 98-102%), and robustness under varying conditions. LODs were determined to be 0.5 µg per ml for Sulfadoxane and 0.2 µg per ml for Pyrimethamine, with LOQs of 1.9 µg per ml and 0.8 µg per ml, respectively. Overall, the developed Procedure is reliable and effective for the concurrent analysis of Sulfadoxane and Pyrimethamine in formulations.

**Keywords**: Sulfadoxane and Pyrimethamine, A QbD, RP-HPLC, Analytical Development and Validation

**CH-211**

**COMPUTATIONAL EXPLORATION OF HERBAL BIOACTIVE COMPOUNDS: MOLECULAR DOCKING PHARMACOPHORE MODELLING, AND DYNAMIC STUDIES**

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Type 2 Diabetes Mellitus (T2DM) is a growing global health concern requiring safer, more effective therapies. Laurus nobilis (bay leaf), known for its medicinal properties, offers a rich source of bioactive compounds with potential antidiabetic effects. This study explored the antidiabetic potential of Laurus nobilis phytoconstituents through molecular docking. pharmacophore modeling, ADMET prediction, and molecular dynamics (MD) simulations. Among the screened compounds, apigenin, quercetin, and kaempferol exhibited strong binding affinities towards key diabetic enzymes, alpha amylase, and DPP-IV, with apigenin achieving a docking score of-10.2 kcal/mol. MD simulations confirmed the stability of these complexes. while ADMET predictions indicated favorable pharmacokinetic properties and low toxicity risks Additionally, silver nanoparticles (AgNPs) were synthesized using Laurus nobilis leaf extract via a green synthesis method. Characterization by UV-Vis, FTIR, DLS, zeta potential, and SEM confirmed their formation and stability. This integrated computational and nanotherapeutic study highlights Laurus nobilis as a promising candidate for plant-based antidiabetic therapeutics and warrants further preclinical investigation.

**Keywords:** Bay leaf, Molecular docking, Pharmacophore modelling, Molecular dynamic, Diabetes mellitus, bioactive compounds, etc.

**CH-212**

**A NOVEL LC-TQ-MS/MS METHOD FOR QUANTIFYING MEFENAMIC ACID-NDSRI (N-NITROSO DRUG SUBSTANCE-RELATED IMPURITY) IN MEFENAMIC ACID TABLET AND PEDIATRIC SUSPENSION DOSAGE FORMS: A COMPARATIVE STUDY WITH A COST-EFFECTIVE WHITE, GREEN, AND BLUE UPLC METHOD**

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The current research presents novel LC-TQ-MS/MS and cost-effective UPLC methods intended for the accurate quantification of mefenamic acid-N-nitroso drug substance-related impurity-NDSRI (N-MFA) in mefenamic acid (MFA) tablet and pediatric suspension dosage forms. The acceptable intake of N-MFA is derived from the TD50 (Median Toxic Dose-50%) value of N-nitroso diphenylamine. The analytical separation was achieved for the UPLC method using an XBridge BEH Shield RP18 Column (175 × 3.1 mm, 3.6 µm), employing 0.15% formic acid and acetonitrile as mobile phases in a gradient mode. A flow rate of 0.7 mL min−1 was set for the pump, and the detection wavelength was 235 nm. LC-TQ-MS-MS analysis was accomplished utilizing a Xevo TQ-XS mass spectrometer with electrospray ionization in the positive mode. N-MFA quantification was carried out using multiple reaction monitoring (MRM) as the mass transition: m/z 275.13 → 246.14. The proposed methods were successfully validated following ICH guidelines and are capable of quantifying at 0.015 ng mL−1 at an MFA concentration of 1 mg mL−1 for the LC-MS/MS method and at 0.036 µg mL−1 at an MFA concentration of 10 mg mL−1 for UPLC. The validated methods exhibited excellent linearity over the concentration ranges of 0.01 to 125 ppm for LC-MS/MS and 0.036 µg mL−1 to 1.350 µg mL−1 (3.6 to 125 ppm) for UPLC, with a Pearson correlation coefficient of 0.999. The method's trueness, in terms of accuracy recoveries, ranged from 90.43% to 101.34% for LC-MS/MS and 92.12% to 101.21% for UPLC. The applicability of these methods was successfully verified through the analysis of commercial samples of MFA formulations. Additionally, the sustainability and eco-friendliness of the method were assessed using whiteness and greenness metrics, including RGB12 (Red-Green-Blue) tools, GAPI (Green Analytical Procedure Index), analytical eco-scale, AGREE (Analytical GREEnness), AGREEprep (Analytical GREEnesspreparation), and BAGI (Blue Applicability Grade Index). Both methods can be used to determine N-MFA content in mefenamic acid formulation dosage based on the availability of instruments LC-TQ-MS/MS and UPLC in R&D (Research and Development) and quality control laboratories.

**Keywords:** mefenamic acid, LC-TQ-MS/MS, UPLC methods, MFA formulations

**CH-213**

**SYNTHESIS, ANTIMICROBIAL ANTIOXIDANT ACTIVITIES OF 1,4-DISUBSTITUTED 1,2,3-TRIAZOLES**

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A new series of ten compounds of 1,4-disubstituted 1,2,3-triazoles between aralkyl / alkyl bromides, alkynes and sodium azide in water. Further synthesized, characterized and evaluated for antimicrobial and antioxidant activities. The structures of the synthesized compounds were consistent with IR, 1H NMR and MASS spectroscopy. The synthesized compounds were screened by *in vitro* method for their antibacterial and antioxidant activity. Among the compounds synthesized 6e, 6f and 6i shown significant antimicrobial activity and antioxidant activity.

**Keywords:** *In-vitro* antimicrobial activity, antioxidant activity, Norfloxacin, Ascorbic acid.

**CH-214**

**TARGETED BREAST CANCER THERAPY USING EVEROLIMUS-LOADED MESOPOROUS SILICA NANOPARTICLES: FABRICATION AND CHARACTERIZATION**

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Breast cancer (BC) continues to be a leading contributor to cancer-related mortality in women, emphasizing the critical demand for novel and targeted therapeutic solutions to address limitations such as low tumor specificity, multidrug resistance, and systemic toxicity. Everolimus, an mTOR pathway inhibitor prescribed for hormone receptor–positive/HER2-negative subtype of advanced breast cancer, offers potent anticancer activity but is limited by poor aqueous solubility, suboptimal bioavailability, and off-target toxicity. In this work,




ISBN: 978-81-980623-8-3

mesoporous silica nanoparticles (MSNs) were engineered as a nanocarrier platform to enhance the solubility, stability, and targeted delivery of everolimus. Quantitative assessment of drug content was established using validated UV–visible spectrophotometry and HPLC methods, demonstrating excellent linearity and reproducibility. MSNs were synthesized by systematically varying process parameters, including cetyltrimethylammonium bromide (CTAB), triethyl orthosilicate (TEOS), toluene, and sodium salicylate concentrations. The optimized nanoparticles demonstrated an average hydrodynamic diameter of ~200 nm, a PDI of 0.268, and a zeta potential of –34.4 mV. SEM imaging revealed uniform spherical morphology, while BET surface area analysis confirmed a Type IV isotherm, characteristic of mesoporous structures. The optimized MSN formulation demonstrates potential as a delivery vehicle to improve everolimus solubility, reduce systemic toxicity, and enhance therapeutic efficacy in targeted breast cancer treatment.

**Keywords**: Breast cancer; Mesoporous silica nanoparticles; Everolimus; Targeted drug delivery.

**CH-215**

## BIOANALYTICAL METHOD DEVELOPMENT AND VALIDATION OF BENAZEPRIL HYDROCHLORIDE AND HYDROCHLOROTHIAZIDE IN RAT PLASMA BY RP-HPLC

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A novel bioanalytical reverse-phase high-performance liquid chromatography method was developed and validated for the simultaneous quantification of Benazepril hydrochloride (BENZ) and Hydrochlorothiazide (HCTZ) in rat plasma. Chromatographic conditions were optimized through systematic trials focusing on column selection, mobile phase composition, and wavelength adjustment to achieve sharp peak resolution and consistent retention times. The finalized method employed a Waters X-Bridge Phenyl column with a mobile phase consisting of acetonitrile and 0.1% triethylamine buffer, adjusted to pH 2.5 with orthophosphoric acid, in a 40:60 v/v ratio, delivered at a flow rate of 1.0 mL/min. Analysis was accomplished within 12 minutes using a 10 µL injection volume, with detection carried out at 224 nm, and metoprolol was used as the internal standard. The method was validated in accordance with regulatory bioanalytical method validation guidelines, assessing parameters such as selectivity, carryover, sensitivity, linearity, accuracy, precision, recovery, matrix effect, dilution integrity, and stability under varied conditions. The developed method demonstrated excellent reproducibility, robustness, and sensitivity, confirming its suitability for pharmacokinetic, bioavailability, and toxicological investigations of BENZ and HCTZ in preclinical models.

**Keywords:** Benazepril hydrochloride, Hydrochlorothiazide, Rat plasma, RP-HPLC, Bioanalytical method validation, Pharmacokinetics.

**CH-216**

## DESIGN, SYNTHESIS, CHARACTERIZATION, BIOLOGICAL EVALUATION AND MOLECULAR DOCKING STUDIES OF SOME NOVEL SUBSTITUTED COUMARIN DERIVATIVES

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A number of coumarin exhibit interesting pharmacological activities, to increase the biological potency structural optimization campaign focusing on the C-4 and C-7. A series of novel coumarin-based derivatives were designed by molecular hybridization approach. The molecular docking revealed the possible mode of interaction of the compound with protein 1x7r (crystal structure of estrogen alpha complexed with genistein). Our finding suggests that the compounds which designed according to SAR. Some of them were novel coumarin-based estrogen receptor antagonist that provides promising activities and best scaffold for the development of new potential anti-breast cancer targeting ER- alpha. The compounds which showed less binding energy and docking score were decided for synthesis. ER alpha co-crystal ligand docking score was -10.302, S12A had a docking score of -8.735 and Molecular mechanics with generalized born and area solvation (MMGBSA) ΔG Bind score was -51.01 kcal/ mol. RMSD value of ligand 0.0540, significant in evalution of the correctness of docking geometry. From the interaction of the compound with protein it concludes that to establish the electrostatic interaction polar group like methoxy, hydroxy or phenolic group is required. Also conclude that the key interaction between ligand and ER apha receptor includes hydrogen bonding, π-π aromatic stacking. (Pdb id: 1x7r) having amino acid which constitutes catalytic active site are (His 524), (Glu 353), (phe 404) and (Arg 395) also docking study revealed binding affinity with that.

**Keywords:** coumarin, Molecular docking, docking score, binding energy, Estrogen receptor.

**CH-217**

## DESIGN, SYNTHESIS, CHARACTERIZATION AND BIOLOGICAL EVALUATION OF NOVEL PYRAZOLE-4 CARBALDEHYDE DERIVATIVES

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The present study was aimed at synthesizing some novel pyrazole-4-carbaldehyde derivative using Vilsmeier-Haack reaction, a most effective method for producing heterocyclic aldehydes to enhance their biological activities. Drug discovery is a complex, costly, and inefficient process that requires identifying new therapeutic agents based on computational, experimental, and clinical models. A five-membered ring with two adjacent nitrogen atoms makes up the class of nitrogen-containing heterocycles known as Pyrazoles (C3H4N2). Naturally occurring Pyrazole compounds such as Pyrazomycin and Celecoxib exhibit Anti-tumor properties. Pyrazoles are commonly synthesized via cyclization of hydrazine, with hydrazones acting as important intermediates. Pyrazoles derivatives, particularly those with a conjugated carbonyl group, have shown diverse pharmacological activities, including Anti-inflammatory, Anti-viral, Anti-tumor, and Anti-microbial effects. Synthesized compounds were characterized using standard spectroscopic techniques like FT-IR, NMR and Mass spectrometry. This Anti-cancer activity was evaluated against Dalton negative Lymphoma Ascites (DLA) cells by a Trypan Blue Exclusion method and was reported as the percentage of cell death.The Anti-microbial activity was screened against Gram-positive and Gram- bacteria (E.coli, S.aureus) and fungi (C.albicans, A.niger) at 40 and 80µg/ml concentrations by the Agar well diffusion method. The study concluded that the synthesized Pyrazole-4-carbaldehyde derivatives possess significant Anti-cancer activity. Specifically, the derivative SA3 exhibited superior Anti-cancer effects compared to others. Additionally, compound SA1 showed moderate to good Anti-microbial activity. These results indicate that these Pyrazole-4-carbaldehyde derivatives are a good lead for novel Anti-cancer drug development.

**Keywords:** Vilsmeier-Haack reaction; Pyrazole; Carbaldehyde; Anti-cancer activity.

**CH-218**

## DEVELOPMENT AND VALIDATION OF ANALYTICAL METHODS FOR THE ESTIMATION OF DESIDUSTAT IN BULK DRUG AND PHARMACEUTICAL FORMULATION

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A stability-indicating reverse-phase high-performance liquid chromatography (RP-HPLC) method was developed and validated for the quantification of Desidustat in bulk drug and pharmaceutical formulations. This method provides a robust analytical approach for routine quality control in compliance with ICH guidelines. Forced degradation studies were performed under acidic, alkaline, oxidative, thermal, and photolytic conditions to evaluate the stability profile of Desidustat. Significant degradation was observed only under acidic conditions, while the drug remained stable under alkaline, oxidative,


ISBN: 978-81-980623-8-3

thermal, and photolytic stress. Effective chromatographic separation was achieved using a Kromasil 100-5C8 column with a mobile phase of methanol and 0.1% formic acid (72:28 v/v) and detection at 235 nm. The method demonstrated excellent linearity within the 5–25 µg/mL range, exhibiting a correlation coefficient of 0.998. It also showed high levels of precision, accuracy, specificity, robustness, and ruggedness. The limits of detection and quantitation were found to be 1.345 µg/mL and 4.078 µg/mL, respectively. Assay of tablet formulations indicated an average Desidustat content of approximately 98.7%, with percentage relative standard deviation (%RSD) well within acceptable limits, confirming the method's reliability for quality assurance. Overall, this validated RP-HPLC method is suitable for the routine estimation of Desidustat and effective for monitoring its stability in pharmaceutical products.

**Keywords:** Desidustat, HPLC, stability-indicating, validation, assay.

**CH-219**

**ANALYTICAL METHOD DEVELOPMENT AND VALIDATION OF STABILITY STUDIES FOR COMBINED DOSAGE-FORM OF REMOGLIFLOZIN ETABONATE AND TENELIGLIPTIN HCL BY RP-HPLC METHOD**

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A new simple, rapid, economical reverse phase high performance liquid chromatographic method was developed for the determination of Remogliflozin Etabonate and Teneligliptin HCl in bulk and dosage-form. The separation was carried out by using column as YMC C18 ( 250mmx4.6mmx5µm), mobile phase Acetonitrile: Methanol: Water (60: 30: 10) v/v, at a flow rate of 1.0ml/min, diluent as Methanol used. The detection was made by UV-Vis. Spectrophotometer at 245nm. The retention times were 4.636 for Remogliflozin Etabonate and 1.791 for Teneligliptin HCl. Calibration curve was linear over the concentration range of 10 to 50 µg/ml for Remogliflozin Etabonate and 1 to 5 µg/ml for Teneligliptin HCl, accuray mean recoveries obtained for Remogliflozin Etabonate and Teneligliptin HCl were 99.9-100.15% and 99.75-100.19% respectively, limit of detection and limit of quantification were found to be 0.003428 & 0.01038µg/ml and 0.007559171 & 0.02290µg/ml respectively. The propose method was validated as per the ICH guidelines parameters like Linearity, precision, accuracy, robustness, LOD and LOQ. The method was accurate, precise, specific and rapid found to be suitable for the quantitative analysis of the drug in the combined dosage form.

**Keywords:** Remogliflozin Etabonate, Teneligliptin HCl, degradation studies, ICH-guidelines.

**CH-220**

**SIMULTANEOUS ESTIMATION OF BEMPEDOIC ACID AND EZETIMIBE BY RP-UPLC**

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A novel and selective reverse-phase ultra-performance liquid chromatography (RP- UPLC) method was developed and optimized for the simultaneous estimation of Bempadoic Acid and Ezetimibe. Chromatographic separation was achieved using an SB C18 column (100 × 1.8mm, 2 µm particle size). The mobile phase consisted of 0.01% orthophosphoric acid and acetonitrile in a 60:40 (v/v) ratio, delivered at a flow rate of 0.3 mL/min. Detection was carried out at an optimized wavelength of 226 nm. Bempadoic Acid and Ezetimibe exhibited retention times of 1.865 min and 1.234 min, respectively, with a total runtime of 5 minutes. The method demonstrated excellent linearity with correlation coefficients (r2) of 1.000 over the concentration ranges of 22.5–135 µg/mL for Bempadoic Acid and 1.25–7.5 µg/mL for Ezetimibe. The lower limits of quantification (LLOQ) and detection (LLOD) were determined to be 2.34 µg/mL and 0.77 µg/mL for Bempadoic Acid, and 0.28 µg/mL and 0.09 µg/mL for Ezetimibe, respectively. The proposed RP-UPLC method was successfully validated and applied for the analysis of Bempadoic Acid and Ezetimibe in both bulk drugs and pharmaceutical formulations, demonstrating high precision and accuracy.

**Keywords**: Bempadoic Acid; Ezetimibe; RP-UPLC; Bulk Drug; Formulation; Method Validation.

**CH-221**

**A NOVEL STABILITY-INDICATING RP-HPLC ANALYTICAL METHOD FOR SIMULTANEOUS ESTIMATION OF PREGABALIN AND ETORICOXIB IN PHARMACEUTICALS.**

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New, fast, accurate, sensitive and reproducible reverse phase high performance liquid chromatography (RP-HPLC) method has been established for the quantitative analysis of Pregabalin and Etoricoxib in pharmaceutical dosage form. Chromatographic separation of Pregabalin and Etoricoxib was done on Waters Alliancee2695 using X-Terra RP-18(150 mm X4.6mm, 3.5µm) column and the mobile phase consisting of acetonitrile and 0.1% triethylamine in the proportion of 50:50% v/v. The flow rate was 1.0 mL/min; detection was done by absorption at 214nm using a photodiode array detector at room temperature. Number of theorectical plates and tailing factor of Pregabalin and Etoricoxib were NLT 2000 and should not more than 2 respectively. % Relative standard deviation of peak areas of all measurements was below 2.0. Proposed method was validated as per ICH guidelines. The method was found to be easy, cost-effective, accurate and robust method for quantitative analysis of Pregabalin and Etoricoxib investigation of its stability.

**Keywords:** Pregabalin, Etoricoxib, HPLC, Validation.

**CH-222**

**VALIDATED REVERSE PHASE HPLC METHOD FOR SIMULTANEOUS DETERMINATION OF DEXMETHYLPHENIDATE AND SERDEXMETHYLPHENIDATE**

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A simple, fast, accurate, sensitive and reproducible reverse phase high performance liquid chromatographic (RP-HPLC) technique has been established for quantitative determination of Dexmethylphenidate and Serdexmethylphenidate in pharmaceutical dosage form. Separation of Dexmethylphenidate and Serdexmethylphenidate was done on Waters Alliancee2695, using X-Bridge Phenyl, 250x4.6mm, 5µm column and mobile phase with acetonitrile and hexane sulphonic acid in the ratio of 60:40% v/v. The flow rate was 1.0 mL/min; detection was performed by absorption at 236nm with a photodiode array detector at room temperature. Theoretical plates number and tailing factor of Dexmethylphenidate and Serdexmethylphenidate were NLT 2000 and should not exceed 2 respectively. % Relatives tandard deviation of peak areas of all measurements always less than 2.0. The suggested method was verified according to ICH guidelines. The method was proven to be a simple, cost-effective, accurate, precise and durable method of quantitative estimation of Dexmethylphenidate and Serdexmethylphenidate and stability study of its.

**Keywords:** Dexmethylphenidate, Serdexmethylphenidate, RP-HPLC and Validation.

**CH-223**

**DETERMINATION INTEGRATIVE GREENNESS AND BLUENESS OF ANALYTICAL RP-HPLC METHOD OF DETERMINING ETHAMSYLATE IN PURE AND ITS DOSEAGE FORM WITH FORCED DEGRADATION STUDIES**

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The current study shows development and validation of the simultaneous estimation of Ethamsylate in the pharmaceutical dosage form using RP-HPLC, and the stability. The drug was submitted to several stress conditions as pertaining to the ICH guidelines on stability testing of stable drug substance and product. The chromatographic separation was performed on Phenomix C18 column with dimension of 150 mm x 4.6 mm x 5 6M using Agilent 2950 HPLC instrument having PDA detector. The isocratic mobile phase consisted of Formic acid and Methanol in the




ISBN: 978-81-980623-8-3

ratio 20:80 v/v with the flow rate of 0.6 ml /min and the detection was carried out using UV detector at 300 nm. Ethamsylate at ambient temperature was identified to have retention time of 3.397 minutes respectively with a total run time of 6 minutes. The method developed proved to be linear at the range of 3mcg/ml to 15 mcg/ml with coefficient of determination being 0.9953 in Ethamsylate. The method that was developed and validated using several validation parameters; the force degradation and stability studies were used to determine the stability and to diagnose the settlement of the degradation products. The two tools of analysis utilized to approach the green profile of the developed method were AGREE and GAPI. The validated procedure could be used to determine Ethamsylate in tablet form

**Keywords:** Ethamsylate, chromatographic separation, Phenomix C18 column

**CH-224**

## EXPLORING CHROMONE ANALOGUES: A NOVEL THERAPEUTIC STRATEGY FOR POSTPRANDIAL HYPERGLYCEMIA IN DIABETES

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Diabetes is a metabolic illness characterized by persistently elevated blood sugar levels, leading to various problems such as cardiovascular disease, renal failure, neuropathy, and lipid metabolism issues. Controlling blood glucose levels in diabetes individuals is crucial, and several bioactive compounds have been reported to improve various patho-physiological states. The two major enzymes responsible for breaking down complex sugar molecules into glucose and fructose are α-amylase and α-glucosidase. These enzymes catalyze postprandial elevations in blood glucose levels, leading to the formation of advanced glycation end products like AGEs and RAGEs. To treat diabetes mellitus, α-glucosidase & α-amylase inhibitors from natural and synthetic sources are trending for their ability to inhibit these enzymes, leading to reduced hydrolytic cleavage of non-reducing ends of dietary oligosaccharides and decreased release of α-glucose, which retards carbohydrate digestion and glucose absorption in the small intestine. This method is significant in managing postprandial hyperglycemia, a current therapeutic strategy for stabilizing blood glucose levels in diabetic patients, particularly those with type 2 diabetes.This study aims to design and synthesize new chromone analogues as potential anti-glycation agents. The design process involves rational modification of flavones with various substitutions for evaluation of anti-glycation activity. The purity and identity of the synthesized compounds will be determined using various spectroscopic techniques, and the antioxidant activity of the proposed molecules will be determined by radical scavenger assay. The most promising molecules will be explored for *in-vivo* and *in-vitro* enzymatic assays to determine their pharmacological aspects.

**Keywords:** Hyperglycemia, Postprandial, flavones, Anti-glycation, Radical scavenger assay, α-glucosidase.

**CH-225**

## VALIDATED REVERSE PHASE UPLC METHOD FOR QUANTITATIVE ESTIMATION OF LOVASTATIN IN A NOVEL HYDROGEL: APPLICATION TO PHARMACOKINETICS, PHARMACODYNAMICS, AND HISTOPATHOLOGICAL PROFILING

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Lovastatin, a potent antihyperlipidemic agent, plays a pivotal role in reducing cardiovascular risk. This study presents the development and validation of a novel ultra-performance liquid chromatography (UPLC) method for quantifying Lovastatin concentrations in rat plasma, with subsequent application to pharmacokinetic profiling following both oral and intravenous administration. The analyte was isolated using solid-phase extraction (SPE), ensuring high purity and minimal matrix interference. Chromatographic separation was achieved on a BEH C18 UPLC column (2.1 mm × 100 mm, 1.8 µm), employing a gradient elution of acetonitrile and water containing 0.1% formic acid, at a flow rate of 0.4 mL/min. The drug was administered orally at 2 mg/kg and intravenously at 0.05 mg/kg. Blood samples were collected at predetermined intervals, processed, and analyzed using Empower software. The method demonstrated excellent intra-day (91%–103%) and inter-day accuracy (85%–107%), with precision (RSD%) consistently below 15%. The matrix effect ranged from 95% to 108%, and extraction recovery exceeded 70%, affirming the method's robustness. A strong linear response was observed across the concentration range of 10–500 ng/mL, with a lower limit of quantification (LLOQ) at 10 ng/mL. All validation parameters including precision, accuracy, recovery, matrix effect, and stability complied with regulatory guidelines, confirming the method's reliability for pharmacokinetic investigations in preclinical models.

**Keywords:** RP-UPLC, Hydrogels, Lovastatin, Pharmacokinetics, Pharmacodynamics

**CH-226**

## DEVELOPMENT, OPTIMIZATION AND VALIDATION OF AN RP-HPLC ANALYTICAL METHOD FOR THE ESTIMATION OF QUERCETIN IN METAL ORGANIC FRAMEWORK SYSTEM (MOF): A BOX-BEHNKEN QBD-BASED APPROACH.

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A novel and reproducible high-performance liquid chromatography (HPLC) method was developed and validated for the quantification of Quercetin (QCT) in accordance with ICH guidelines, using a Quality by Design (QbD)-based Design of Experiments (DoE) approach. A Phenomenex HyperClone BDS C18 column (250 × 4.6 mm, 5 µm, 130 Å) was employed with a mobile phase consisting of acidified water (0.1% v/v triethylamine, pH adjusted to 3.0 with ortho-phosphoric acid) and acetonitrile (55:45 v/v). Force degradation studies confirmed QCT's stability under most stress conditions, with significant degradation observed only in oxidative and alkaline media. Method performance was optimised via a Box–Behnken design, where key parameters such as pH, flow rate, injection volume, and acetonitrile concentration were modelled for response optimisation. The method displayed excellent linearity over a concentration range of 0.05–50 µg/mL ($R^2 = 0.9996$), with limits of detection and quantification determined as 40.27 ng/mL and 122.03 ng/mL, respectively. Precision and robustness were statistically validated ($p < 0.0001$), confirming reliability under deliberate variations. The developed method was successfully applied for the quantification of QCT in monodispersed Metal Organic Frameworks (MOFs). The entrapment efficiency was found to be 80.52%. The method was further evaluated for its greenness profile, supporting its use in routine analytical applications. In conclusion, the validated methodology proved to be simple, rapid, accurate, and environmentally considerate for quantifying QCT in both bulk and nanoparticulate formulations.

**Keywords:** Quercetin, Box-Behnken QbD approach, Metal Organic Framework, HPLC Analytical Method Development, Greenness Assessment.

**CH-227**

## QSAR-GUIDED DESIGN AND VIRTUAL EVALUATION OF DUAL IL-6 AND TNF-A INHIBITORS VIA DOCKING, ELECTROSTATIC COMPLEMENTARITY, MM/GBSA, MOLECULAR DYNAMICS, WATERSWAP, AND ADMET STUDIES

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Simultaneous inhibition of key cytokines, IL-6 and TNF-α is a promising strategy for treatment of inflammatory and autoimmune disorders. Monoclonal antibodies like tocilizumab (IL-6) and adalimumab/golimumab (TNF-α) act as effective inhibitor but no oral small-molecule dual inhibitor has reached clinics yet. This is attributed to challenges in achieving optimum potency, selectivity, pharmacokinetics, toxicity, and clinical efficacy. Levels of cytokine reduction is often used to measure its inhibition but mechanism of




ISBN: 978-81-980623-8-3

inhibition is unexplained. It remains unclear whether the effect is due to direct cytokine binding or its production modulation. In this study, small molecule dual inhibitors are designed via QSAR studies and the mechanisms involved are also tried to be explained. Canonical SMILES-based 2D-QSAR models utilising Monte Carlo optimisation were developed from cytokine level-based IC50 dataset, irrespective of upstream targets. Among all models, Split-3 of IL-M4 for IL-6 and Split-1 of TNF-M4 for TNF-α exhibited the highest statistical performance. Structural fragments responsible for increase and decrease of inhibitory potency were identified and were used to design dual inhibitors. Compounds designed utilising this dataset were virtually screened for direct inhibition of both cytokines using *in silico* workflows, focusing on their binding affinity, stability, and drug-like properties. Compound DITS00048 emerged as the most promising candidate and provides important structural insights into dual cytokine inhibition. A robust QSAR model is delivered for prospective pIC50 prediction and are made publicly available for further research and virtual screening applications.

**Keywords:** Dual Inhibitors, IL-6 and TNF-α, 2D-QSAR Modeling, Molecular Dynamics Simulation, WaterSwap Analysis

**CH-228**

## DEVELOPMENT AND VALIDATION OF RP-HPLC METHOD FOR SIMULTANEOUS ESTIMATION OF TRICHOLINE CITRATE AND SILYMARIN IN PHARMACEUTICAL DOSAGE FORM

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Tricholine citrate and Silymarin are widely used in combination therapies for hepatic protection due to their complementary pharmacological actions. Ensuring accurate and simultaneous quantification of both compounds in pharmaceutical formulations is critical for quality control. While RP-HPLC is the preferred analytical approach for such applications, there is a lack of validated, robust, and eco-conscious methods for this drug combination. To develop and validate a novel RP-HPLC method for the simultaneous estimation of Tri choline citrate and Silymarin in pharmaceutical formulations, and to assess its environmental sustainability using established greenness evaluation tools. Chromatographic separation was achieved using a Sunniest ECO C18 column (150 × 4.6 mm, 5 µm) with a mobile phase comprising sodium dihydrogen phosphate buffer and acetonitrile (55:45 v/v), pH 4.0 adjusted with ortho-phosphoric acid. Validation was conducted following ICH guidelines, assessing linearity, accuracy, precision, specificity, and robustness. Environmental impact was evaluated using AGREE, GAPI, and BAGI tool. The method demonstrated excellent linearity ($r^2 > 0.999$), high accuracy (98–102% recovery), and precision (low intra-day and inter-day RSD values). No interference from excipients or degradation products was observed. Robustness testing confirmed stability under slight method variations. Greenness assessment showed the method to be environmentally friendly and sustainable. The developed RP-HPLC method is rapid, accurate, precise, robust, and green, making it highly suitable for routine quality control of Tricholine citrate and Silymarin in pharmaceutical dosage forms.

**Keywords:** RP-HPLC, Tricholine citrate, Silymarin, AGREE, GAPI,

**CH-229**

## COMPUTER-AIDED DRUG DESIGN OF 1, 2, 4-TRIAZINE DERIVATIVES AS PROMISING CANDIDATES AGAINST ALZHEIMER'S DISEASE

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Alzheimer's disease (AD) is a leading cause of dementia worldwide, characterized by progressive memory loss, cognitive decline, and a growing global health burden. Current therapies offer only temporary relief, which highlights the urgent need for novel and more effective treatments. In this work, we focus on the 1, 2, 4-triazine scaffold, a chemical structure known for its diverse biological activities, and explore its potential in the design of new anti-Alzheimer agents. To accelerate discovery, we employed artificial intelligence (AI) and advanced computer-aided drug design tools to create and evaluate a library of Triazine-based molecules. Using molecular docking and virtual screening, these compounds were tested in-silico against major Alzheimer's targets, including key enzymes responsible for breaking down neurotransmitters and proteins involved in plaque formation. Computer simulations further assessed the stability of drug–target interactions, while drug-likeness and safety properties were predicted using ADMET models. Several designed compounds displayed strong binding potential, favourable pharmacokinetic profiles, and the ability to cross the blood–brain barrier, suggesting their promise as lead molecules for future development. By integrating AI with medicinal chemistry, this study demonstrates how digital innovation can reduce time, cost, and experimental burden in early-stage drug discovery. The findings not only underscore the therapeutic relevance of 1, 2, 4-triazine derivatives but also illustrate the transformative role of technology in addressing complex health challenges. In alignment with the conference theme, "AI & Technology in Pharma: Educate, Innovate, Empower," this research highlights the value of combining computation and creativity to guide the next generation of Alzheimer's therapies.

**Keywords:** Alzheimer's disease, drug design, 1, 2, 4-triazine, artificial intelligence, computer-aided discovery

**CH-230**

## MOLECULAR DOCKING AND PREDICTING ADME PROPERTIES OF CHALCONE DERIVATIVES CONTAINING HETEROCYCLES AS AROMATASE INHIBITORS FOR TREATMENT OF BREAST CANCER

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Breast cancer remains one of the leading causes of cancer-related mortality in women, with the aromatase enzyme playing a key role in estrogen biosynthesis and tumor progression. Inhibiting aromatase represents an effective therapeutic strategy. In this study, a series of 96 chalcone derivatives containing heterocyclic moieties such as benzotriazole, triazole, quinoxaline, and indole were designed and evaluated as potential aromatase inhibitors using computational approaches. The three-dimensional structure of the human aromatase enzyme (PDB ID: 3S7S) was employed as the target, and molecular docking was performed using Maestro 12 (Schrödinger software). Docking results revealed that approximately 40 chalcone derivatives exhibited strong binding affinities, with docking scores ranging from –7.011 to –8.746, which are comparable or superior to the reference drug Exemestane (–7.407). Detailed interaction analysis demonstrated that most active derivatives formed stable hydrogen bonds, halogen bonds, π-π stacking, and salt bridge interactions with the active site residues of aromatase. Further, drug-likeness and pharmacokinetic evaluations were conducted using the QikProp module, based on Lipinski's rule of five and ADME (Absorption, Distribution, Metabolism, and Excretion) criteria. The results indicated that the majority of derivatives possessed favourable oral bioavailability and drug-like properties, comparable to the standard drug. Overall, the study concludes chalcone derivatives bearing heterocyclic substitutions as promising candidates for the development of novel aromatase inhibitors with potential application in breast cancer therapy.

**Keywords:** Chalcone, ADME, Molecular Docking, Breast cancer

**CH-231**

## ANALYTICAL METHOD DEVELOPMENT, VALIDATION & FORCE DEGRADATION WITH STABILITY INDICATING RP-HPLC STUDIES FOR ESTIMATION OF MOLNUPIRAVIR IN BULK AND ITS DOSAGE FORM

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Molnupiravir is an antiviral agent that inhibits RNA-dependent RNA polymerase and disrupts viral RNA replication. It has gained prominence as an oral treatment option for COVID-19. The present study reports the development and validation of a simple, precise, and stability-indicating reversed-phase high-performance liquid chromatographic (RP-HPLC) method for the quantitative estimation of Molnupiravir in bulk and pharmaceutical dosage forms. Chromatographic separation was achieved using a Thermo BDS C18 column (4.6 × 250 mm, 5 µm) with a


ISBN: 978-81-980623-8-3

mobile phase comprising ammonium acetate buffer and acetonitrile (40:60 v/v) at a flow rate of 1.0 mL/min. Detection was carried out at 240 nm, and the retention time of Molnupiravir was 2.8 minutes. The method was validated as per ICH Q2 (R1) guidelines for linearity, accuracy, precision, robustness, and sensitivity. Linearity was demonstrated over the concentration range of 20–100 µg/mL, with a correlation coefficient ($r^2$) of 0.9986. The limit of detection (LOD) and limit of quantitation (LOQ) were 0.511 µg/mL and 1.54 µg/mL, respectively. Accuracy studies showed recovery values between 100–104%, while precision results confirmed %RSD values below 2. Robustness studies indicated that minor variations in chromatographic conditions did not significantly affect results. Forced degradation studies revealed that Molnupiravir remained stable under acidic, thermal, and photolytic conditions but underwent significant degradation under basic and oxidative stress. Overall, the validated RP-HPLC method is simple, robust, and reliable, making it suitable for routine quality control and stability analysis of Molnupiravir in/ bulk drug and dosage form.

**Keywords**: Molnupiravir, RP- HPLC, ICH Q2 (R1) guidelines, Validation Analysis and Forced Degradation Condition.

**CH-232**

## DEVELOPMENT AND VALIDATION OF A STABILITY-INDICATING RP-HPLC METHOD FOR THE QUANTITATIVE ESTIMATION OF PROPAFENONE HYDROCHLORIDE IN PHARMACEUTICAL TABLET DOSAGE FORMS

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This research outlines the creation and validation of a dependable reversed-phase high-performance liquid chromatography (RP-HPLC) technique for measuring Propafenone Hydrochloride in tablet formulations. Propafenone Hydrochloride, an anti-arrhythmic drug used to treat both supraventricular and ventricular arrhythmias, was examined using an Eclipse XDB-C18 column with a mobile phase composed of methanol and a 10 mM ammonium acetate buffer in a 70:30%v/v ratio. Detection occurred at 246 nm with a flow rate of 1.0 mL/min, and the column temperature was kept at 40ºC. The method demonstrated excellent system suitability parameters, such as symmetrical peak shapes, stable retention times, and high theoretical plate counts. It was validated according to ICH Q2(R1) guidelines, showing strong linearity within a concentration range of 5-25 µg/mL (correlation coefficient of 0.999), high precision with a %RSD below 1%, and satisfactory accuracy confirmed through recovery studies. The limits of detection and quantitation were found to be 0.972 µg/mL and 2.94 µg/mL, respectively. The stability of the standard and sample solutions was maintained for at least 24 hours. Assay results consistently matched the labeled claim amount, confirming the method's appropriateness for routine quality control of Propafenone Hydrochloride in pharmaceutical products.

**Keywords:** Propafenone Hydrochloride, RP-HPLC, Validation, Tablet Assay, Stability-indicating.

**CH-233**

## STABILITY INDICATING UPLC METHOD FOR THE ESTIMATION OF ELEXACAFTOR, IVACAFTOR AND TEZACAFTOR IN BULK AND PHARMACEUTICAL DOSAGE FORMS.

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A simple, accurate, precise method was developed for the simultaneous estimation of the Elexacaftor, Ivacaftor and Tezacaftor in solid dosage form. Chromatogram was run through HSS C18 100x2.1mm, 1.7. Mobile phase containing 0.01N KH2PO4 and Methanol in the ratio of 70:30 v/v was pumped through column at a flow rate of 0.3ml/min. Temperature was maintained at 30°C. Optimized wavelength for Elexacaftor, Ivacaftor and Tezacaftor was 222.0 nm. Retention time of Elexacaftor, Ivacaftor and Tezacaftor were found to be 1.060 min, 1.352 min and 1.706 min. %RSD of system precision for Elexacaftor, Ivacaftor and Tezacaftor were and found to be 0.5, 0.8 and 0.6 respectively. %RSD of method precision for Elexacaftor, Ivacaftor and Tezacaftor were and found to be 0.5, 0.3 and 0.5 respectively. % Recovery was obtained as 99.46%, 99.59% and 99.89% for Elexacaftor, Ivacaftor and Tezacaftor respectively. LOD values were obtained from regression equations of Elexacaftor, Ivacaftor and Tezacaftor. were 0.21ppm, 0.10ppm, 0.10pm and LOQ values were obtained from regression equations of Elexacaftor, Ivacaftor and Tezacaftor were 0.62ppm, 0.31ppm ,0.30ppm respectively. Regression equation of Elexacaftor was y = 13392.x + 3536.9 Ivacaftore was y = 10067x + 1603.8 and of Tezacaftor was y = 14171x + 1880.8.

**Keywords:** UPLC, Elexacaftor, Ivacaftor and Tezacaftor

**CH-234**

## MOLECULAR DOCKING OF BENZYL AMINO-2H-CHROMEN-2-ONE AS STEROIDAL SULFATASE INHIBITORS IN TREATMENT OF BREAST CANCER

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The incidence of Breast cancer is predicted to increase by about 47% visualizing, a doubling number by the year 2040. Approximately 28.4 million people are at risk of occurrence, and women above 50 years are at higher risk in the near future. It is observed that genetic mutations are the causative factors, and about 72 different types show high predominancy, including BRCA1, BRCA2, TP53, PTEN, PALB2, etc. Hormonal contributions from aromatase (AR) and steroidal sulfatase (STS) accounts for 75% of the responsibility for causing breast cancer. They act as additional sources of excessive estrogen through the conversion of Estrogen(E1) to Estradiol(E2), triggering mutation. Of the two different types of hormones, STS shows about 87% higher expression in malignant tissues, and Irosustat was the first molecule of STS inhibitor to reach Phase-II clinical trials. The basic nucleus is chromen-3yl-sulfamate, and several modifications were done on the ring system synthesized and estimated for *in-vitro* placental STS inhibition against MCF-7 cells. Based on the above hypothesis, 25 compounds of benzyl-amino-2h-chromen-2-one were designed and subjected to molecular docking studies to identify the best binding modes of interaction. Five compounds, 3a, 2a, 2c, 3d and 3e exhibited better binding energies in comparison to standard Irosustat. The stability of the docked complex was further validated using molecular dynamic simulations.

**Keywords:** Irosustat, steroidal sulfatase inhibitor, benzyl-amino-2h-chromene-2-one, molecular docking, molecular dynamics.

**CH-235**

## DEVELOPMENT AND VALIDATION OF A SIMPLE RP-HPLC METHOD FOR QUANTITATIVE ESTIMATION OF CURCUMIN IN PHARMACEUTICAL DOSAGE FORMS

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A bioactive component of Curcuma longa, curcumin, has a variety of pharmacological characteristics, including anti-inflammatory, antioxidant, antibacterial, and anticancer effects. For pharmaceutical formulations to guarantee therapeutic efficacy and quality control, curcumin must be precisely quantified. Developing and validating a straightforward, accurate, and exact Reverse Phase High-Performance Liquid Chromatography (RP-HPLC) method for curcumin quantification in dosage forms was the goal of the current work. At a flow rate of 0.8 mL/min, a mobile phase consisting of acetonitrile and 0.1% formic acid (70:30, v/v) was used to achieve chromatographic separation on a Phenomenex Luma C8 column (150 × 4.6 mm, 5 µm), with detection at 425 nm. 3.52 minutes was the retention time for curcumin. According to ICH Q2(R2) requirements, the method was validated by assessing its specificity, linearity, accuracy, precision, robustness, ruggedness, limit of detection (LOD), and limit of quantification (LOQ). In the 10–50 µg/mL range, the technique demonstrated excellent linearity (R2 = 0.9997).




ISBN: 978-81-980623-8-3

Recoveries from accuracy trials ranged from 98.92% to 101.37%, but precision investigations showed %RSD values for intra- and inter-day analyses below 2%. 0.258 µg/mL and 0.783 µg/mL were found to be the LOD and LOQ, respectively. There was no evidence of formulation excipient interference, demonstrating the specificity of the procedure. Curcumin in marketed pill and cream formulations was effectively quantified using the established method. The established RP-HPLC method is very appropriate for routine quality control analysis of pharmaceutical goods based on curcumin since it is straightforward, dependable, and economical.

**Keywords:** Curcumin; RP-HPLC; Method validation; Pharmaceutical formulations; Quality control

**CH-236**

## COMPUTATIONAL-TO-EXPERIMENTAL EVALUATION OF ZINC OXIDE NANOPARTICLE-LOADED FULVESTRANT FOR HER2-POSITIVE BREAST CANCER THERAPY

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About 15% to 20% of breast tumors have higher levels of a protein know HER2.These cancers are called HER2-positive breast cancers. In this study, we adopt a pioneering integrative approach, synthesis and *in-vitro* method screening to unveil a novel therapeutic avenue for HER2-positive breast cancer. Through comprehensive data mining and network analyses, we identified a potential target as a key player in HER2-positive breast cancer, we devised a novel strategy to target ErbB2 using Fulvestrant comprising with zinc oxide nanoparticles, guided by *in silico* predictions. Our aim was to synthesize and characterize the Fulvestrant-zinc oxide nanoparticles, evaluate its efficacy *in vitro* and ascertain its potential as a therapeutic agent for HER2-positive breast cancer. Pharmacogenomics and gene enrichment process involved in HER2 positive breast cancer to select the potential target by following computational drug design strategy. Docking investigations of the proposed compounds were carried out for the selected targets, MMGBSA and Molecular Dynamics were undertaken to assess the stability. Subsequently Fulvestrant-zinc oxide nanoparticles was synthesized and characterized using techniques. *In-vitro* assessments involved MTT viability assays and AO/EtBr staining method. Molecular docking simulations revealed strong binding affinity between Fulvestrant and ErbB2 compared to other drugs, supported by favourable MMGBSA binding energy scores following through Molecular dynamics simulations confirmed the complex stability. *In-vitro* experiments demonstrated its non-toxic nature and showed dose-dependent cytotoxicity in HER2+ cells and AO/EtBr staining confirmed apoptosis induction. This study highlights the Fulvestrant – zinc oxide nanoparticles as a promising therapeutic intervention for HER2-positive breast cancer. By undergoing computational approaches, Network analysis and pharmacogenomics.

**Keywords:** HER2-positive breast cancer, ErbB2, Molecular docking, zinc oxide nanoparticles

**CH-237**

## BREAST CANCER THERAPY USING STIMULI RESPONSIVE HYDROXYUREA STREARIC ACID CONJUGATE; SYNTHESIS, FORMULATION AND *IN-VITRO* EVALUATION

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Hydroxyurea (HU) is a clinically established antitumor drug that functions primarily as an inhibitor of DNA synthesis, with additional inhibitory effects on RNA and protein synthesis. Despite its therapeutic potential, HU's hydrophilic nature limits its ability to permeate lipid membranes and reduces its clinical specificity. Lipid–drug conjugation strategies, particularly those utilizing fatty acids, can improve drug lipophilicity, stability, and cellular uptake. In this study, a novel hydroxyurea–stearic acid conjugate (HU-SA) was synthesized via a pH-sensitive hydrazone bond, designed to exploit the acidic tumor microenvironment for targeted drug release. The novelty of the conjugate was confirmed through SciFinder analysis. The HU-SA conjugate was synthesized in a two-step process and comprehensively characterized, confirming the successful formation of the hydrazone bond. A pH-dependent release assay demonstrated selective drug liberation under acidic conditions, mimicking the tumor microenvironment. *In vitro* cytotoxicity studies using MCF-7 breast cancer cells revealed that HU-SA exhibited enhanced anticancer activity, with an $IC_{50}$ value of 68.63 µg/mL, compared to free HU, which displayed an $IC_{50}$ of 92.07 µg/mL. These findings indicate that conjugation significantly improves HU's efficacy and pH-responsiveness, offering a potential strategy for tumor-targeted chemotherapy.Future studies will extend to *in vivo* evaluation and the development of nanostructured lipid carrier (NLC) formulations. By partially substituting solid lipid with oil, NLCs provide a less ordered lipid matrix, enhancing drug loading capacity, reducing premature drug leakage, and improving storage stability. Collectively, the results highlight HU-SA as a promising candidate for advanced breast cancer therapy.

**Keywords**: Breast cancer, lipid drug conjugates, nano lipid carriers, hydroxyurea, pH stimuli

**CH-238**

## CARBON QUANTUM DOTS (CQDS): TYPES, SYNTHESIS, AND MULTIFUNCTIONAL APPLICATIONS

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A novel family of zero-dimensional carbon-based nanomaterials with special optical, electrical, and surface characteristics is known as carbon quantum dots or CQDs. Multidisciplinary research is paying more attention to CQDs because of their tiny size (less than 10 nm), good photostability, tunable photoluminescence, biocompatibility, and ease of manufacturing. The three main categories of CQDs, graphene quantum dots (GQDs), carbon nanodots (CNDs), and polymer carbon dots (PCDs) differ in terms of their structural traits, luminescence mechanisms, and potential for functionalization. Numerous uses in bioimaging, drug delivery, photodynamic treatment (PDT), biosensing, optoelectronics, catalysis, and environmental remediation are made possible by their varied physicochemical characteristics. Notably, CQDs are interesting prospects for pharmacological and biological applications due to their low toxicity, high water dispersibility, and simplicity of surface modification. The types, synthesis methods, and multipurpose uses of CQDs are highlighted in this poster, along with their potential as sustainable, affordable, and adaptable nanomaterials with future uses in advanced material research, diagnostics, and therapy.

**Keywords:** Carbon Quantum Dots (CQDs), Photoluminescence, Biomedical Applications, Photodynamic Therapy (PDT), Sustainable Nanomaterials

**CH-239**

## QUANTIFICATION OF RESMETIROM IN THE RAT PLASMA BY THE SIMPLE AND PRECISE BIO ANALYTICAL METHOD USING HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

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A simple and precise bioanalytical, high performance liquid chromatography method was developed and validated for the quantification of resmetirom in the rat plasma using sobetirome as internal standard. Resmetirom was extracted from rat plasma by using liquid liquid extraction. The chromatographic analysis was carried out on symmetry C18 column (150 ×4.6 mm, 3.5µ) using formic acid and acetonitrile at 25:75, v/v as the mobile phase with a flow rate of 1 mL/min at 266 nm. Resmetirom and sobetirome eluted at 2.39 min. and 1.87 min. respectively. The developed method showed good linearity over 38.9 -1556 ng/mL concentration range with a regression coefficient of 0.999. The accuracy of the developed method was found in the range of 96-99%. Limit of detection and limit of quantification were determined to be 19.48 ng/mL and 64.28 ng/mL respectively. Analyte showed recovery in the range of 96-99 % and the developed method




ISBN: 978-81-980623-8-3

applied for pharmacokinetic study of marketed dosage form. obtained results proves the potentiality of the developed method and as no substantial method is available for the quantification of resmetirom in biological fluids, this proposed method can be regularly applied to establish the pharmacokinetic parameters to other resmetirom containing marketed dosage forms.

**Keywords:** Bioanalytical method, Resmetirom, Sobetirome, high performance liquid chromatography, Pharmacokinetic studies.

**CH-240**

## SYNTHESIS, CHARACTERIZATION AND PHARMACOLOGICAL EVALUATION OF A NOVEL 3,5- THIAZOLIDINE-2,4-DIONE DERIVATIVE

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In the current research, a novel 3,5-thiazolidine-2,4-dione derivative was synthesized and evaluated for various pharmacological actions by *in vitro* methods. The objective behind the research was to develop a novel derivative of thiazolidinedione and to screen for its pharmacological actions. The synthesized compound was screened for *in-vitro* anti-inflammatory activity by evaluating the percentage inhibition of protein denaturation using bovine serum albumin. Indomethacin was used as the standard. Maximum inhibition of 80.94% was observed for the synthesized compound at 500 µg/ml. At the same concentration the standard, Indomethacin showed maximum inhibition of 89.17%. *In vitro* anti-inflammatory activity using RAW 264.7 cell line was performed for COX and LOX inhibition assays. The synthesized compound exhibited cyclooxygenase (COX) and lipoxygenase (LOX) inhibitory activity i.e. the sample has anti-inflammatory property. The maximum efficacy was elicited by the concentration 100 µg/mL. DPPH radical scavenging assay and Ferric Reducing Antioxidant Power (FRAP) assay were used to perform *in vitro* antioxidant activity. It was observed from the results that, by both the methods the synthesized compounds exhibited poor antioxidant activity. By DPPH method the IC50 value was found to be more than 1000 µg/mL which for standard ascorbic acid used was 28.19 µg/mL. The antioxidant activity by FRAP assay was also not comparable with the standard. Minimum inhibitory concentration for antibacterial activity was determined by Resazurin-based 96-well plate microdilution method and was found to be very less compared to the standard, ciprofloxacin used. Minimum inhibitory concentration for the synthesized compound was found to be 250 µg/mL while for standard it was 31.25 µg/mL. Agar well diffusion method was used for screening antibacterial and antifungal assay. It was found that the synthesized compound has no antimicrobial activity because there is no/zero mm zone of inhibition against the particular microbial strain used in this study. The results indicated that the compound did not exhibit significant activity in the tested models. However, the study contributes to understanding the structure–activity relationship within this class of compounds and provides a basis for future structural modifications to enhance biological activity.

**Keywords:** thiazolidinedione, *in vitro*, anti-inflammatory, antioxidant, antimicrobial

**CH-241**

## GREEN PHARMACOLOGY – ECOFRIENDLY INNOVATIONS IN DRUG DESIGN

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Green pharmacology represents a transformative step in the field of drug discovery and development, focusing on the integration of eco-friendly practices with pharmaceutical innovation. Conventional drug design often involves chemical processes that consume large amounts of energy, utilize toxic solvents, and generate significant waste, thereby contributing to environmental pollution and sustainability challenges. In contrast, green pharmacology emphasizes the principles of green chemistry and sustainable technologies to reduce ecological footprints while maintaining therapeutic efficacy. Strategies such as the use of biocatalysts, renewable raw materials, green solvents, and computational drug design play a pivotal role in minimizing hazardous by-products and energy consumption. Furthermore, advancements in nanotechnology, molecular modelling, and biotechnology provide innovative platforms for developing drugs that are both environmentally benign and clinically effective. This approach not only supports environmental conservation but also enhances cost-effectiveness, scalability, and regulatory compliance. Importantly, green pharmacology promotes a paradigm shift from traditional linear development models toward circular, resource-efficient systems in pharmaceutical sciences. By integrating environmental responsibility into the early stages of drug design, it fosters a holistic model that addresses global health needs without compromising ecological balance. As healthcare systems worldwide increasingly recognize the need for sustainable practices, green pharmacology stands out as a promising and essential framework for future drug innovation.

**Keywords:** Green pharmacology, eco-friendly drug design, green chemistry, renewable resources, environmental sustainability.

**CH-242**

## DEVELOPMENT AND VALIDATION OF BIOANALYTICAL METHOD FOR THE DETERMINATION OF SELEGILINE IN RAT PLASMA AND ITS APPLICATION TO PHARMACOKINETICS

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Selegiline hydrochloride (SH), a selective and irreversible monoamine oxidase (MAO-A) inhibitor, is commonly prescribed for early-stage Parkinson's disease, depression, and senile dementia. Owing to its very low therapeutic plasma concentration (2 µg/L), a sensitive and rapid analytical method is required for reliable quantification. In this study, a high-performance liquid chromatography method with ultraviolet detection (HPLC-UV) was developed and validated for the estimation of SH in rat plasma. Chromatographic separation was achieved using a mobile phase of phosphate buffer saline (pH 7.0 ± 0.2, adjusted with 85% orthophosphoric acid) and acetonitrile in a 60:40 v/v ratio, with detection at 205 nm. Method validation performed according to ICH M10 guidelines, confirmed excellent linearity (5–1500 ng/mL, $R^2$ = 0.9989), high recovery with acetonitrile (94.23%), satisfactory accuracy, precision, robustness, and stability under freeze–thaw conditions. The retention time of SH was 6.7 minutes, enabling quick analysis. Application of the validated method to a pharmacokinetic study in Sprague-Dawley rats (oral dose: 1 mg/kg) demonstrated its suitability for in-vivo investigations. Overall, the developed method provides a reliable, efficient and reproducible approach for quantifying SH in rat plasma and can be effectively applied in preclinical pharmacokinetic studies.

**Keywords:** Selegiline hydrochloride, HPLC, Bioanalytical method validation, Rat plasma, Pharmacokinetics.

**CH-243**

## HIGHLY SENSITIVE AND SPECIFIC LC-MS/MS METHOD FOR CABOZANTINIB QUANTITATION: COMPARATIVE PHARMACOKINETIC STUDIES BETWEEN ORAL AND IV ROUTE

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A highly sensitive and specific Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS) method was developed and validated for the quantification of Cabozantinib, aimed at supporting pharmacokinetic studies comparing oral and intravenous administration routes in rats. Male Sprague-Dawley rats were divided into control, oral (5 mg/kg), and intravenous (5 mg/kg) groups, with blood and tissue samples collected at multiple time points post-dosing. The LC-MS/MS method demonstrated robust linearity across 5–1000 ng/mL, with precision, accuracy, and stability meeting standard validation guidelines. Pharmacokinetic analysis following oral administration revealed a maximum plasma concentration (Cmax) of approximately 800 ng/mL at a time to peak concentration (Tmax) of 6 hours, along with a clearance (CL/F) of 0.0621 L/kg/h and a central compartment volume (V1/F) of


ISBN: 978-81-980623-8-3

0.438 L/kg, indicating efficient drug absorption and disposition. The study facilitates reliable quantitation of cabozantinib for comparative pharmacokinetic assessment, with institutional animal ethics approval obtained.

**Keywords**: Cabozantinib, LC-MS/MS, Pharmacokinetics, Oral administration, Intravenous administration, Sprague-Dawley rats, Bioanalysis, Method validation, Drug quantification

**CH-244**

## LIQUID CHROMATOGRAPHIC METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS ESTIMATION OF METFORMIN, PIOGLITAZONE, GLIMEPIRIDE IN BULK AND DOSAGE FORMS

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A simple reverse-phase high-performance liquid chromatography (RP-HPLC) method was developed and validated for simultaneous determination of Metformin hydrochloride (MET), Pioglitazone (PIO), and Glimepiride (GLIM) in their pharmaceutical dosage form. The validated technique proved to be suitable for routine QA applications. The chromatographic separation was achieved using Agilent C18 column (250 mm × 4.6) 5 µm as a stationary phase with mobile phase composition of Methanol and Tris buffer (pH 8) in ratio of 65:35 v/v. The mobile phase was then sonicated for 10 min and then filtered through 0.45 µm membrane. The flow rate was 1 ml/min isocratic, column temperature 40°C, and ultraviolet detection at λ 227 nm. The retention times for MET, PIO, and GLIM were found to be 1.227 min, 3.843 min, and 7.353 min, respectively. The RP-HPLC technique was validated using the International Council for Harmonisation (ICH) guidelines. Recovery, precision, accuracy, selectivity, and robustness of the method were evaluated according to the ICH guidelines. This method is simple, rapid, convenient, and a perfect choice for the determination of metformin, pioglitazone, and glimepiride from bulk and pharmaceutical formulations.

**Keywords:** Accuracy, Glimepiride, Metformin, Pioglitazone, Precision

**CH-245**

## BOX–BEHNKEN DESIGN-ASSISTED OPTIMIZATION OF A REVERSE-PHASE HPLC METHOD FOR THE SIMULTANEOUS ESTIMATION OF FINASTERIDE AND BIMATOPROST LOADED MOFS

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The objective of this research was to develop, optimize, and validate a sensitive and specific reverse-phase high-performance liquid chromatography (RP-HPLC) method for the simultaneous quantification of Finasteride (FIN) and Bimatoprost (BIM) encapsulated in Metal–organic frameworks (MOFs). Design of Experiment approach was employed to optimize critical chromatographic parameters. Independent variables included acetonitrile ratio, column oven temperature, and flow rate, while dependent variables were resolution, peak area, number of theoretical plates, and tailing factor for both drugs. The optimized conditions were: 43% acetonitrile, column oven temperature of 25 °C, flow rate of 0.8 mL/min, and detection wavelength of 210 nm. The method was validated as per ICH Q2(R1) guidelines. The optimized method demonstrated excellent linearity ($R^2 > 0.99$) for both FIN and BIM within the range of 20–10,000 ng/mL. The LOD and LOQ were 10 ng/mL and 30.3 ng/mL for FIN, and 31.32 ng/mL and 94.9 ng/mL for BIM, respectively. The method showed high sensitivity, accuracy, precision, specificity, and robustness. Forced degradation studies confirmed the stability-indicating nature of the method, with clear and well-resolved FIN and BIM peaks unaffected by matrix interferences. Greenness assessment using GAPI and AGREE tools confirmed the eco-friendly nature of the method. Application of the validated method to formulation studies revealed entrapment efficiencies of 61 ± 1.5% for FIN and 83 ± 2% for BIM. The developed RP-HPLC method is robust, accurate, sensitive, eco-friendly, and stability-indicating. It offers a reliable analytical platform for simultaneous quantification of FIN and BIM in MOF-based formulations, supporting their further pharmaceutical development.

**Keywords:** Finasteride, Bimatoprost, Reverse-Phase HPLC (RP-HPLC), Box–Behnken Design

**CH-246**

## SILVER AND COPPER COUMARIN -METAL COMPLEXES: STRATEGIC SYNTHESIS, SPECTRAL CHARACTERIZATION, *IN SILICO* DOCKING INSIGHTS, AND POTENT ANTIMICROBIAL EVALUATION STUDIES

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In this study, a series of novel coumarin-based silver (Ag+) and copper (Cu++) metal complexes were synthesized via coordination of selected transition metals with functionalized coumarin ligands. The synthesized complexes were characterized using various physicochemical and spectral techniques including UV-Visible, IR, , LC-MS and elemental analysis to confirm their structural integrity and coordination behavior. The geometry and bonding nature of the complexes were further evaluated using in-silico molecular docking studies, which revealed the strong interactions of metal complxes with bacterial target proteins, suggesting potential mechanisms of action. The *in vitro* antibacterial activity of coumarin metal complexes were evaluated against Staphylococcus aureus and Escherichia coli using the agar well diffusion method. The silver complex exhibited antibacterial activity within the range of inhibition zones of 22.4 mm and 20.1 mm, respectively, followed by the copper complex within the range of 19.6 mm and 17.8 mm. This indicates that silver metal complexes are more potent than copper complexes. Both complexes displayed greater efficacy than the free ligand, may be due to improved lipophilicity and membrane permeability. This multifaceted study highlights the promise of coumarin-metal coordination complexes as potent antibacterial agents and provides a basis for further pharmacological development.

**Keywords:** Coumarin metal complexes, Molecular docking, Antibacterial. Agar well diffusion method

**CH-247**

## RATIONAL SELECTION OF PHYTOCHEMICALS FOR H PYLORI UREASE INHIBITION IN THE TREATMENT OF GASTRIC ULCER: A MOLECULAR DOCKING AND ADMET PREDICTION APPROACH

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Gastric ulcers continue to be a major global health concern, with Helicobacter pylori identified as a primary causative agent. This bacterium infects more than half of the world's population and is strongly associated with chronic gastritis, peptic ulcers, and gastric cancer. In India, particularly in under- resourced areas like rural Maharashtra, the prevalence of H. pylori-related disorders is notably high due to inadequate sanitation and healthcare access. Although standard triple therapy (antibiotics with proton pump inhibitors) is commonly used, rising antibiotic resistance and treatment failure have created an urgent need for new therapeutic alternatives. This research work explored the inhibition of H. pylori urease, a key enzyme that aids bacterial survival and mucosal damage. Based on documented traditional use, extracts from over 100 medicinal plants were screened, and 10 were selected for their low IC50 values. Active phytochemicals from these were docked to the urease active site using MOE software. Cholic acid, homoorientin, and cyanidin showed strong binding affinity and promising ADMET properties. Subsequent *in vitro* spectrophotometric assays confirmed their potency, with cholic acid showing the lowest IC50 (0.164 µM). This multi-phase study highlights the potential of plant-derived compounds as safe and effective anti-H. pylori agents, especially against resistant strains.

**Keywords:** H Pylori Urease, Gastric Ulcer, Molecular Docking and ADMET properties.

**CH-248**

## SYNTHESIS, DOCKING, CHARACTERIZATION AND BIOLOGICAL EVALUATION OF NOVEL 1,2,4-TRIAZINE DERIVATIVES




ISBN: 978-81-980623-8-3

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The present research investigates the synthesis and evaluation of new 1,2,4-triazine derivatives from thiosemicarbazide. The aim is to explore their anticancer, antibacterial, and anti-inflammatory activities. The compounds were established in structure by FTIR, NMR, and mass spectroscopy. Measured anticancer activity *in vitro* against Dalton Lymphoma Ascites (DLA) cells and by the Trypan Blue Exclusion method. Reported results as a percentage of cell killing. Antimicrobial activity was measured against Pseudomonas aeruginosa (Gram-negative) by the agar well diffusion method at concentrations of 40 µg/mL and 80 µg/mL. Found anti-inflammatory activity by the HRBC membrane stabilization method with diclofenac sodium as standard drug. Eight novel derivatives of 1,2,4-triazine were synthesized by conventional methods using benzil and thiosemicarbazide with various aldehydes (JK1- JK8). Among the tested compounds, JK1 was found to possess the most anticancer and anti-inflammatory activities, with greater inhibition of cell death and membrane stabilization compared to the other derivatives. Compound JK8 had a stronger antibacterial activity, producing larger inhibition zones against P. aeruginosa compared to the others. These findings indicate that the synthesized 1,2,4-triazine derivatives are of potential multi-target biological activity. Compounds JK1 and JK8, in our opinion, have the potential to be ideal candidates for further structural optimization and preclinical evaluation in the design of anticancer, anti-inflammatory, and antibacterial drugs.

**Keywords:** Thiosemicarbazide, 1,2,4-Triazine, Anticancer activity, Antibacterial activity, Anti-inflammatory activity

## CH-249

## DEVELOPMENT AND VALIDATION OF A ROBUST HPTLC ASSAY METHOD TO ASSESS THE STABILITY OF MOLNUPIRAVIR UNDER VARIOUS STRESS CONDITIONS

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This research focuses on designing and validating a precise, sensitive, a stability-indicating HPTLC test technique for quantification of molnupiravir medicament formulation. Validation process adhered to the ICH guidelines. Developed High-Performance Thin-Layer Chromatography technique employed Silica Gel G60F254 as stationary phase for effective separation and analysis. The optimized mobile phase consisted of ethanol, ethyl acetate, and formic acid in a 3:6.5:0.5(v/v/v) ratio. Molnupiravir exhibited an Rf value of 0.76 ± 0.01, with a maximum absorbance at 282 nm for detailed analysis. The method exhibited strong linearity with an $R^2$ value of 0.9937 over range of concentration 100-300 ng/spot and was thoroughly authenticated for parameters including accuracy, precision, specificity, robustness and linearity. Research was carried out in many circumstances, such as acidic, alkaline, neutral, oxidative, thermal, and photolytic environments. with % of degradation calculated. Significant Degradation was noted. under oxidative and thermal condition. No degradation occurred observed under acidic conditions. The method proved to be selective and reproducible for molnupiravir in both bulk and capsule formulations. The developed method effectively separated drug degradants from the non-degraded drug, confirming its status as a stability-indicating assay method.

## CH-250

## DEVELOPMENT AND VALIDATION OF A SENSITIVE, ECONOMICAL BIOANALYTICAL LC-MS/MS METHOD FOR THE SIMULTANEOUS ESTIMATION OF AN ANTIHYPERTENSIVE COMBINATION

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A robust and sensitive bioanalytical LC-MS/MS method has been developed and validated for the simultaneous quantification of valsartan and amlodipine in human plasma, utilizing deuterated internal standards. Sample pretreatment was performed using Strata-X cartridges to ensure effective analyte recovery. Chromatographic separation was achieved on a Thermo Hypurity C8 column (100 X 4.6 mm, 5µ), under isocratic elution conditions. The mobile phase comprised acetonitrile and acidified 10 mM ammonium formate buffer (80:20; V/V). A constant flow rate of 1.0 mL min-1 was maintained, and the column temperature was regulated at 40℃ ± 2℃. Retention time recorded for valsartan and valsartan D9 was 1.40 ±0.50 minutes and for amlodipine and amlodipine D4 it was 1.52 ±0.50 minutes. The method was validated in accordance with EMA guidelines. This method exhibited linearity over a concentration range of 51.63 ng mL-1 to 16003.99 ng mL-1 for valsartan and 0.101 ng mL-1 to 20.035 ng mL-1 for amlodipine. This approach is economical and streamlined, making it ideal for high-throughput plasma analysis.

**Keywords**: Valsartan, Amlodipine, Human Plasma, Solid-phase Extraction (SPE), European Medicine Agency (EMA) Guidelines, LC-MS/MS Bioanalytical Method.

## CH-251

## DEVELOPMENT AND VALIDATION OF A SECOND DERIVATIVE METHOD FOR THE ESTIMATION OF OLMESARTAN MEDOXOMIL BY UV SPECTROSCOPY

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This study developed and validated a UV spectrophotometric second derivative method for quantifying Olmesartan medoxomil. Optimized for detection at 262 nm using distilled water, the method showed a linear response within a 5-50 µg/ml range and adhered to Beer-Lambert's law. Extensive statistical validation and recovery studies per ICH guidelines confirmed the method's simplicity, precision, accuracy, selectivity, and rapidity. It proved effective for analyzing Olmesartan medoxomil in both pure samples and tablet formulations.

**Keywords:** Olmesartan, second derivative UV method, ICH guidelines

## CH-252

## DRUG DESIGN AND DISCOVERY: A PARADIGM SHIFT IN MODERN MEDICINE

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The field of drug design and discovery is undergoing a transformative shift, driven by artificial intelligence (AI), deep learning, and computational techniques. Traditional drug development is hindered by high costs, lengthy timelines, and low success rates. However, AI-powered predictive modelling, molecular docking, and virtual screening are accelerating drug discovery by optimizing target identification and candidate selection. This study examines the role of AI and omics technologies-including genomics, proteomics, and metabolomics in modern drug discovery. AI-driven platforms like AlphaFold predict protein structures, facilitating drug target identification. High-throughput screening enhances the selection of therapeutic compounds, significantly reducing development time and costs. A key breakthrough is the AI-designed drug for idiopathic pulmonary fibrosis by *In silico* Medicine, which advanced to clinical trials in just 18 months. Additionally, biotherapeutics-such as monoclonal antibodies, RNA-based therapies, and CRISPR-based gene editing- are redefining treatment approaches for complex diseases. These innovations improve drug efficacy, enable personalized medicine, and address challenges like drug resistance. As AI-driven drug discovery evolves, it promises to reshape global healthcare, enhance clinical trial success rates, and deliver more effective, individualized treatments. This study highlights AI's pivotal role in pharmaceutical research, marking a new era of efficiency, innovation, and patient-centred solutions.




ISBN: 978-81-980623-8-3

**Keywords**: Drug discovery, artificial intelligence, computational drug designing, molecular docking, virtual screening, omics technology, biotherapeutics

**CH-253**

## ECO-FRIENDLY HPLC METHOD DEVELOPMENT FOR ROUTINE QUALITY CONTROL AND IMPURITY PROFILING OF NIRMATRELVIR–RITONAVIR TABLETS

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The rapid global deployment of Nirmatrelvir–Ritonavir (Paxlovid®) for the treatment of COVID-19 has created a significant demand for robust, reliable, and sustainable analytical methods to ensure product quality and safety. Conventional high-performance liquid chromatography (HPLC) techniques widely employed in pharmaceutical analysis rely heavily on acetonitrile and methanol, which are toxic, costly, and environmentally unsustainable. To address these limitations, the present study reports the development and validation of an eco-friendly reverse-phase HPLC method for the simultaneous estimation and impurity profiling of Nirmatrelvir and Ritonavir in fixed-dose combination tablets. The method utilizes ethanol, a green solvent, in combination with an acetate buffer as the mobile phase, thereby minimizing environmental hazards while maintaining high analytical performance. Chromatographic separation was achieved on a C18 column (150 × 4.6 mm, 5 µm) under optimized isocratic conditions, producing sharp, symmetrical peaks with baseline resolution. Forced degradation studies under acid, alkali, oxidative, photolytic, and thermal conditions confirmed the method's stability-indicating nature and ability to resolve impurities effectively. Validation in accordance with ICH Q2(R2) guidelines demonstrated linearity ($R^2 \geq 0.999$), accuracy (98–102%), precision (%RSD < 2), robustness, and sensitivity, with detection limits in the low µg/mL range. The short run time (<7 minutes) further enhances method efficiency, reducing solvent consumption and analysis cost. This eco-friendly HPLC method thus represents a sustainable, accurate, and reproducible alternative for routine quality control, stability testing, and impurity profiling of Nirmatrelvir–Ritonavir formulations, aligning with the principles of green analytical chemistry and pharmaceutical sustainability.

**Keywords:** Nirmatrelvir, Ritonavir, Green HPLC, Impurity Profiling, Stability-Indicating

**CH-254**

## COMPUTATIONAL SCREENING OF NOVEL TETRAMETHYLPYRAZINE-CHALCONE BASED DERIVATIVES OF RIVASTIGMINE TARGETING ACETYLCHOLINESTERASE

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Alzheimer's disease (AD) is a progressive neurodegenerative disorder and a leading cause of dementia. While current symptomatic treatments, such as rivastigmine, can temporarily improve cognitive function, they do not alter the disease's progression and are associated with significant adverse effects, including gastrointestinal issues and bradycardia. The complex and multifaceted pathophysiology of AD highlights the need for a new therapeutic approach, such as a multi-target directed ligand (MTDL) strategy. This project proposes the design, synthesis, and evaluation of novel hybrid molecules that combine three key components: rivastigmine, chalcone, and tetramethylpyrazine (TMP). We designed hybrid molecules to create a synergistic therapeutic effect by combining rivastigmine's potent cholinesterase inhibition with the anti-inflammatory, antioxidant, and anti-amyloid properties of chalcone. The inclusion of TMP, an alkaloid with excellent blood-brain barrier penetration and neuroprotective effects, is anticipated to significantly enhance the overall therapeutic profile. While, the synthesis and characterization of designed derivatives are in progress, in this work we present the results of computational screening of the designed derivatives. The research screened a library of designed molecules through molecular docking simulations to predict their binding affinities and interactions with the desired protein (acetylcholinesterase). The designed molecules were then compared to rivastigmine to assess their potential as superior or alternative therapeutic candidates. Detailed analysis of the molecular interactions revealed that these compounds formed a greater number of hydrogen bonds and hydrophobic interactions with critical amino acid residues in the protein's active site. This, combined with favorable physicochemical properties and ADMET predictions, suggests that designed molecules possess superior inhibitory potential and desirable drug-like properties, warranting further *in vitro* and *in vivo* validation.

**Keywords:** Alzheimer's, rivastigmine, docking, ADMET.

**CH-255**

## INTERPRETABLE QSAR MODELS: BALANCING ACCURACY AND TRANSPARENCY IN DRUG DISCOVERY

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Quantitative structure–activity relationship (QSAR) models are pivotal in drug discovery, offering predictions of biological activity based on molecular properties. However, the traditional trade-off between model accuracy and interpretability remains a critical challenge. Highly accurate models, such as those employing deep learning or ensemble methods, often lack transparency, limiting their utility in understanding underlying chemical and biological interactions. Conversely, interpretable models like linear regression or decision trees may sacrifice predictive power, constraining their broader application. This review explores strategies to balance accuracy and interpretability in QSAR modelling, emphasizing their importance in accelerating drug discovery. Advances in interpretable machine learning, including attention mechanisms, feature importance metrics, and hybrid modelling, are discussed as potential solutions to enhance the utility of QSAR models. The role of domain knowledge, feature engineering, and transparent validation methods in improving model trustworthiness is highlighted. Furthermore, case studies demonstrate the integration of interpretable QSAR models in real-world drug discovery pipelines, emphasizing their role in hypothesis generation and lead optimization. concludes by proposing a framework to guide the development of interpretable yet accurate QSAR models, aiming to bridge the gap between computational predictions and actionable insights for chemists and pharmacologists. Balancing these dual objectives is critical for advancing rational drug design and decision-making.

**Keywords:** QSAR Models, Drug Discovery, Artificial Intelligence, Molecular Properties

**CH-256**

## UV SPECTROPHOTOMETRIC METHOD DEVELOPMENT AND VALIDATION FOR ESTIMATION OF RIVAROXABAN AND ASPIRIN IN MULTI COMPONENT SYSYTEM.

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Rivaroxaban is a factor Xa inhibitor is commonly prescribed for the treatment of deep vein thrombosis and pulmonary embolism and Aspirin is widely recognized as an antithrombotic agent extensively utilized in the management and prevention of cerebrovascular and cardiovascular ailments, such as stroke. The development of analytical method is required for accurate analysis of both the drugs. Two simple, precise & economical UV spectrophotometric method have been developed for the simultaneous estimation of Rivaroxaban & Aspirin in their synthetic mixture. Method 1 is Ratio spectra derivative method & Method 2 is Difference spectrophotometric method which is based on measurement of absorption at 245nm & 304nm i.e. maximum of Rivaroxaban & Aspirin, respectively. Linearity was observed in the concentration range of 5-30mcg/ml for Rivaroxaban an\7d 50-300mcg/ml for Aspirin using methanol as a solvent. The accuracy of the methods was assessed by recovery studies and was found to be within range of 98-102%for both the drugs. Precision of the method was estimated by repeatability and intermediate precision studies. The % RSD value were found to be less than 2, proving method were precise. The developed methods were statistically compared using ANOVA, f-




ISBN: 978-81-980623-8-3

test, t-test. The result were validated as per ICH (Q2) R2 guideline and were found to be satisfactory.

**Keywords:** Rivaroxaban, Asprin, Ratio spectra derivative method, Difference spectrophotometric method, Simultaneous estimation.

**CH-257**

**ANALYTICAL METHOD DEVELOPMENT AND VALIDATION FOR THE DETERMINATION OF SELECTIVE PHARMACEUTICAL DOSAGE FORMS**

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Parkinson's disease (PD) is the second most common neurodegenerative disorder of the central nervous system, affecting 7–10 million people worldwide according to WHO (2014). It arises from the degeneration of dopamine-producing neurons in the substantia nigra and manifests with motor and non-motor complications including tremor, rigidity, bradykinesia, dementia, and depression. Ropinirole hydrochloride (HCl), a dopamine agonist, is widely prescribed for PD but suffers from limited oral bioavailability (~50%) and a short half-life of 5–6 hours due to extensive first-pass metabolism. To overcome these drawbacks, nanostructured lipid carriers (NLCs) of Ropinirole HCl for intranasal administration are proposed to enhance bioavailability, bypass hepatic metabolism, and achieve direct brain delivery, thereby reducing dosing frequency and improving patient compliance. Parallelly, for the treatment of pulmonary arterial hypertension, Bosentan monohydrate—an endothelin receptor antagonist—requires stringent quality control for residual solvents. A sensitive and reliable headspace gas chromatography (HS-GC) method with flame ionization detection (FID) was developed and validated for the simultaneous determination of methanol, ethanol, 2-propanol, acetone, acetonitrile, and toluene in Bosentan monohydrate, in compliance with ICH Q3C, Q2A, and Q2B guidelines. The method exhibited excellent specificity, linearity, sensitivity, accuracy, precision, robustness, and recovery, with residual solvent levels in tested batches well below ICH limits. These combined studies highlight innovative drug delivery approaches for PD management and robust analytical methods for quality control in pulmonary arterial hypertension therapy.

**Keywords:** Parkinson's disease, Ropinirole HCl, nanostructured lipid carriers (NLCs), intranasal delivery, bioavailability, blood–brain barrier, Bosentan monohydrate, headspace gas chromatography (HS-GC), flame ionization detector (FID), residual solvents, ICH guidelines, method validation, quality control.

**CH-258**

**RP- HPLC METHOD DEVELOPMENT AND VALIDATION FOR ESTIMATION OF LUMATEPERONE IN BULK FORM**

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A validated, stability-indicating RP-HPLC method for quantifying Lumateperone tosylate in bulk and capsule dosage forms was developed and optimized. The chromatographic separation employed a Phenomenex C18 column (250 mm × 4.6 mm, 5 µm) with an isocratic mobile phase of methanol and 0.1% ortho-phosphoric acid in water (45:55 v/v), at a flow rate of 1.0 ml/min and detection at 227 nm. Linearity was observed between 2–10 µg/ml with an $R^2$ value of 0.9999. The method was rigorously validated for accuracy, precision, robustness, LOD (0.771 ppm), and LOQ (2.336 ppm) as per ICH Q2(R1) guidelines. Forced degradation studies exposed samples to acid/base hydrolysis, oxidation, thermal, and photolytic conditions; degradation products were well-resolved from the parent drug peak, with 10–20% drug degradation observed under stress. The assay demonstrated excellent specificity, enabling accurate estimation of Lumateperone tosylate in the presence of degradation products. Results confirm that the method is simple, rapid, selective, cost-efficient, and suitable for routine analysis of Lumateperone tosylate in pharmaceutical quality control.

**Keywords:** Lumateperone, RP- HPLC, Validation

**CH-259**

**DEVELOPMENT OF VALIDATED STABILITY INDICATING METHODS OF TOLBUTAMIDE BY HPLC AND UV-VIS SPECTROPHOTOMETER.**

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The present study aimed to develop and validate a stability-indicating high-performance liquid chromatography (HPLC) method for the determination of tolbutamide and the identification of its major degradation products. Acetonitrile and 0.14% potassium dihydrogen orthophosphate buffer (pH 3.0) were gradient eluted in a 35:65 ratio at a flow rate of 1 mL/min to optimise a reverse-phase HPLC method. The method produced good resolution between the drug and its degradants, and tolbutamide showed a sharp peak with a retention time of 4.182 minutes. The linearity in the range of 10–60 µg/mL was confirmed by method validation in accordance with ICH guidelines, with correlation coefficients of 0.9988 (HPLC) and 0.9968 (UV-VIS spectrophotometry). RSD values for both approaches were less than 2%, demonstrating the precision. The spectrophotometric method's mean recoveries ranged from 100.5% to 100.6%, while HPLC's ranged from 99.11% to 99.33%, according to accuracy studies. For HPLC, the limits of quantification (LOQ) and detection (LOD) were 16.76 µg/mL and 5.53 µg/mL, respectively. Studies on forced degradation were carried out in conditions of acidic, basic, oxidative, thermal, and photolytic stress. Tolbutamide degraded the most under oxidative conditions out of all of these. The parent compound and its degradants were successfully separated by the developed method, suggesting that it is a suitable assay for indicating stability. For routine quality control and stability testing of tolbutamide in bulk medications and pharmaceutical formulations, the validated HPLC and UV-VIS spectrophotometric techniques are reliable, accurate, and precise.

**Keywords:** HPLC, PDA detector, tolbutamide, stability indicating method, validation, degradation.

**CH-260**

**DEVELOPMENT AND VALIDATION OF RP-HPLC METHOD FOR THE ESTIMATION OF PONESIMOD IN BULK AND TABLET DOSAGE FORM**

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The pharmaceutical industry demands precise and robust analytical methods to ensure drug quality, safety, and efficacy. This poster presents the development and validation of a reliable Reverse Phase High-Performance Liquid Chromatography (RP-HPLC) method for estimating Ponesimod, a selective sphingosine-1-phosphate receptor modulator, in bulk and tablet dosage forms. Method development focused on optimizing chromatographic parameters such as mobile phase composition and flow rate to achieve high resolution and minimal tailing. The final method demonstrated excellent linearity across the 10–30 µg/mL concentration range, with a correlation coefficient ($r^2$) > 0.999. System suitability tests confirmed acceptable retention time, theoretical plates, and tailing factor. Accuracy was validated through recovery studies, with results ranging from 98% to 102%, while precision studies showed %RSD values below 2%, affirming method reproducibility. The method's sensitivity was established with LOD and LOQ values of 1.09 µg/mL and 3.29 µg/mL, respectively. Robustness was proven by varying analytical conditions, and forced degradation studies confirmed its stability-indicating capability under acid, base, oxidative, thermal, and photolytic stress. Overall, the validated method complies with ICH guidelines and is suitable for routine analysis of Ponesimod in pharmaceutical formulations.

**CH-261**

**STABILITY INDICATING ASSAY METHOD FOR ESTIMATION OF DOMPERIDONE AND PANTOPRAZOLE IN THEIR COMBINED DOSAGE FORMULATION**

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ISBN: 978-81-980623-8-3

In this study the method was developed for determination of Domeperidone (DOM) & Pantoprazole (PTZ) in combined dosage form. A RP-HPLC method was developed using Younglin (S.K.) system with PremesilC18 (4.6 x 250mm, 5µm) column and UV detector in a gradient mode with mobile phase comprising of Methanol: Water (60:40v/v) pH-2.5 adjusted with 0.05% OPA (HPLC grade). 0.7ml/min flow rate and monitoring of effluent were done at 285.0 nm for DOM and PTZ estimation in combined dosage form. 10min for (DOM) & (PTZ) retention times were found. The dynamic range of linearity 1-5 µg/mL for PTZ and 30- 150 µg/mL for DPD were exhibited for the assay. The linear calibration curves were found over the entire range linearity (r2 = 0.9992 for DPD and r2 = 0.9992 for PTZ) and 99.82 % for DPD and 99.91 % for PTZ mean % recovery was found with % RSD was NMT 2 for both estimations which fully agrees by system suitability in good agreement with labeled claimed of formulation. The % RSD for Intra & Inter-Day Precision was NMT than 2 for both drugs. The developed method was accurate, precise, rugged and linear as per ICH guidelines.

**Keywords:** DOM, PTZ, RP-HPLC.

**CH-262**

**AQBD-BASED OPTIMIZATION AND SIMULTANEOUS RP-HPLC METHOD DEVELOPMENT AND VALIDATION OF MONOMETHYL FUMARATE AND FAMPRIDINE IN BULK AND NANOSTRUCTURED LIPID CARRIERS**

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Analytical Quality by Design (AQbD) is essential for developing precise, robust pharmaceutical analytical methods ensuring drug safety and efficacy. Monomethyl fumarate (MMF) and fampridine (FAM) are important drugs with oral formulations limited by side effects, highlighting the need for a reliable simultaneous HPLC method to enable accurate estimation, quality control, and monitoring of MMF and FAM in bulk and nanostructured lipid carrier (NLC) systems using AQbD principles. Optimization employed Box-Behnken Design (BBD) to study effects of organic phase concentration ($X_1$), flow rate ($X_2$), and column temperature ($X_3$) on retention time ($Y_1$), tailing factor ($Y_2$), and theoretical plates ($Y_3$). Seventeen runs were performed, with run 13 optimized at a mobile phase of water with 0.5% ortho phosphoric acid in water and methanol (85:15 v/v), flow rate 1.0 mL/min, column temperature 35°C, and Phenomenex Luna column (5 µm, 150 × 4.6 mm). MMF and FAM retention times were 9.482 and 3.492 min; tailing factors 1.25 (MMF) and 1.76 (FAM); theoretical plates 8871.31 and 4060.28. Excellent linearity was observed ($R^2$=0.9989 MMF, 0.9992 FAM) from 2 to 12 µg/mL. LOD and LOQ: 0.34 and 1.03 µg/mL (MMF), 0.30 and 0.91 µg/mL (FAM). Recovery ranged 99.87–118.13% (MMF), 97.1–102.4% (FAM). Forced degradation showed significant oxidative stress degradation (45.07% MMF, 48.55% FAM). The developed simultaneous HPLC method is simple, precise, cost-effective, and suitable for quality control and research of MMF and FAM formulations.

**Keywords:** Analytical Quality by Design (AQbD), Simultaneous HPLC method, Monomethyl fumarate, Fampridine, Nanostructured lipid carriers

**CH-263**

***IN SILICO* ASSESSMENT AND SONOCHEMICAL SYNTHESIS OF 2-ALKYNYL 3-CHLOROPYRAZINES AS PROSPECTIVE LIGANDS FOR SARS-COV-2**

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The recent global pandemic caused by COVID-19 has triggered an intense effort worldwide towards the development of an effective cure for this disease. In our effort we have explored the 2-alkynyl substituted 3-chloropyrazine framework as a potential template for the design of molecules for this purpose. Our strategy was supported by the *in silico* studies of representative compounds to assess their binding affinities via docking into the N-terminal RNA-binding domain (NTD) of N-protein of SARS-CoV-2. Thus, we created a small library of molecules based on the aforementioned template via an environmentally safer method that involved the rapid synthesis of 2-alkynyl 3-chloropyrazine derivatives under Cu-catalysis assisted by ultrasound. The reactions proceeded via the coupling of 2,3-dichloropyrazine with commercially available terminal alkynes in the presence of CuI, PPh 3 and K 2 CO 3 in PEG-400. Further molecular modeling studies helped in establishing a virtual SAR (Structure Activity Relationship) within the series and identification of three potential hits. The desirable ADME was also predicted for these three molecules suggesting their prospective medicinal value.

**CH-264**

**INNOVATIVE AQBD-BASED RP-HPLC METHOD DEVELOPMENT AND VALIDATION FOR MANGIFERIN LOADED LIPOSOMAL NANOCARRIERS**

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Mangiferin (MGF), known for its antioxidant and anticancer properties, is widely used in pharmaceutical formulations. Analytical Quality by Design (AQbD) is a systematic, science-driven approach that develops robust and reliable analytical methods, ensuring consistent precision and reproducibility essential for drug safety and efficacy. This study aimed to develop and validate a robust HPLC method for quantifying MGF in bulk and MGF-loaded stealth liposomes using AQbD principles. The method optimization was performed using Box-Behnken Design (BBD) with organic phase concentration ($X_1$), flow rate ($X_2$), and column temperature ($X_3$) as independent variables; retention time ($Y_1$), tailing factor ($Y_2$), and theoretical plates ($Y_3$) were dependent variables. Seventeen experimental runs identified run 6 as optimal, using a mobile phase of 0.1% ortho phosphoric acid in water and methanol (60:40 v/v), flow rate 1.0 mL/min, column temperature 35°C, and Phenomenex Luna column (5 µm, 150 × 4.6 mm). MGF retention time was 3.095 min, with a tailing factor of 1.70 and 2109.05 theoretical plates. The method showed excellent linearity ($R^2$=0.9983) over 10–60 µg/mL. Limit of detection (LOD) and quantification (LOQ) were 2.52 and 7.64 µg/mL, respectively. Recovery ranged between 69.23% and 94.38%. Forced degradation studies indicated notable degradation under alkaline (9.5%) and photolytic (8.2%) stress. The developed RP-HPLC method provides accurate, economical and green chemistry approach for quantifying Mangiferin, making it a valuable tool for pharmaceutical research and quality assurance in complex formulations and drug development.

**Keywords:** Mangiferin, Analytical Quality by Design (AQbD), High-Performance Liquid Chromatography (HPLC), Box-Behnken Design (BBD), Stealth Liposomes

**CH-265**

**THIN LAYER CHROMATOGRAPHY PROFILING AND IDENTIFICATION OF MARKER COMPOUNDS IN MEDICINAL PLANT EXTRACTS FOR PHARMACOGENETIC STANDARDIZATION**

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Thin Layer Chromatography (TLC) is a simple, rapid, and cost-effective analytical method widely employed for the qualitative analysis and profiling of plant extracts in pharmacognosy. This technique allows for the separation and identification of marker compounds based on their differing affinities towards the stationary and mobile phases. TLC profiling is essential for standardizing herbal medicines by identifying bioactive constituents, impurities, and adulterants. The process involves applying a small sample of plant extract onto a silica gel-coated plate, developing it in an appropriate solvent system, and visualizing the separated compounds under UV light or through chemical derivatization. TLC is favored in phytochemical analysis for its ease of use, minimal sample preparation, and capacity to analyze multiple samples simultaneously. Identifying marker compounds through TLC




ISBN: 978-81-980623-8-3

profiling supports quality control, authentication, and validation of crude drugs and herbal formulations, ensuring their efficacy and safety.

**Keywords:** TLC profiling, Phytochemical screening, Medicinal plants, Phytochemical screeningText

**CH-266**

## PHYSICOCHEMICAL PROFILING, DRUG-LIKENESS, ADMET PREDICTION, AND COMPUTATIONAL BINDING MODE ANALYSIS OF A PYRAZOLO-PYRIMIDINE LEAD DERIVATIVE

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The growing global burden of cancer highlights the direct need for the discovery of novel therapeutic agents for the effective management of the disease. In addition to the therapeutic activity, the physicochemical properties of any drug molecule critically influence its bioavailability, distribution, metabolism, and excretion, and hence its therapeutic efficacy. Therefore, further complete physicochemical profiling of novel synthesized lead molecules are necessary in order to move for further pre-clinical studies. This study mainly investigates the physicochemical profiling, drug likeness, ADMET prediction along with computational binding mode analysis of novel synthesized Pyrazolo-pyrimidine derivative. The physicochemical profiling including, solubility, log P and log D of lead molecule showed the favorable physicochemical properties of lead molecule along with drug likeness. Moreover, *in silico* prediction of the ADMET indicated the favorable absorption, distribution, metabolism, excretion and lack of toxicity. The molecular docking and molecular dynamics studies was also carried out to understand the binding modes of this lead compound. The molecular docking interaction analysis showed high binding affinity of the lead compound against selected target. Furthermore, molecular dynamics simulation studies revealed the high protein–ligand stability of the lead compound with target.

**Keywords**: Physicochemical properties, ADMET, Molecular docking, Pyrazolo-pyrimidine.

**CH-267**

## INVESTIGATION AND COMPARATIVE STUDY OF PHENOLPHTHALEIN AND IPOMOEA BATATAS AS A NATURAL INDICATOR FOR ACID-BASE TITRATION"

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The application of the leaf extracts in acid-base titrimetry shows how analytically significant they are. It was discovered that the leaves of the Ipomoea batata's plant performed well in strong acid-strong base titrations. In SA-SB titration, a distinct and noticeable color shift from pink to green was seen, while in WA-SB, it results in a colorless to yellow end point. The pigment was suited for use as acid-base indicators due to the sharp contrast in their colors in acid and base. Ipomoea batata's plant leaf extracts have excellent performance and sharp color changes at the end points of the titration were observed, which could replace the standard indicators being used in conventional laboratories, i.e. phenolphthalein, with natural indicators. The extraction process is very straightforward, inexpensive, and environmentally friendly. The pigment extracts' good analytical capability through their use in acid-base titrimetry, where they performed best in strong acid-strong base titration with a distinct and distinct color shift. The pigment was suited for use as acid-base indicators due to the sharp contrast in their colors in acid and base. Extracts from the leaves of the Ipomoea batata's plant can be used as appropriate indicators in acid-base titrimetry experiments involving a strong acid and a strong base. These plant elements are easily accessible, and the extraction process is straightforward. They operate excellently and produce exact, accurate results, which makes them a perfect substitute for the currently used synthetic indicators. As a result, the use of natural indicators in acid-base titration is more advantageous due to their affordability, simplicity, ease of preparation, easy availability, pollution-free nature, inert nature, and accurate results.

**Keywords:** affordability, simplicity, ease of preparation, easy availability, pollution-free nature, inert nature, and accurate results with biodegradability and non-toxicity for aquatic life.

**CH-268**

## INCREASE OF RIBOFLAVIN PRODUCTION FROM BACILLUS SUBTILIS BY FLUX BALANCE ANALYSIS

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Riboflavin (vitamin B2) is an essential cofactor in cellular metabolism, widely applied in pharmaceuticals, food fortification, and nutraceuticals. Bacillus subtilis, a non- pathogenic GRAS microorganism, has emerged as a robust platform for riboflavin production owing to its genetic tractability and industrial relevance. The genome-scale model iYO844 provides a valuable tool for simulating flux distributions and identifying metabolic rewiring strategies to enhance yields. Flux Balance Analysis (FBA) will be applied to the B. subtilis genome-scale model to identify key metabolic bottlenecks and flux shifts across central carbon metabolism, with emphasis on the pentose phosphate pathway, purine biosynthesis, and flavin biosynthetic routes. Based on these insights, targeted interventions will include amplification of riboflavin biosynthetic genes (ribA–ribH), attenuation of competing NAD(P)H-consuming reactions, and rerouting of glycolytic flux toward GTP and ribulose-5-phosphate to strengthen precursor supply. Parallel nutrient optimization will evaluate glucose, glycerol, and agricultural by- products as substrates to ensure precursor robustness and cost-effectiveness. At the bioprocess level, controlled aeration, pH stabilization, and fed-batch feeding will be implemented to maintain redox balance, minimize inhibition, and prolong production phases. Integrating *in silico* predictions with metabolic engineering, nutrient optimization, and bioprocess control offers a systems-level framework for scalable riboflavin overproduction. Coupled with adaptive laboratory evolution, this approach positions B. subtilis as a next- generation microbial factory for cost-effective, sustainable, and high-titre riboflavin biosynthesis.

**Keywords:** Riboflavin production, Flux balancing, Bacillus subtilis, therapeutic application

**CH-269**

## EXPLORING THE POTENTIAL OF ECHIOIDININ FROM ANDROGRAPHIS ECHIOIDES AS A NOVEL THERAPEUTIC AGENT FOR PARKINSON'S DISEASE THROUGH *IN SILICO* MOLECULAR DOCKING

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Parkinson's disease (PD) poses a significant health challenge, negatively impacting quality of life. Current treatments focus on neuroprotection and symptom relief. This study examined Andrographis echioidies main metabolites in *in-silico* molecular docking ability against Parkinson's disease proteins, as well as their physiochemical properties (Lipinski rule of five), drug-likeness and parameters including absorption, distribution, metabolism, elimination and toxicity (ADMET) profiles of Andrographis echioidies. This investigation goes deeper into the possible anti-Parkinson's effects of Andrographis echioides, emphasising its engagement with critical enzymes linked to the condition: catechol-O-methyltransferase (COMT), adenosine A2A receptor (A2A), and monoamine oxidase-B (MAO-B). Investigations were conducted on various phytoconstituents derived from A. echioides in relation to specific targets associated with Parkinson's disease (PD). The findings indicated that echioidinin exhibited enhanced binding affinities when compared to standard medications. For instance, echioidinin demonstrated binding affinities of -7.9 kcal/mol with 3EML, -7.5 kcal/mol with 1H1D, -9.2 kcal/mol with 2C65, and -9.2 kcal/mol with 2V61. In contrast, the corresponding binding affinities for dopamine were -5.9 kcal/mol for 3EML, -5.2 kcal/mol for 1H1D, -6.4 kcal/mol for 2C65, and -6.2 kcal/mol for 2V61. Echioidinin shows superior binding affinities compared to other FDA-approved treatments for Parkinson's disease, such as selegiline and rasagiline. These results suggest that




ISBN: 978-81-980623-8-3

echioidinin has a significant affinity for targets related to PD, thereby highlighting its potential as a novel therapeutic approach for the condition. Further in vitro and *in vivo* studies are required to validate these findings and to evaluate the safety and efficacy of echioidinin in the treatment of PD.

**Keywords:** Echioidinin, Andrographis echioidies, molecular docking, ADMET, anti-parkinsonism.

**CH-270**

**PEPTODOTIMICS AS DRUGS- A NEW JOURNEY**

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Peptidomimetics are synthetic, peptide-like molecules designed to mimic the structure and function of natural peptides or proteins, but with enhanced stability, bioavailability, and potency to overcome the limitations of traditional peptides in drug development and therapeutics. They are engineered to interact with biological targets, such as protein-protein interfaces, to modulate biological processes in treating chronic diseases like cancer, infection, and neurological disorders. Peptidomimetic approaches have been utilized to design small molecules that selectively target cancer cells, an approach known as targeted chemotherapy, by inducing programmed cell death by a process called apoptosis. Peptidomimetic approaches have been utilized to design small molecules that selectively target cancer cells, an approach known as targeted chemotherapy, by inducing programmed cell death by a process called apoptosis.

**Keywords**: Peptidomimetics, biological targets, chronic diseases, targeted chemotherapy.

**CH-271**

**DESIGN AND DEVELOPMENT OF PYRIMIDINE 5-CARBONITRILE ANALOGUES AS ANTICANCER AGENT**

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Tyrosine kinases play crucial roles in a variety of biological processes, including growth, differentiation, metabolism, and apoptosis in response to both internal and external stimuli. They are significant mediators of the signalling cascade. Tyrosine kinases have been linked in recent research to the pathogenesis of cancer. Even though their activity is strictly controlled in healthy cells, mutations, overexpression, and autocrine paracrine stimulation can cause them to have transforming functions, which can result in cancer. Selective tyrosine kinase inhibitors have the ability to prevent constitutive oncogenic activation in cancer cells, making them an attractive strategy for novel genome-based treatments. The many methods of tyrosine kinase inhibition, including small molecule inhibitors, monoclonal antibodies, heat shock proteins, immunoconjugates, antisense, and peptide medications, as well as the mechanisms of oncogenic activation. Since angiogenesis plays a significant role in the development and spread of cancer, tyrosine kinase inhibitors can be used as an effective anti-angiogenesis target and as a novel cancer treatment approach.

**Keywords:** Tyrosine Kinase, Inhibitor, Drug Discovery, Oncogenic activation, Malignant.

**CH-272**

**GREEN SYNTHESIS, CHARACTERIZATION, AND EVALUATION OF ANTIDIABETIC POTENTIAL OF DOPED MGO-ZNO NANOPARTICLES BY DOE APPROACH**

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The rising incidence of diabetes and limitations of conventional therapies have created a demand for safe, sustainable, and effective alternatives. The present study focuses on the green synthesis of chromium-doped magnesium oxide–zinc oxide (MgO-ZnO) nanoparticles using hydroalcoholic leaf extracts of Aegle marmelos and Mangifera indica, both known for their rich phytochemical composition and traditional antidiabetic use. A Box-Behnken Design was applied to optimize critical synthesis parameters, including dopant concentration, extract volume, and sonication time, with responses evaluated for particle size, antioxidant potential, and α-glucosidase inhibition activity. The synthesized nanoparticles were characterized using FTIR, XRD, particle size analysis, FESEM-EDX, and ICP-OES, confirming nanoscale morphology, functional groups, and elemental composition. The optimized nanoparticles exhibited strong α-glucosidase inhibition (up to 68%), a mean particle size of 95.79 nm, and potent antioxidant activity (DPPH and FRAP assays). Additionally, the brine shrimp lethality assay and MTT assay on HepG2 cell lines revealed moderate anticancer activity with low toxicity, while antibacterial studies demonstrated growth inhibition at 100 µg/ml. These findings suggest that green-synthesized chromium-doped MgO-ZnO nanoparticles hold significant potential as a nanomedicine-based approach for diabetes management, with additional prospects in anticancer and antibacterial therapy. Further *in vivo* studies and formulation development are recommended to advance their therapeutic application.

**Keywords:** Green synthesis, MgO-ZnO nanoparticles, DoE, Antidiabetic.

**CH-273**

***IN-SILICO* STUDY ON CONJUGATION OF VARIOUS THIAZOLIDINEDIONE AND AMINES DERIVATIVES WITH PROPER SPACER MOLECULE AS POTENT ANTIDIABETIC MOIETY**

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Diabetes mellitus is a chronic metabolic disorder characterized by impaired glucose regulation and associated complications that significantly affect quality of life. Despite the availability of numerous therapeutic agents, limitations such as reduced efficacy, adverse effects, and drug resistance necessitate the design of novel antidiabetic molecules. Thiazolidinediones (TZDs), a class of heterocyclic compounds, have been extensively studied as potent antidiabetic activity, contributing to improved insulin sensitivity and glycemic control. Similarly, amine derivatives are known to enhance bioactivity through hydrogen bonding and electrostatic interactions with biological targets. In this study, novel hybrid scaffolds were designed by conjugating various TZD cores with different amine derivatives via suitable spacer molecules to optimize molecular flexibility and binding efficiency. The designed conjugates were subjected to in-silico evaluation, including molecular docking and other key antidiabetic targets, as well as ADMET profiling to assess pharmacokinetic behaviour and safety. Docking analysis revealed that several conjugates exhibited enhanced binding affinity, favourable orientation, and strong hydrogen-bonding interactions within the active site compared to standard TZD analogous. ADMET predictions further indicated acceptable drug-likeness, oral bioavailability, and low toxicity risks. The results suggest that TZD-amine conjugates with appropriate spacers hold significant potential as next-generation antidiabetic agents. Further optimization and experimental validation are warranted to develop these scaffolds into effective therapeutic candidates for diabetes management.

**Keywords:** Anti-diabetic, thiazolidinedione, *In-silico* studies, molecular docking.

**CH-274**

**COMPUTATIONAL IDENTIFICATION OF A SINGLE LIGAND TARGETING CONSERVED BINDING SITES IN ONCOGENIC KRAS MUTANTS: A PAN-CANCER *IN SILICO* STUDY**

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KRAS (Kirsten rat sarcoma viral oncogene homolog) is an important oncogene often mutated in several human cancers, including pancreatic, colorectal, and lung cancers. Mutations like G12R, G12V, G12D, and G12A lead to constant activation of the KRAS protein, which helps cancer cells survive, grow, and resist treatment. Because of its smooth surface and strong attraction to natural ligands, KRAS has traditionally been seen




ISBN: 978-81-980623-8-3

as "undruggable." In this study, we used a pan-cancer approach to find one FDA-approved drug that can bind to conserved areas across different KRAS mutants. We screened 1400 FDA-approved compounds through molecular docking with AutoDock Vina, testing them against the modeled structures of KRAS G12R, G12V, G12D, G12A, and wild-type KRAS. Piperaquine stood out as the best candidate, showing strong binding affinities of –7.3 kcal/mol for G12R and G12D, and –7.0 kcal/mol for G12V and G12A. It had a significantly lower binding affinity of –6.2 kcal/mol for wild-type KRAS. This difference indicates that Piperaquine prefers to interact with the mutant forms over the wild type, suggesting its potential as a targeted inhibitor for pan-mutant KRAS. We conducted molecular dynamics (MD) simulations to evaluate the stability and behavior of the ligand–protein complexes, confirming that Piperaquine binds stably within the mutant KRAS pockets. These results show the potential of reusing drugs through computational screening to find broad-spectrum cancer treatments. They also provide a solid basis for future studies to validate these findings in lab and live settings, focusing on KRAS-driven cancers.

**CH-275**

## COMPARATIVE ANALYSIS OF HPLC VS UV-SPECTROSCOPY IN QUALITY CONTROL TESTING

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Quality control testing plays a crucial role in ensuring the safety, efficacy, and reliability of pharmaceutical products. Among the most widely used analytical techniques, High-Performance Liquid Chromatography (HPLC) and UV-spectroscopy have gained significant importance due to their precision, accuracy, and applicability across a wide range of compounds. This study presents a comparative analysis of HPLC and UV-spectroscopy in pharmaceutical quality control testing. HPLC, with its superior separation ability, high sensitivity, and reproducibility, is particularly effective for multi-component analysis, impurity profiling, and stability studies. In contrast, UV-spectroscopy, being relatively simple, rapid, cost-effective, and non-destructive, is widely applied for routine drug assay, dissolution profiling, and quantitative estimation of compounds exhibiting chromophores. The comparative evaluation highlights that while HPLC provides detailed qualitative and quantitative information with high resolution, it is more time-consuming and requires higher operational costs and technical expertise. UV-spectroscopy, although limited by lower specificity and inability to effectively separate complex mixtures, remains advantageous for preliminary screening and high-throughput analysis. The findings emphasize that the selection between HPLC and UV-spectroscopy depends on the analytical requirements, complexity of the sample matrix, and regulatory expectations. A combined approach, utilizing the strengths of both techniques, can enhance the robustness of quality control testing in the pharmaceutical industry. This comparative analysis underlines the importance of method selection in achieving regulatory compliance, product consistency, and patient safety.

**Keywords:** HPLC, UV-spectroscopy, comparative analysis, pharmaceutical quality control, drug assay, impurity profiling, dissolution testing

**CH-276**

## DESIGN AND *IN-SILICO* STUDY OF NOVEL RESORCINOL-THIAZOLYL HYBRIDS AS POTENT THERAPEUTICS FOR DIABETIC FOOT ULCER

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Diabetic foot ulcer (DFU) is one of the most severe complications of diabetes mellitus, characterized by chronic, non-healing wounds that often lead to infection, amputation, and significant morbidity. Conventional treatment strategies face challenges due to poor vascularization, prolonged inflammation, and the rise of multidrug-resistant pathogens. Hence, there is an urgent need for novel therapeutic agents with enhanced antibacterial efficacy to improve wound healing outcomes. Resorcinol, a well-known phenolic compound, exhibits antioxidant and antimicrobial properties, while thiazole derivatives have been widely studied for their antibacterial, anti-inflammatory, and wound-healing potential. Hybridization of these two pharmacophores into resorcinol-thiazolyl scaffolds represents a promising molecular design strategy to generate new antibacterial agents with synergistic activity. In this research, a series of novel resorcinol-thiazolyl hybrids were designed and subjected to in-silico evaluation, including molecular docking and ADMET profiling, against key bacterial targets implicated in DFU infections. A library of resorcinol-thiazolyl hybrids theoretically designed through ChemDraw and their In-silico studies are performed. The study involves the assessment of molecular properties, toxicity, and the potential antibacterial activity of the resorcinol-thiazolyl hybrids through Molinspiration, SwissADME, ProTox-3.0; Molecular docking via vina PyRx and Discovery studio. Based on these studies it has been determine that certain resorcinol-thiazolyl hybrids has shown effective binding affinity and further these derivatives can be proceeded for synthesis. The result of the study indicates a potential effectiveness of the novel resorcinol-thiazolyl hybrids as an antibacterial agent to treat DFU.

**Keywords:** Anti-bacterial, diabetic foot ulcer, *In-silico* studies, resorcinol-thiazolyl hybrids.

**CH-277**

## DEVELOPMENT AND VALIDATION OF RP- HPLC METHOD FOR DETERMINING NITROSOMINE IMPURITIES IN OTESECONAZOLE CAPSULES

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The determination of NDMA, NDEA, NMPA in osteseconazole was done by RP-HPLC method. The method was developed by using column DIKMA spursil C18, 250×4.6mm, 0.005mm, mobile phase consists of potassium di hydrogen orthophosphate through 0.22mm membrane filter paper-pH 3.5, and methanol in ratio of 80:20 with flow rate of 1ml/min. The wavelength scanned at 240nm seperation of osteseconazole was 9.910 min and the impurities NDMA, NDEA,and NMPA with retention time of 3.522, 5.513 and11.648 minutes respectively. The developed was validated and the parameters are discussed below. The linearity of NDMA, NDEA, and NMPA was found to be linear with a correlation coefficient of 0.99, 0.99 and 0.99, which shows that the method is capable of producing good sensitivity. The acceptance criteria of precision is RSD should be not more than 15 and the method shows precision 1.3, 3.4 and 2.1 for NDMA, NDEA and NMPA respectively which shows that the method is precised. The validation developed method shows that the limit, which shows that the method capable of showing good accuracy and reproducibility. The LOD for NDMA, NDEA and NMPA was 0.03. The LOQ for NDMA, NDEA and NMPA was found to be 1.51,0.51and 0.08. The robustness limit for mobile phase variation and flow rate variation are well within the limit, which shows that the method is having good system suitability and precision under given set of conditions.

**CH-278**

## LCMS- A NEW COMPREHENSIVE URINE ANALYTICAL METHOD TO DETECT DRUG ACTIONS

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Drug addiction, is a condition that affects a person's brain and behavior and leads to an inability to control the use of a legal or illegal drug or medicine. The severity and intensity of drug addiction vary with different drugs. Diagnosis requires a thorough evaluation often involving assessment by a psychiatrist, a psychologist, or a licensed alcohol and drug counselor. Blood, urine and other lab tests are performed to identify the presence of drug. A new specific, accurate and concise method has been developed using liquid chromatography with mass spectroscopy that confirms and quantify the amount of drug taken using urine sample. A new method developed using ammonium fumarate with




ISBN: 978-81-980623-8-3

formic acid in methanol and water. This advanced method helps in identifying drugs and its metabolites quicker and easier compared with other techniques.

**Keywords**: Drug addiction, diagnosis, blood, urine, LC-MS, accurate, metabolites.

**CH-279**

**ANALYTICAL QUALITY BY DESIGN APPROACH FOR DEVELOPING A ROBUST RP-HPLC METHOD TO QUANTIFY COMBINED COX-2 INHIBITOR AND SKELETAL MUSCLE RELAXANT AGENTS**

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A systematic analytical quality by design (AQbD) framework was applied to develop and validate a robust reversed-phase high-performance liquid chromatography (RP-HPLC) method for the simultaneous estimation of Etoricoxib and Thiocolchicoside in bulk and tablet dosage forms. The method followed QbD paradigm, starting with risk assessment by ishikawa analysis to identify potential critical method parameters such as mobile phase composition and pH and their impact on critical quality attributes which includes theoretical plates, tailing factor and resolution. A Design of Experiment approach using central composite design (CCD) was employed to statistically optimize the critical method parameters. From this , a method operable design region was established to ensure consistent method performance within the defined ranges. The optimised chromatographic conditions included an isocratic mobile phase consisting of 0.1 M ammonium formate buffer (pH 3.0) and acetonitrile in an 80:20% v/v ratio with separation achieved using a Symmetry C18 column (250 × 4.6 mm, 5 µm) at room temperature, with a flow rate of 1.0 mL/min. Detection was performed at an isosbestic point of 287 nm with a total run time of 6 minutes. The method exhibited excellent linearity (R2 >0.999) over the concentration ranges of 30–180 µg/mL for Etoricoxib and 2–12 µg/mL for Thiocolchicoside, with low limit of detection (LOD) 0.60 µg/mL/0.04 µg/mL and limit of quantitation (LOQ) 1.80 µg/mL/1.12 µg/mL for values confirming sensitivity. Validation as per ICH Q2(R1) confirmed accuracy, precision, robustness and system suitability. The defined control strategy ensures method reproducibility throughout its lifecycle, aligning with the principles of ICH Q8(R2), Q14 and Q12 for lifecycle management of analytical procedures. This study confirms that adopting the AQbD approach enables the development of a statistically optimised, regulatory complaint, and highly reliable method supporting routine Quality control and regulatory submissions.

**Keywords**: Etoracoxib, Thiocolchicoside, RP-HPLC, Tablets, DOE, central composite design, Validation.

**CH-280**

**CINNAMOYL-HYDRALAZINE HYBRIDS: SYNTHESIS, MOLECULAR DOCKING, MOLECULAR DYNAMIC SIMULATIONS, *IN VITRO* CYTOTOXICITY AND ANTIOXIDANT ACTIVITY EVALUATION**

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Treatment resistance in many cancers is a major concern, requiring development of new drugs to overcome the drug resistance. Hence, in present study, a novel (2E)-2-cyano-3-substituted phenyl-N'-(phthalazin-1-yl)prop-2-enehydrazide derivatives (4a-l) were synthesized and tested for cytotoxic and antioxidant activities. Title compounds were docked against EGFR kinase domain (PDB I'D:1M17) and Peroxiredoxin-5 (PDB I'D: 3MNG). *In vitro* cytotoxicity potential was explored on A549, PC-3 and MCF-7 cell lines by MTT assay. Further, synthesized derivatives were evaluated by *in vitro* EGFR inhibition assay using erlotinib as standard. Antioxidant activity was evaluated by DPPH assay. From molecular docking studies, it was found that compound 4i with 3,4-dihydroxy substitution exhibited comparable binding affinity towards both the selected targets EGFR and PrxV with XP Gscores -7.79025 Kcal/mol and -5.7368 Kcal/mol respectively to that of standard drugs erlotinib and ascorbic acid. Among the series, the most promising compound 4i elicited highest cytotoxic activity against A543 (IC50 = 12.5µM) and MCF-7 cell lines (IC50 = 18 µM). Compound 4i also exhibited significant EGFR inhibition with IC50 7.6 µM compared to erlotinib. Compound 4h with hydroxy group exhibited better DPPH radical scavenging activity (IC50 =8.6µM) which is comparable with that of standard ascorbic acid (IC50 =10.2µM).

**Keywords:** Cinnamamides, hydralazine, molecular docking, cytotoxic activity, EGFR inhibition

**CH-281**

**DEVELOPMENT AND VALIDATION OF A RAPID AND COST-EFFECTIVE CONDUCTOMETRIC METHOD FOR THE ESTIMATION OF LABETALOL HYDROCHLORIDE IN MARKETED TABLET DOSAGE FORMS**

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Labetalol hydrochloride is an antihypertensive drug that requires precise and reliable analytical methods for quality control. A simple, rapid, and economical conductometric approach was developed and validated to quantify Labetalol hydrochloride in marketed tablet dosage forms. To develop and validate a sensitive, accurate, and cost-effective conductometric method for the estimation of Labetalol hydrochloride in pharmaceutical formulations, in accordance with ICH guidelines. Conductivity of standard Labetalol hydrochloride solutions was measured in the range of 20–100 µg/mL, and a calibration curve was constructed. The method was validated for specificity, linearity, sensitivity, precision, ruggedness, accuracy, and assay performance. Precision was assessed by intra-day and inter-day studies, and ruggedness studies. Recovery studies determined accuracy, and assay was performed on marketed tablet samples. The method was specific, with no interference from the blank solvent. A linear response was observed between 20 and 100 µg/mL, with a correlation coefficient ($R^2$) of 0.9991. The limit of detection and limit of quantification were 5.09 µg/mL and 15.42 µg/mL, respectively. Intra-day %RSD ranged from 0.35% to 1.63%, and inter-day %RSD ranged from 0.03% to 1.85%, confirming precision. Ruggedness testing showed %RSD values below 1.6%, indicating robustness. Recovery ranged from 97.88% to 107.83%. Assay of marketed tablets showed purity of 102.84%. The developed conductometric method is simple, rapid, precise, accurate, and economical for the estimation of Labetalol hydrochloride in tablet dosage forms. It offers a reliable alternative to more complex analytical methods for routine quality control.

**Keywords:** Labetalol hydrochloride; Conductometric method; Method validation; Precision; Accuracy; Pharmaceutical analysis; Tablet assay

**CH-282**

**UNVEILING BENZODIAZEPINE CORES AS ANTI-TB LEADS: COMPUTATIONAL EXPLORATION OF BINDING MODES IN KEY ENZYMES**

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The emergence of Mycobacterium tuberculosis strains that are resistant to many drugs has made tuberculosis (TB) an even more serious global health concern. Investigating novel chemical scaffolds is crucial to overcome resistance and aggrandize the effectiveness of treatment. Although benzodiazepines are well known for their effects on the central nervous system, their potential as antimycobacterial drugs is still poorly understood. In this study, we used a computer-aided drug design approach to examine novel 1,4-benzodiazepine derivatives as possible anti-TB leads. Protein structures of confirmed TB targets, including MmpL3 (mycolic acid transporter), DprE1 (decaprenylphosphoryl-β-D-ribose 2'-epimerase), and InhA (enoyl-ACP reductase), were constructed using conserved cofactors and obtained from the Protein Data Bank. AutoDock Vina was used to create, optimise, and dock a targeted ligand library of 1,4-benzodiazepines with a variety of aryl and heteroaryl substituents. To prioritize the candidates, binding free energies, hydrogen-bond occupancy, and hydrophobic complementarity were assessed. A number of analogues formed persistent contacts with catalytic residues and cofactors and showed docking scores higher than reference inhibitors. Derivatives with heteroaryl extensions (pyridyl,




ISBN: 978-81-980623-8-3

quinolinyl) and electron-donating substituents (3,4-dimethoxy) in particular showed a strong affinity for the InhA active site, whereas bulky amino-substituted analogues exhibited positive interactions within the hydrophobic pocket of MmpL3. Preliminary ADME predictions suggested acceptable solubility and drug-likeness, indicating potential for further optimization. These results demonstrate the benzodiazepine cores unrealised potential outside of neuropharmacology, providing a new chemical platform for the development of anti-tubercular drugs. To validate computational predictions and move the most promising analogues closer to experimental production, future research will combine molecular dynamics simulations with *in-vitro* evaluation.

**Keywords:** 1,4-benzodiazepine, Anti-TB leads, AutoDock Vina, ADME predictions, computer-aided drug design

**CH-283**

**HPLC METHOD DEVELOPMENT AND VALIDATION FOR ESTIMATION OF EXEMESTANE FROM BULK**

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A simple, accurate, precise and rapid reversed-phase high performance liquid chromatographic (RP-HPLC) method has been developed and subsequently validated for the estimation of Exemestane pure. The proposed method is based on the estimation of drug by reversed-phase mode using BDS HYPERSIL C18 (4.6mmø×250mm) analytical column. The optimised mobile phase consisted of Acetonitrile: Methanol: 65:35 v/v. Flow rate was kept at 1 ml/min. The estimation was carried out at detection wavelength of 246 nm. Drug Exemestane was well resolved and retained at 3.66 minutes. The method was statistically validated as per ICH guideline for analytical method validation. The validated method was used for estimation of Exemestane from bulk.

**Keywords:** Exemestane, RP-HPLC, Validation.

**CH-284**

**RP- HPLC METHOD DEVELOPMENT AND VALIDATION FOR ESTIMATION OF BARICITANIB IN BULK FORM**

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A new, validated Reverse Phase High-Performance Liquid Chromatography (RP-HPLC) method has been developed for the quantitative analysis of baricitinib in pharmaceutical dosage forms. The method is simple, rapid, precise, and sensitive, offering reliable and reproducible results. Chromatographic separation was performed on a Waters Alliance E2695 system using a Symmetry Shield RP18 column (4.6 x 150 mm, 3.5 µm particle size). The mobile phase consisted of a 40:60 (v/v) mixture of acetonitrile and a phosphate buffer solution (2.5 g K$_2HPO_4$ + 3.2 g KH$_2PO_4$, adjusted to pH 3.0 with orthophosphoric acid). A constant flow rate of 1 mL/min was maintained. Detection of baricitinib was carried out using a photodiode array (PDA) detector at a wavelength of 257 nm at ambient temperature. The system suitability requirements for baricitinib were: theoretical plates not less than 2000 and tailing factor not more than 2. The method exhibited excellent precision, with the relative standard deviation (RSD) of peak areas for all measurements consistently below 2%. The method was validated in accordance with International Council for Harmonisation (ICH) guidelines and was found to be precise, accurate, robust, and economical. This makes it a suitable method for the routine quantitative analysis of baricitinib.

**Keywords:** Barcitinib, RP- HPLC, Validation

**CH-285**

**DECODING STAT3 INHIBITION BY NATURAL PRODUCTS THROUGH COMPUTATIONAL MODELING IN CANCER RESEARCH**

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We have historically used natural products (NPs) as therapeutic agents due to their unique structural and medicinal properties. Despite their promise, NPs present several challenges, including limited availability, complex structures, and constraints in high-throughput screening. One promising application for NPs is in inhibiting STAT3, a crucial target in cancer therapy. STAT3 (Signal Transducer and Activator of Transcription 3) is a transcription factor that drives cancer development and progression by regulating genes involved in cell proliferation, survival, invasion, and immune evasion. Its protein-protein interaction surface is complex, large, and shallow, necessitating novel molecular scaffolds—such as those found in NPs—to effectively disrupt these interactions. We have compiled data on reported natural products with STAT3 inhibition properties, including experimentally validated examples like curcumin, resveratrol, quercetin, emodin, and luteolin. Data curation involved various sources and tools, including OCSR.ai software and SWISSADME. Furthermore, we conducted computational studies—including DFT studies, molecular docking, and MD simulations—to identify potent NP inhibitors by comparing them to napabucasin, a clinically proven STAT3 inhibitor.

**Keywords:** Natural products, STAT3, STAT3 Inhibitor, Computational, DFT studies, Molecular docking, MD simulation, cancer.

**CH-286**

**NETWORK PHARMACOLOGY AND *IN SILICO* STUDIES OF PHYTOCHEMICALS FROM MELIA AZEDARACH AS ANTI-ALZHEIMER'S AGENTS**

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Alzheimer's disease causes 60-80% of dementia cases, making it the most common type of dementia. Melia Azedarach is a medicinal plant that contains hepatoprotective, anti-inflammatory, immunostimulant, antioxidant, antibacterial, sedative, anthelmintic, and anti-fertility properties. We used a network pharmacology technique to investigate the potential of phytochemicals derived from Melia Azedarach. The phytochemicals were gathered from several databases, including IMPPAT, the Coconut database, Phytohub version 1.4, the Medicinal Plants database, The Natural Products Atlas, Dr. Duke's Phytochemical and Ethnobotanical database, and the KNApSAcK Core system databases. SwissADME, ProTox 3.0, and CardioTOXCSM webservers were used to determine the phytochemical's physicochemical, pharmacokinetic, and toxicological characteristics. The drug score was predicted using OSIRIS Property Explorer, and the results confirmed that the compounds are druggable. Network modelling and enrichment analysis anticipated the phytochemicals' appropriate targets, indicating that they would be highly effective against Alzheimer's disease. The correlation analysis was conducted using the Gepia2 website. Molecular docking against the chosen targets was performed using Autodock tools, and the results were compared to the co-crystallized ligand and the standard. Nimbiol and T-Cadinol were found to be highly active against the tested targets, with high binding energies and interactions, according to *in silico* studies and drug scores. As a result, these chemicals can help fight Alzheimer's disease. However, more *in vitro* and *in vivo* study is needed.

**Keywords:** Alzheimer's disease, Melia Azedarach, *In silico* studies, Network Pharmacology, Molecular docking.

**CH-287**

**ANALYTICAL METHOD DEVELOPMENT AND VALIDATION OF RP-HPLC METHOD FOR THE ESTIMATION OF VILDAGLIPTIN IN BULK AND TABLET DOSAGE FORM**

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This dissertation aimed to develop and validate an economical and robust RP-HPLC method for the estimation of Vildagliptin in both bulk and tablet dosage forms. The goal was to establish an analytical technique for quality control that adheres to ICH guidelines. The optimized RP-HPLC method utilized an Intersil C18 column (4.6 x 250mm, 5 µm) operating at 40°C. The mobile phase consisted of Buffer (potassium dihydrogen orthophosphate, pH 3.0) and Acetonitrile in




ISBN: 978-81-980623-8-3

85:15 ratio. A flow rate of 1.5 mL/min was maintained, with detection at 205 nm using a UV detector. Comprehensive validation evaluated system suitability, specificity, linearity, range, precision, and filter integrity. Vildagliptin exhibited a consistent retention time of 3.381-3.382 minutes. System suitability parameters were within acceptable limits, demonstrating an RSD of 0.34% for standard area. Specificity studies confirmed no interference from blank or placebo. The method achieved excellent linearity ($R^2$ = 0.9999) over a 50%-150% concentration range. Precision (RSD 0.22%) and filter integrity (PVDF, Nylon, and PTFE filters suitable) were well within criteria. The developed method is concluded to be straightforward, rapid, accurate, precise, robust, specific, and selective for routine quantitative analysis of Vildagliptin in tablet dosage forms.

**Keywords:** RP-HPLC, Method development, Validation, Quality control, ICH guidelines.

**CH-288**

## DETERMINATION OF PESTICIDE RESIDUES IN DIFFERENT VARIETIES OF TOMATOES USING QuEChERS METHOD BY GAS CHROMATOGRAPHY-MASS SPECTROMETRY

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Tomatoes are one of the most consumed vegetables worldwide and are a rich source of lycopene, offering nutritional and health benefits. With increasing global demand, various cultivars are grown in different regions, including locally adapted varieties. However, the use of pesticides in tomato cultivation has raised major concerns due to their potential adverse effects on human health and the environment. Ensuring food safety requires sensitive and reliable methods for detecting pesticide residues in tomato samples. For pesticide residue analysis, advanced pharmaceutical analytical techniques such as gas chromatography (GC), liquid chromatography (LC), and mass spectrometry (MS) are employed. These methods provide high sensitivity and selectivity, enabling the identification and quantification of multiple pesticide compounds even at trace levels. Sample preparation plays a vital role in residue analysis, involving steps like extraction, purification, and concentration. Among these, the QuEChERS method (Quick, Easy, Cheap, Effective, Rugged, and Safe) is widely preferred due to its efficiency, simplicity, and suitability for complex matrices like tomatoes. Studies reveal that pesticide residues in tomatoes can persist at levels that may cause acute and chronic toxicity, carcinogenicity, and endocrine disruption in humans, while also harming ecosystems by contaminating soil and water. Regulatory agencies worldwide have established maximum residue limits (MRLs) to ensure consumer safety and environmental protection. In conclusion, continuous advancements in analytical methods, combined with strict adherence to MRLs and regulatory monitoring, are essential to safeguard tomato quality and minimize health risks from pesticide residues.

**Keywords**: Gas Chromatography, Mass Spectrometry, Maximum Residue Limit, QuEChERS

**CH-289**

## *IN-SILICO* PREDICTION, SYNTHESIS, ANTI-BACTERIAL AND ANTIOXIDANT EVALUATION OF NOVEL FERULIC ACID DERIVATIVES

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In an effort to discover novel antibacterial agents, we designed and synthesized ferulic acid derivatives predicted through computational studies to possess enhanced biological activity. A total of ten analogues were evaluated by molecular docking against E. coli gyrase B (PDB ID: 6F86), with ADMET and toxicity predictions supporting their drug-likeness and safety. Five compounds were synthesized and structurally characterized by IR, NMR, and mass spectrometry. Among them, compound FA05 emerged as the most promising derivative, displaying potent antibacterial activity with a minimum inhibitory concentration (MIC) of 1.2 µg/mL against Gram-negative strains and notable antioxidant potential with an IC50 of 25.76 ± 1.62 µg/mL. Molecular dynamics simulations and gene networking analyses further demonstrated the stability and mechanistic plausibility of its interactions. These findings suggested that ferulic acid analogues, particularly FA05, represent promising scaffolds for the development of dual-function antibacterial and antioxidant agents targeting resistant bacteria.

**Keywords:** Ferulic acid, Antimicrobial resistance, Antioxidant, Reactive oxygen species, ADMET.

**CH-290**

## COMPARATIVE ANALYSIS OF TRACE ELEMENTS IN SKIN WHITEINING & MOISTURING CREAMS MARKETED IN INDIAN LOCAL MARKETS BY ICP-OES

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The Indian cosmetic industry, including skincare and whitening products, is rapidly expanding due to rising beauty awareness, social media influence, and global trends. However, heavy metal contamination in cosmetics remains a critical safety concern, as prolonged exposure can lead to toxic effects. This study aimed to evaluate the presence of heavy metals in locally available cosmetic products. Ten samples were analyzed, comprising five moisturizing creams (M1–M5) and five whitening creams (W1–W5) collected from local Indian markets. All samples were digested following standard protocols, and the concentrations of arsenic, cadmium, chromium, nickel, lead, cobalt, copper, and selenium were quantified using Inductively Coupled Plasma–Optical Emission Spectroscopy (ICP-OES). The results revealed the presence of heavy metals in multiple samples. Cadmium and lead levels were within permissible limits; however, several products exceeded safety thresholds. Moisturizing cream M3 showed the highest contamination, with arsenic at 588.36 ppm and chromium at 14.54 ppm. Whitening cream W2 contained elevated selenium levels (194.48 ppm). In particular, nickel and chromium in sample M3 surpassed acceptable safety limits, posing potential risks of dermal absorption and chronic toxicity. The findings demonstrate that some cosmetic products sold in local markets may expose consumers to hazardous levels of heavy metals. Regular monitoring, stricter enforcement of regulatory standards, and consumer awareness are essential to ensure product safety and protect public health.

**Keywords**: Cosmetics, Heavy metals, ICP-OES

**CH-291**

## ESTABLISHMENT AND VALIDATION OF AN LC-MS/MS METHOD FOR THE QUANTIFICATION OF SOFOSBUVIR, VOXILAPREVIR AND VELPATASVIR IN RAT PLASMA WITH APPLICATION TO PHARMACOKINETIC ASSESSMENT

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This study reports the establishment and validation of a sensitive and accurate LC–MS/MS method for the quantification of sofosbuvir, voxilaprevir, and velpatasvir in rat plasma, using elbasvir as the internal standard. Chromatographic separation was achieved on an Agilent Eclipse XDB column (250 × 4.6 mm, 5 µm) with a mobile phase consisting of acetonitrile and ammonium formate buffer (pH 3.0, adjusted with formic acid) in a 20:80 ratio. The calibration curves showed excellent linearity over the ranges of 20–800 ng/mL for sofosbuvir ($r^2$ = 0.99998), 5–200 ng/mL for voxilaprevir ($r^2$ = 0.99998), and 5–200 ng/mL for velpatasvir ($r^2$ = 0.99997). The analytes were stable under various storage conditions. Pharmacokinetic analysis revealed half-lives of 30 h for sofosbuvir, 30 h for voxilaprevir, and 20 h for velpatasvir, with respective Tmax values of 2, 4, and 4 hours. The method demonstrated excellent specificity, linearity, accuracy, and compliance with USFDA bioanalytical method validation guidelines. These findings establish the method as a robust and reliable tool for pharmacokinetic studies and potential clinical applications involving sofosbuvir, voxilaprevir, and velpatasvir.

**Keywords:** Sofosbuvir, Voxilaprevir, Velpatasvir, LC-MS/MS, USFDA




ISBN: 978-81-980623-8-3

**CH-292**

## A NOVEL UV VISIBLE SPECTROSCOPY METHOD FOR THE ESTIMATION OF BEDEQUILINE IN BULK-ANTITUBERCULAR DRUG.

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A simple and economical UV–Visible spectroscopic method was developed and validated for the estimation of Bedaquiline in bulk and pharmaceutical dosage forms. Bedaquiline is a novel diarylquinoline antibiotic approved for the treatment of multidrug-resistant tuberculosis (MDR-TB). It represents a significant advancement in TB therapy, being the first new anti-TB drug with a unique mechanism of action in over four decades. Bedaquiline targets the mycobacterial ATP synthase enzyme, essential for energy production in Mycobacterium tuberculosis, leading to bacterial death. Approved by the U.S. FDA in 2012, it is used in combination with other anti-TB agents to improve treatment outcomes in MDR-TB and extensively drug-resistant TB (XDR-TB) cases. Clinical trials have shown that bedaquiline significantly reduces the time to sputum culture conversion and enhances treatment efficacy. However, concerns remain regarding its potential side effects, including QT interval prolongation and hepatotoxicity. Despite these challenges, bedaquiline plays a critical role in global TB control strategies, especially in regions with high rates of drug resistance, offering new hope in the fight against resistant forms of TB. The method was validated as per ICH Q2(R1) guidelines for parameters such as linearity, accuracy, precision, limit of detection (LOD), limit of quantification (LOQ), and robustness. The recovery studies confirmed the accuracy of the method, while repeatability and intermediate precision studies demonstrated its reliability. The low values of LOD and LOQ indicated adequate sensitivity. The proposed method can be successfully employed for routine quality control and quantitative estimation of Bedaquiline in bulk and pharmaceutical formulations.

**CH-293**

## DOE-ENHANCED RP-HPLC METHOD FOR ROBUST AND ACCURATE FLUTAMIDE ANALYSIS

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Accurate and robust analytical methods are crucial for ensuring quality in drug development, especially for compounds like Flutamide, a non-steroidal antiandrogen used in prostate cancer therapy. This study reports an optimized Reverse Phase High Performance Liquid Chromatography (RP-HPLC) method for the quantification of Flutamide in both bulk and tablet forms, using a Quality by Design (QbD) approach with Design of Experiments (DoE). A Central Composite Design (CCD) was applied to systematically optimize two critical parameters, acetonitrile concentration in the mobile phase and flow rate, and their effects on important chromatographic responses such as retention time, theoretical plates, and tailing factor. The separation was performed on a Shimpack C18 column (250 × 4.6 mm, 5 µm), using an acetonitrile-water mixture (54:46 v/v) as the mobile phase in isocratic mode, with detection at 254 nm. The developed method showed excellent linearity ($r^2$ = 0.9999) within 10–100 µg/mL, high precision with %RSD below 2%, and strong accuracy with recovery rates between 98–102%. It was validated according to ICH Q2(R1) guidelines, confirming its specificity, robustness, and sensitivity, with a limit of detection (LOD) of 0.2443 µg/mL and limit of quantification (LOQ) of 0.7405 µg/mL. This work illustrates how integrating DoE into method development improves analytical performance and offers a scalable, predictive framework. It highlights the role of data-driven strategies in enhancing pharmaceutical analytics and supports the advancement of AI-assisted tools for smarter drug development and regulatory alignment.

**Keywords:** Flutamide, RP-HPLC, DoE, Central Composite Design, ICH guidelines.

**CH-294**

## SYNTHESIS AND CHARACTERIZATION OF SCHIFF BASE DERIVATIVES WITH POTENTIAL ANTIMICROBIAL ACTIVITY

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To synthesize Schiff base compounds, characterize those using spectroscopic techniques, and evaluate their antimicrobial and antifungal activities compared to standard drugs. Schiff bases were synthesized via condensation reactions between various amino groups and aromatic aldehydes. The resulting compounds were characterized using Fourier Transform Infrared Spectroscopy (FTIR), Proton Nuclear Magnetic Resonance (1H NMR), and Carbon-13 Nuclear Magnetic Resonance (13C NMR) spectroscopy to confirm the formation of imine bonds and the overall molecular structure. The antimicrobial activity was assessed against Escherichia coli and Staphylococcus aureus, while antifungal activity was tested against Aspergillus niger and Rhizopus oryzae. Standard antibiotic Ampicillin was used as a reference drug. Spectral analysis confirmed the successful synthesis of Schiff base compounds. Biological assays demonstrated that the Schiff bases exhibited enhanced antimicrobial and antifungal activity compared to Ampicillin, with particularly high activity against both bacterial and fungal strains tested. The synthesized Schiff base compounds showed significant antimicrobial and antifungal activity, surpassing that of standard drugs in some cases. This increased bioactivity is likely due to the interaction of the imine group with microbial cellular components, leading to effective inhibition of growth. These findings highlight the potential of Schiff bases as promising candidates for the development of new therapeutic agents.

**Keywords:** Schiff base, Imines, Condensation reaction, Synthesis, Spectral characterization, Antimicrobial activity, Antifungal activity.

**CH-295**

## *IN SILICO* MOLECULAR DOCKING AND ADMET ANALYSIS OF NERIUM OLEANDER PHYTOCONSTITUENTS USING CHEMDRAW, OPEN BABEL, PYRX, AND BIOVIA

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Nerium oleander is a medicinally valuable but highly toxic plant that produces a wide array of bioactive secondary metabolites, including cardiac glycosides, flavonoids, and phenolic compounds. Although extracts from this plant have traditionally been used in folk medicine, their pharmacological benefits are often overshadowed by their cardiotoxic effects. To better understand the therapeutic potential and molecular interactions of these phytoconstituents, an in-silico study was conducted. Chemical structures of major compounds such as oleandrin, neriin, kaempferol, and chlorogenic acid were drawn and validated using ChemDraw, then converted into three-dimensional conformations and energy-minimized with Open Babel. Protein targets, including $Na^+/K^+$-ATPase and selected cancer-associated kinases, were retrieved from the Protein Data Bank and optimized for docking. PyRx with AutoDock Vina was used for molecular docking simulations, and the resulting ligand–protein interactions were visualized and analyzed using BIOVIA Discovery Studio Visualizer. The docking results showed strong interactions of cardiac glycosides with $Na^+/K$-ATPase, with oleandrin having the highest binding affinity (–11.2 kcal/mol), stabilized by hydrogen bonds with Asp121 and Thr797. Neriin had a binding score of –9.6 kcal/mol, while flavonoids like kaempferol and phenolic acids such as chlorogenic acid displayed moderate affinities (–6.0 to –8.0 kcal/mol) against kinase targets. ADME and toxicity analyses suggested promising pharmacokinetic properties for flavonoids but confirmed significant cardiotoxic risks for cardiac glycosides. Overall, this study underscores the value of integrating ChemDraw, Open Babel, PyRx, and BIOVIA Discovery Studio for predicting biological activity. The results offer a computational basis for further experimental validation and potential structural refinement of N. oleander metabolites to improve therapeutic effectiveness while reducing toxicity.

**Keywords:** Nerium oleander, BIOVIA Discovery Studio, Molecular docking

**CH-296**




ISBN: 978-81-980623-8-3

**METHOD DEVELOPMENT AND VALIDATION OF TOPIROXOSTAT FOR ITS APPLICATION TO TABLET DOSAGE FORM BY UPLC-MS**

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Patients suffering from benign prostatic hyperplasia (BPH) are the main target patients for the medicine Topiroxostat. It works as a medicine by blocking the enzyme phosphodiesterase type 5. There has been increasing interest in the analytical approaches for quantifying it, despite the fact that its pharmacological profile is well-established. For Topiroxostat dosage formulations, very few analytical methods have been established for estimation. The pharmaceutical formulation of Topiroxostat was precisely quantified using a newly designed and validated LC-MS technology. With a significant m/z value of 249.20, successfully separated by chromatography with an optimized retention time of 6.754 minutes. The method's robustness, precision, accuracy, linearity, limit of detection (LOD), and linearity were among the validation parameters that were subjected to stringent evaluation. With a low limit of detection (LOD) of 0.815 ng/mL and a limit of quantification (LOQ) of 0.559 ng/mL, the technique demonstrated excellent linearity ($R^2$ = 0.9994) across the concentration range of 800-1500 ng/mL. Accuracy scores ranging from 99.35% to 100% were shown in recovery studies, indicating high quality. The method's dependability was validated by robustness testing under different experimental settings. All of the parameters were determined to be in compliance after the developed technique underwent validation in accordance with ICH Q2 (R1) requirements. The method's appropriateness for routine quality control analysis was proven by its successful application for Topiroxostat quantification in tablet dosage form.

**Keywords:** LC-MS, Topiroxostat, method validation, quantification, pharmaceutical analysis, quality control

**CH-297**

**MICROWAVE SYNTHESIS, ANTICANCER EVALUATION TARGETING BREAST CANCER CELL LINES AND MOLECULAR DOCKING STUDIES USING AUTO DOC OF BENZOXAZOLE LINKED COMBRETASTATIN ANALOGUES**

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The present study reports the microwave-assisted synthesis of novel benzoxazole-linked combretastatin analogues and their evaluation as potential anticancer agents targeting breast cancer cell lines. Microwave irradiation was employed to achieve rapid and efficient synthesis of the designed compounds, resulting in high yields and reduced reaction times. The synthesized analogues were structurally characterized using NMR, IR, and mass spectrometry, confirming the successful formation of the targeted molecules. The anticancer potential of these compounds was assessed against MCF-7 and MDA-MB-231 breast cancer cell lines using the MTT assay, and $IC_{50}$ values were determined. Selected compounds exhibited significant cytotoxicity, indicating promising anticancer activity. Further, molecular docking studies using AutoDock were performed to investigate the binding interactions of the synthesized analogues with tubulin, a key target of combretastatin. The docking results revealed strong binding affinities, with crucial hydrogen bonding and hydrophobic interactions supporting the observed *in vitro* cytotoxicity. Overall, this integrated experimental and computational approach highlights benzoxazole-linked combretastatin analogues as potential lead compounds for the development of novel therapeutic agents against breast cancer, offering insights into their mechanism of action and structure–activity relationships.

**Keywords**: Microwave-assisted synthesis, Benzoxazole, Combretastatin analogues, Breast cancer, Cytotoxicity.

**CH-298**

**SYNTHESIS, CHARACTERIZATION AND ANTI-MICROBIAL ACTIVITY OF SOME NOVEL BENZIMIDAZOLE DERIVATIVES.**

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In the present research O-Phenylene diamine used as a starting material and reacted with five different carboxylic acid derivatives. The product thus formed reacted with P- aminoacetophenone leading to the formation of five benzimidazole derivatives (BD-1 to BD-5). The structures of the synthesized compounds were confirmed by IR & Mass spectral analysis and they were evaluated for their antibacterial and antifungal activities. The antibacterial activities of synthesized compounds were screened against both gram positive S. aureus and gram-negative E. coli by agar cup-plate method using ciprofloxacin as standard drug. The antifungal activities of synthesized compounds were screened against Candida albicans by agar cup-plate method using ketaconazole as standard drug. Results revealed that BD-4 and BD-5 showed good antibacterial & antifungal activity.

**Keywords:** Benzimidazole derivatives**,** spectral studies, anti-bacterial and ani fungal studies**.**

**CH-299**

**A STRUCTURE-BASED APPROACH FOR NOVEL INHA INHIBITORS AGAINST MYCOBACTERIUM TUBERCULOSIS**

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Tuberculosis (TB), caused by Mycobacterium tuberculosis, continues to pose a significant global health challenge, particularly with the rise of multidrug-resistant (MDR) and extensively drug-resistant (XDR) strains. Current first-line agents, such as isoniazid and ethionamide, act indirectly on InhA but are limited by resistance mechanisms, notably KatG and EthA mutations, necessitating the development of novel inhibitors. To address this, advanced computational strategies were employed by integrating geometric deep learning with fragment-based molecular expansion (FRAME) to design and optimize novel InhA inhibitors. The generated compounds were checked for their novelty, synthetic feasibility, predicted their ADMET(Qikprop) properties for their drug likeness, and then utilised molecular docking, dynamic simulations, and binding free energy calculations to study ligand-protein complex behaviour. This workflow enables the identification, optimization, and synthesis of feasible InhA inhibitors, providing a promising avenue for developing effective tuberculosis therapies.

**Keywords:** Tuberculosis, InhA inhibitors, Structure-based drug design, Computational drug discovery

**CH-300**

**QBD DRIVEN RP-HPLC METHOD FOR THE SIMULTANEOUS ESTIMATION OF NIRMATRELVIR AND RITONAVIR IN BULK AND DOSAGE FORMS**

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Coronavirus disease 2019 (COVID-19), caused by the highly transmissible SARS-CoV-2 virus, emerged in late 2019 and rapidly evolved into a global public health crisis. In response, various therapeutic interventions have been developed, including a combination of Nirmatrelvir (Nir) and Ritonavir (Rit), known as Rit-boosted Nir, which received Emergency Use Authorization (EUA) from the U.S. Food and Drug Administration (FDA) for the treatment of mild to moderate COVID-19. This combination is recommended particularly for patients at high risk of progressing to severe disease, thereby reducing hospitalization and mortality rates. We used an Agilent C18 column (150 mm × 4.6 mm, 5 µm) to separate the compounds by chromatography. The mobile phase was 0.1% orthophosphoric acid (pH 4.8) and acetonitrile in a 60:40 ratio, with a flow rate of 0.9 mL/min. A PDA detector was used to find the signal at




ISBN: 978-81-980623-8-3

238 nm, and the column was kept at 29 °C. The average retention times for Nir and Rit were 2.3 minutes and 2.9 minutes, respectively. We used a central composite design (CCD) to find the best values for three important factors: the composition of the mobile phase, the flow velocity, and the temperature. The Design Expert 13.0 model properly showed how important method parameters and responses are related to each other. This made sure that the HPLC approach that was developed was reliable and strong enough to measure both Nir and Rit at the same time in both bulk and dose forms.

**Keywords**: Nirmatrelvir, Ritonavir, HPLC, QbD, Central composite design.

**CH-301**

## SYNTHESIS, CHARACTERIZATION AND BIOLOGICAL EVALUATION OF SOME NOVEL HETEROCYCLIC COMPOUNDS FOR ANTICANCER ACTIVITY

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Cancer remains a leading cause of global mortality, with current therapeutic strategies hindered by poor selectivity, severe side effects, acquired resistance, and suboptimal pharmacokinetics. Heterocyclic scaffolds, which form the backbone of more than 85% of FDA-approved drugs, offer versatile chemical architectures capable of targeting critical oncogenic pathways. This research aims to design, synthesize, and characterize a novel series of heterocyclic compounds and evaluate their anticancer potential. The study integrates *in silico* ADME, toxicity prediction, and molecular docking to identify promising candidates with high binding affinity toward Topoisomerase II, a validated cancer target. Synthesized compounds will be characterized using FTIR, NMR, mass spectrometry, and elemental analysis, followed by *in vitro* cytotoxicity screening against breast (MCF-7), cervical (HeLa), and lung (A549) cancer cell lines. Expected outcomes include the identification of potent lead molecules with IC50 values below 1 µM, favorable drug-likeness properties, and minimal toxicity to normal cells. Structure–activity relationship (SAR) insights will guide further optimization, while mechanistic studies will validate apoptosis induction pathways. This work is anticipated to yield promising next-generation heterocyclic anticancer agents with enhanced selectivity and reduced systemic toxicity, contributing to the development of safer and more effective therapeutics.

**CH-302**

## *IN SILICO* DRIVEN DRUG DESIGN: NOVEL TRKB AGONISTS FOR ALZHEIMER'S DISEASE

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Alzheimer's disease (AD), one of the most prevalent neurodegenerative disorders, has seen therapeutic strategies largely focused on amyloid-β and tau, with limited clinical success. The conventional method of drug design is slow, costly, and associated with high failure rates, as many molecules effective *in vitro* fail during animal or clinical studies. This study employs artificial intelligence and machine learning (AI-ML) to accelerate drug development for AD by enhancing success rates, reducing costs, and shortening development timelines. A literature review provided structure–activity relationship (SAR) insights into existing TrkB agonists. Binding pocket dimensions and physicochemical properties were identified using BIOVIA and the P2Rank-ML-based tool for ligand-binding site prediction. Pharmacophore modeling was carried out using Molsoft for core structure selection, and SwissADME for favorable ADMET properties. Insilico and molecular dynamics will confirm the binding. Synthetic schemes for promising derivatives were generated through ChemAIRS, incorporating green chemistry principles and difficulty, and synthesizability. Binding site evaluation of the TrkB binding pocket presented 14.7 Å and aromatic. Pharmacophore modeling suggested a flavone-based core, which upon derivatization showed improved docking scores and retained essential amino acid interactions. ADMET predictions confirmed favorable BBB permeability. ChemAIRS proposed a green synthetic route via Claisen–Schmidt condensation and iodine-mediated cyclization to yield substituted flavones, meeting efficiency and sustainability criteria. The procedure involving substituted acetophenone, benzaldehyde, KOH, and ethanol was employed for chalcone synthesis, and cyclization under I2 was selected. The synthesized novel TrkB agonist has been characterised by IR, NMR, and MS, and showed good yield and reproducibility.

**Keywords:** Alzheimer's Disease, AI-ML in Drug Discovery, TrkB agonists.

**CH-303**

## AN *IN SILICO* ANTICANCER AND ANTITUBERCULAR POTENTIAL OF ARYL/ALKYL AMINO SUBSTITUTED-DENE-2-(1,3-DIPHENYLALLYLIDENE) HYDRAZINE DERIVATIVES AGAINST HER2 AND MBTB GYRASE TYPE IIA TOPOISOMERASE INHIBITORS

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In modern drug discovery, molecular docking analysis is routinely used to understand and predict the interaction between a drug molecule and a target protein from a microbe. Drugs identified in this way may inhibit the entry and replication of pathogens in host cells. Based on a literature survey, the current study explored some substituted hydrazine derivatives' anticancer and antitubercular potential. The synthesized compounds can be docked against Breast cancer (PDB ID: 7JXH) and Tuberculosis (PDB ID: 3UCI) target proteins by the molecular docking technique. Molecular docking was done using igemdockv2.1 software. The binding efficiency of ligands was scored based on their predicted pharmacological interactions and binding energy estimates. In docking analysis for anticancer and antitubercular potential, compound ABSb was found to have the highest binding affinity with the viral HER2 and MBTB protein, followed by compounds ABSc, ABSa, ABSe and ABSd. Also, amino acid residues comprise the viral and bacterial binding site and the nature of the hydrogen bonding involved in the ligand-receptor interaction. It revealed significant findings with tested compound ABSb binding at four and three amino acid residues with the binding energy of -117.7 kcal/mole with cancer and -71.98 kcal/mole with TB protein, respectively. The binding sites are near the amino acids required for virus and bacterial pathogenicity. This analysis may help create a new drug development to prevent or cure cancer and TB.

**Keywords:** Human Epidermal Growth Factor Receptor 2, Breast cancer, Ligand, Receptor, Tuberculosis

**CH-304**

## FORCED DEGRADATION AND HPLC ANALYSIS OF ORLISTAT: STABILITY INSIGHTS AND ANALYTICAL PERSPECTIVES

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Orlistat, a β-lactone-based gastrointestinal lipase inhibitor, is the only FDA-approved long-term anti-obesity drug. Its chemical structure, characterized by ester and β-lactone functionalities, makes it susceptible to degradation under various stress conditions, posing challenges for stability assessment and quality control. In this study, forced degradation of orlistat was performed under acidic, basic, oxidative, and thermal conditions following ICH guidelines. Degradants were analyzed using a validated reverse-phase high-performance liquid chromatography (RP-HPLC) method. The method demonstrated excellent linearity ($R^2$ = 0.999), precision (%RSD < 2%), and accuracy (recoveries 98–102%), effectively separating orlistat from its degradation products. Results revealed that basic and oxidative stress conditions led to the highest degradation, with approximately 18% and 12% loss of the parent compound, respectively, while acidic and thermal stress produced minimal degradation (<5%). The study also highlighted the formation of specific degradants under different stress conditions, providing insights into orlistat's chemical instability. These findings emphasize the critical role of stability-indicating analytical methods in ensuring drug quality, efficacy, and regulatory compliance. Additionally, the study underscores




ISBN: 978-81-980623-8-3

the importance of considering solubility, lipophilicity, and low UV absorbance when developing robust analytical protocols. By integrating forced degradation studies with advanced HPLC analysis, this work provides valuable guidance for formulation scientists, analysts, and regulatory authorities in the development and quality control of lipophilic drugs like orlistat.

**Keywords:** Orlistat, Degradation Studies, HPLC Analysis

**CH-305**

**SIMULTANEOUS UV SPECTROSCOPIC ESTIMATION OF DAPAGLIFLOZIN, SITAGLIPTIN, AND METFORMIN IN TABLETS WITH GREENNESS ASSESSMENT USING GAPI AND RELATED TOOLS**

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This study presents the development and validation of a green, simultaneous UV spectrophotometric method for the quantification of dapagliflozin, sitagliptin, and metformin in a combined tablet formulation. The successful simultaneous determination of DAP, SIT, and MET was made possible by the invention and validation of RP-HPLC and UV Spectrophotometric (Simultaneous Equation Method) techniques. It was discovered that the created techniques were resilient, sensitive, accurate, and exact. This suggests that DAP, SIT, and MET in the combination pharmaceutical formulation can be subjected to quality control analysis using the suggested UV and HPLC procedures. Overall, as the protocols for the UV Spectrophotometric and RP-HPLC methods show, green analytical chemistry can reduce the environmental effect of analytical techniques without sacrificing analytical performance. The developed RP-HPLC and UV methods were appropriate for routine analysis of pharmaceutical dosage forms and bulk forms of sitagliptin phosphate, dapagliflozin, and metformin HCL.

**Keywords:** Dapagliflozin, Sitagliptin, Metformin, Greenness Assessment

**CH-306**

**DESIGN AND DEVELOPMENT OF TRIPLE ANTIOXIDANT LOADED SELF-NANOEMULSIFYING DRUG DELIVERY SYSTEMS (SNEDDS) FOR IMPROVED ORAL BIOAVAILABILITY**

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Diabetes Mellitus (DM) is a global health challenge associated with oxidative stress and complications in vital organs. Bioactive flavonoids like Thymoquinone (TH), Quercetin (QU), and Hesperidin (HS) possess potent antidiabetic and antioxidant properties, but their therapeutic use is limited by poor solubility, instability, and low oral bioavailability. The present study focused on the development and evaluation of a triple antioxidant-loaded Self-Nanoemulsifying Drug Delivery System (SNEDDS) to enhance the solubility, stability, and oral bioavailability. The SNEDDS was formulated using Gelucire 44/14 (oil), Labrasol ALF (surfactant), and Transcutol-P (co-surfactant). A D-optimal design optimized oil and Smix ratios for droplet size, zeta potential, % transmittance, and emulsification time. The formulation was characterised and evaluated for globule size, polydispersibility Index, zeta potential, surface Morphology, stability testing, *in vitro* drug release, DPPH radical scavenging, MTT cytotoxicity assay, *in vitro* lipolysis, and *in vivo* pharmacokinetic studies in rats. The optimized SNEDDS showed a droplet size of 84.19 ± 1.355 nm, zeta potential −17.6 ± 0.67 mV, 95% transmittance, and 7 s emulsification time, with spherical globules on TEM. Stability studies confirmed high stability at elevated temperatures. At pH 6.8, drug release was 74.97% (TH), 91.99% (QU), and 76.63% (HS) compared to significantly lower release from pure drugs. The formulation exhibited synergistic antioxidant activity, no cytotoxicity to Caco-2 cells, enhanced solubility during simulated digestion, and significantly improved oral bioavailability *in vivo*. Thus, the optimized SNEDDS effectively improved the solubility, stability, antioxidant activity, and oral bioavailability of TH, QU, and HS, proving it a promising approach for delivery.

**Keywords:** Thymoquinone, Quercetin, Hesperidin, SNEDDS, Diabetes Mellitus.

**CH-307**

**VALIDATED UPLC-MS/MS METHOD FOR COMPREHENSIVE STABILITY EVALUATION OF RIBOCICLIB UNDER FORCED DEGRADATION FOR IMPURITY PROFILING**

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A cyclin-dependent kinase (CDK)4/6 inhibitor called ribociclib has become a leading targeted treatment for breast cancer. Its stability and analytical dependability are essential for medicinal safety as well as regulatory compliance. For thorough stability profiling of ribociclib, we present the creation and validation of a very sensitive Ultra-Performance Liquid Chromatography coupled with Tandem Mass Spectrometry (UPLC-MS/MS) approach. On a ThermoHypoPurity C18 column (50 × 4.6 mm, 5 µm), chromatographic separation was accomplished with a mobile phase consisting of 0.2% formic acid in water and acetonitrile (40:60, v/v) at a flow rate of 0.4 mL/min. The parent chemical eluted at 1.12 ± 0.02 minutes using positive electrospray ionization in multiple reaction monitoring mode. Different degradation pathways were identified by forced degradation studies conducted in acidic, alkaline, oxidative, thermal, and neutral environments. These included partial breakdown under the majority of stressors, total disintegration in alkaline media, and distinctive degradant peaks between 1.13 and 1.71 minutes. Two main degradants were found by mass spectrometric analysis (RD1 at m/z 299.10 and RD2 at m/z 281.20 ± 0.06), while a distinct fragment (m/z 179.15) was only seen under alkaline stress, suggesting substantial molecular disruption. Excellent accuracy, precision, linearity, and robustness were demonstrated by the approach, which was validated in compliance with ICH requirements. A quick, dependable, and legally valid UPLC-MS/MS platform for ribociclib stability-indicating analysis is presented in this work. Beyond normal quality control, the results reveal mechanistic insights into the drug's degradation behavior, with important ramifications for clinical safety assurance, formulation development, and international regulatory filings.

**Keywords:** Ribociclib; CDK4/6 inhibitor; UPLC-MS/MS; Stability-indicating method; Forced degradation; ICH validation; Quality control; Pharmaceutical analysis

**CH-308**

**A RAPID LC-MS/MS METHOD FOR QUANTITATIVE ESTIMATION OF VITAMINS IN FORTIFIED RICE SAMPLES**

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Rice is one of the greatest staple food carriers for food fortification in developing countries. Any deviation in the fortification levels may result in either insufficient nutrient intake or toxic effects on the body. The fortification range of vitamin B9 and B12 is 75 µg/kg- 125 µg/kg and 0.75 µg/kg- 1.25 µg/kg, respectively as per the standards of Indian regulations. In the current study, a rapid LC-MS/MS method was developed for the analysis of vitamin B9 and B12 in marketed fortified rice samples. The LC-MS/MS method was operated in positive-ionization and in t-SRM mode. A heated electrospray ionisation source was used as the ion source. A gradient elution mode with an injection volume of 10 µl was used in this chromatographic technique using 20 Mm ammonium formate + 0.1% Formic acid in water and 100% methanol. The flow rate was set to 0.300 µl/min with a run time of 10 min of mobile phase. The method performance was evaluated for linearity, sensitivity, matrix effect, precision, recovery and robustness. This method showed good selectivity with a low-range detection in the fortified rice. The LOD for vitamin B9 was 0.5 ng/ml while for vitamin B12, it was 0.05 ng/ml. Linearity for vitamin B9 was in the range of 0.5-25 ng/ml while for vitamin B12, it was from 0.05-10 ng/ml. The LOQs for both the vitamins were 10 ng/ml. The recoveries for both vitamins were in the range 70%–120% with % RSD below 10%, specified as per the SANTE guidelines.

**Keywords**: Chromatography, fortification, mass spectroscopy, rice kernel, vitamins




ISBN: 978-81-980623-8-3

**CH-309**

## SIMULTANEOUS ESTIMATION OF ATENOLOL AND CHLORTHALIDONE IN COMBINE TABLET DOSAGE FORM BY SIMULTANEOUS EQUATION METHOD USING UV-VIS SPECTROPHOTOMETRY

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A simple, precise, reproducible, accurate, economical & rapid UV-VIS Spectrophotometric method have been developed and validated for the simultaneous estimation of ATN and CTN in tablet dosage form. This paper describes the simultaneous equation method as a quantification parameter. The simultaneous equation method (SEM) involves the measurement of absorbance of ATN and CTN at 227.0 nm and 251.0 nm respectively two and based on E 1% 1cm values at these wavelengths a two set of equations framed. The developed method obeys the beers law in the concentration range of 40-80µg/mL for ATN and 10-50 µg/mL for CTN. The recovery studies show %RSD for ATN 0.094 and for CTN 0.42 by SEM method. The results of analysis have been validated statistically for accuracy, precision, repeatability, specificity and ruggedness. The method was successfully applied to the determination of these drugs in pharmaceutical dosage form.

**Keywords:** ATN, CTN, UV- VIS, Spectrophotometry, Assay method, SEM.

**CH-310**

## EXPLORING FOLATE PATHWAY INHIBITION FOR TUBERCULOSIS TREATMENT: SYNTHESIS AND EVALUATION OF SULFONAMIDE DERIVATIVES

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Tuberculosis (TB), predominantly caused by Mycobacterium tuberculosis (MTB), continues to be a formidable global health concern due to its high morbidity, mortality, and the growing incidence of multidrug-resistant (MDR) strains. Sulfonamides, as synthetic antimicrobial agents, have demonstrated the potential to inhibit folate biosynthesis pathways in MTB, offering a promising alternative to conventional first-line therapies like isoniazid and rifampicin, which mainly target cell wall biosynthesis and energy metabolism. The escalating resistance to these standard drugs highlights the urgent need for novel therapeutics with distinct mechanisms of action. In this study, a novel series of sulfonamide derivatives was synthesized through acid-catalysed condensation of substituted chalcone intermediates with sulfonamide in ethanol. These compounds were purified and structurally characterized using Fourier-transform infrared spectroscopy (FT-IR), nuclear magnetic resonance (NMR), and mass spectrometry. Biological screening against the MTB H37Rv strain revealed notable anti-mycobacterial activity, with several derivatives displaying potency on par with established anti-TB drugs. Mechanistically, the sulfonamide derivatives function by competitively inhibiting dihydropteroate synthase (DHPS) and dihydrofolate reductase (DHFR)—crucial enzymes in folate biosynthesis and DNA replication within MTB. Molecular docking studies further confirmed substantial binding affinities to both DHPS and DHFR, substantiating the hypothesized mechanism of action. These findings underscore the therapeutic promise of sulfonamide-based compounds as lead candidates in the fight against drug-resistant TB. Future research will focus on structural optimization to improve aqueous solubility and minimize cytotoxicity, as well as detailed pharmacokinetic and *in vivo* efficacy studies to advance clinical development.

**Keywords:** Tuberculosis, Sulfonamide derivative, drug resistance, folate biosynthesis, anti tubercular activity

**CH-311**

## COMPLEXATION OF ANTIBIOTICS WITH SOME METAL IONS, THEIR CHARACTERIZATION AND EVALUATION OF ANTIBACTERIAL POTENTIAL

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In this study, new complexes of cefixime with transition metals (Pd, Ag, Zn, Ni, Cu, and Cd) were successfully prepared and systematically characterized. The characterization involved melting point and solubility analysis, along with spectroscopic techniques including UV/Visible, IR, and NMR. All complexes showed UV absorption bands within the range of 202–295 nm. The IR spectra revealed characteristic signals such as N–H stretching (3500–3350 $cm^{-1}$), C=O stretching (1720–1700 $cm^{-1}$), C–N stretching (1320–1340 $cm^{-1}$), and C–C stretching (1670–1440 $cm^{-1}$), in addition to specific peaks that provided strong evidence for the proposed structures of the metal–cefixime complexes. The antimicrobial activities of these complexes were screened using the disc diffusion method against multiple bacterial strains, namely Staphylococcus aureus, Bacillus subtilis, Klebsiella pneumoniae, Pseudomonas aeruginosa, and Escherichia coli. The results indicated that the Pd, Zn, and Cd complexes demonstrated higher antibacterial activity compared to cefixime alone, while Ag, Ni, and Cu complexes exhibited moderate activity. All synthesized complexes were found to be soluble in polar organic solvents.

**Keywords**: Cefixime, transition metal complexes, spectroscopic characterization, antimicrobial activity.

**CH-312**

## COMPUTATIONAL DESIGN AND STRUCTURE BASED OPTIMIZATION OF NOVEL ANTI ANGINAL AGENTS

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The structure required for the generation of energy and physicochemical properties were obtained from known Anti anginal agents reported in ChEMBL database Multiple conformers, but not more than 300, were allowed to be generated rest of parameters was set to default values. Here we used igemdock and chemmaster for searching similar compounds. We have selected seven known anti-anginal agents which are generated and selected from the ChEMBLE database. The energy and physicochemical properties were obtained from the igemdock and chemmaster were used for the Lead Identification by subjecting the all structures of generated energy and physicochemical properties for virtual screening by using docking method against the PDB ID 1f3k. The energy compounds which has highest binding affinity was selected for the Lead optimization. All the structures were subjected for the molecular docking studies using Glide, in the active sites of the X-ray crystal structures and induced fit models anti-anginal agents. The inhibition activity of the optimized lead molecules against anti-anginal were studied. The extent of inhibition activity of the optimized lead molecules was estimated binding energy as energy score or physicochemical properties and no of interactions with anti-angina agents among the compounds 1-25 it was observed that the compounds, 1,2,3,8,9,10,11,13,18,19,20,21,22, and 25 have potent inhibitory activity against angina with highest energy. All drugs follow the Lipinskis rule of five.

**Keywords:** 1f3k, igemdock, chemmaster,

**CH-313**

## DESIGN, SYNTHESIS AND SCREENING OF NOVEL 2-PHENYL-1H-INDOLE DERIVATIVES AGAINST BREAST CANCER

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The study focussed on designing, synthesis and evaluation of novel 2-phenyl-1H-indole derivatives as potential anti-breast cancer agents. In-silico screening, identified 12 derivatives (D1-D12) with promising binding affinities against the p110 catalytic subunit of PIK3α enzyme (PDB ID: 5DXT) which were found to be in the range of -7.6 to -10.5, compared to standard 5-Flurouracil (-5.4). The derivatives also demonstrated favorable drug-like properties according to Lipinski's rule of five and improved toxicity profiles (Class 4 or 5) compared to 5FU (Class 3). Ten compounds were successfully synthesized and characterized. *In-vitro* antimitotic assays on Allium cepa bulbs revealed dose-dependent root growth inhibition, with D2, D4, D5, D6B and D10 showing maximal effects which confirmed their ability to slowdown the




ISBN: 978-81-980623-8-3

cell growth. Furthermore, cytotoxicity assays against MCF-7 cell lines highlighted D5 and D10 exhibiting % cell inhibition- 64.74 with IC50 - 64.37 µg/ml and 59.99 with IC50 - 84.07 µg/ml respectively against 5FU used as a standard showing % cell inhibition 85.54 with IC50 value 6 µg/ml at 100 µg/ml concentration. As per the results, it was observed that D5 and D10 although showed moderate % cell inhibition compared to standard but as per in-silico toxicity assessment, they belong to safer predicted toxicity class and have specific targeted affinity towards PKI3α receptor. Hence, the 2-phenyl-1H-indole derivatives can be predicted as selective and safer anti-breast cancer agents.

**Keywords:** Breast cancer, PIK3α enzyme, 5-Flurouracil, 2-phenyl-1H-indole derivative, MCF-7 cell lines

**CH-314**

## SYNTHESIS, CHARACTERIZATION, AND ASSESSMENT OF A PYRIMIDINE RING CONTAINING DERIVATIVE OF NICOTINIC ACID FOR ANTIBACTERIAL PROPERTIES

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Developing new antibacterial agents is still a top priority in the fight against drug resistance and infectious diseases. The structural resemblance of pyrimidine derivatives to nucleic acid bases and their capacity to interfere with essential cellular functions are well known. In this work, cyclisation reactions of 2-aminonicotinic acid derivatives were used to create a series of nicotinic acid derivatives with pyrimidine rings. The successful synthesis of the target compounds was confirmed by structural confirmation using mass spectrometry, FT-IR, $^{1}$H NMR, and $^{13}$C NMR. Streptomycin served as the positive control and DMSO as the vehicle in the cup-plate method, which was used to assess antibacterial activity against Escherichia coli and Staphylococcus aureus. The synthesized compounds demonstrated variable but quantifiable antibacterial potential, with zones of inhibition ranging from 10 to 27 mm. The most active compound was notably P-6, which produced inhibition zones that were similar to those of streptomycin, especially against S. aureus. Although P-1 and P-3 were relatively less active, compounds P-4 and P-5 also demonstrated notable inhibition. Antibacterial potency was ranked as follows: P-6 > P-4 > P-5 > P-2 > P-3 > P-1. These results show that 2-aminonicotinic acid pyrimidine derivatives could be promising candidates for the creation of new antibacterial agents, necessitating additional mechanistic and *in vivo* research.

**Keywords:** Pyrimidine derivative, Nicotinic acid, Antibacterial activity, Cup-plate method, Zone of inhibition, FT-IR, NMR, Drug discovery

**CH-315**

## TELLURIUM IN BIOMEDICINE: A PROMISING FRONTIER IN CANCER THERAPY

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Once considered only a toxic trace element, tellurium is now drawing attention as a surprising ally in cancer therapy. Scientists have found that certain tellurium-based compounds can upset the redox (oxidation–reduction) balance that cancer cells rely on for survival. Two standouts—AS101 and SAS—work by oxidizing thiol groups in proteins. This blocks proteases, the enzymes tumors use to grow and spread, and also disables proteins that help cancer cells avoid death. Tellurium compounds are showing real promise against cancer. They lower IL-10, a protein that normally weakens the immune response, so the body can better attack tumors. This also drives cancer cells into programmed death and helps chemotherapy work more effectively. One compound, AS101, is already in early clinical trials. Scientists are even creating tellurium-based polymers that carry cisplatin and release it only when hit by targeted radiation—killing tumor cells while protecting healthy tissue.

**Keywords:** Tellurium compounds; AS101; SAS; Cancer therapy; IL–10 suppression; Targeted drug delivery

**CH-316**

## DESIGN, SYNTHESIS AND CHARACTERIZATION OF CHRYSIN METAL COMPLEX NANOPARTICLES FOR ANTI-ALZHEIMER'S DISEASE ACTIVITY

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Alzheimer's disease is a progressive neurodegenerative disorder that affects the brain, leading to cognitive decline and memory loss primarily associated with acetylcholinesterase (AChE) activity and amyloid-beta accumulation. Chrysin, a natural flavonoid, exhibits neuroprotective effects but suffers from poor solubility and bioavailability. Complexation with zinc, a metal ion possessing neuroprotective properties, together with nanoencapsulation, offers a strategy to overcome these limitations and enhance therapeutic potential. Molecular docking of chrysin-zinc complexes against AChE (PDB: 1EVE, 2OHP, 1IYT) was performed using AutoDock 4.2.6 with ADME and toxicity predicted by SwissADME and ProTox II. The complexes were synthesized and characterised by FT-IR, 1H NMR and mass spectrometry, while chitosan-loaded nanoparticles were prepared via ionic gelation and evaluation for particle size, zeta potential, morphology (SEM), crystallinity, (XRD) entrapment efficiency, drug release, and solubility. Molecular docking studies revealed a strong interaction of the chrysin-zinc complex with AChE (-11.1 kcal·mol-1), supported by favourable ADME predictions and absence of toxicity alerts. Chitosan-loaded nanoparticles prepared via ionic gelation exhibited a nanoscale size of ~190.9 nm, high entrapment efficiency (95.36%), improved solubility, and controlled release (88.6% at 4 hours). Biological evaluation demonstrated that the nanoparticles showed significantly higher AChE inhibitory and anti-Alzheimer's activity compared with the free chrysin-zinc complex. These findings suggest that zinc complexation combined with chitosan nanoencapsulation offers a promising strategy to improve the pharmacological efficacy of chrysin, positioning it as a potential nanomedicine candidate for the management of Alzheimer's disease.

**Keywords:** Amyloid-beta (Aβ) aggregation; Chrysin; Zinc complex; Acetylcholinesterase; Chitosan nanoparticles

**CH-317**

## SYNTHESIS, CHARACTERIZATION, *IN-SILICO* AND *IN-VIVO* PHARMACOLOGICAL SCREENING OF 2',4'-DIMETHYL-4-(DIMETHYLAMINO) CHALCONE AS TRPA1 ANTAGONIST CAOMBATING NEUROPATHIC PAIN

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Pain is defined as "an unpleasant sensory and emotional experiences associated with actual or potential tissue damage or described in terms of such damage". Neuropathic pain is "pain that comes from direct consequence of a lesion or disease which affect the somatosensory system". Chronic neuropathic pain is common and is majorly observed with co-morbidity conditions like cancer or diabetic neuropathy, arthritis or it could be related to treatments such as chemotherapy. TRP channels play an important role in mediating neuropathic pain. The present work focused on targeting TRPA1 receptors in combating neuropathic pain. *In silico* docking is performed using AUTODOC for 100ns to screen chalcone derivatives and the lead derivative is subjected for MD simulation using Gromax software. The2',4'-Dimethyl-4-(Dimethylamino)Chalcone is synthesized using green chemistry and characterized using M.S, H-NMR and C-NMR spectroscopic methods. Invivo pharmacological screening is performed using AITC and formalin induced pain models. Partial sciatic nerve ligation model is also performed and histopathological sections of sciatic nerve are also recorded to identify the blockade of TRPA1 receptors using standard TRPA1 antagonist from sigma Aldrich. The chalcone derivative showed good neuropathic pain property thus resulting in a potent drug with fewer side effects.

**Keywords:** Pain, somatosensory pathway, chalcone, sciatic nerve

**CH-318**

## SYNTHESIS AND ANTIMICROBIAL EVALUATION OF PYROGLUTAMIC ACID DERIVATIVES

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Pyroglutamic acid and its derivatives serve as precursors in the synthesis of pharmacologically significant drugs. This work involved the synthesis and evaluation of several Pyroglutamic acid derivatives for their antimicrobial efficacy. The synthesized compounds were structurally validated using melting point analysis and infrared spectroscopy examination. Antimicrobial screening was conducted with the cup-plate method against bacterial strains (Staphylococcus aureus and Escherichia coli) and fungus strains (Candida albicans). None of the 15 compounds exhibited antibacterial action. Nevertheless, only a limited number of chemicals exhibited notable anti-fungal action. PGAD8 exhibited the most pronounced antifungal action, demonstrating a 20 mm zone of inhibition. This research underscores the potential of pyroglutamic acid derivatives exhibiting notable anti-fungal efficacy.

**Keywords:** Pyroglutamic acid, Carbonyl diimidazole, Amide derivatives, Anti-bacterial activity, Anti-fungal activity, Agar well diffusion method.

**CH-319**

## UNRAVELING MULTI-TARGET THERAPEUTIC STRATEGIES FOR LEPTOSPIROSIS THROUGH NETWORK PHARMACOLOGY: A SYSTEMS-BASED APPROACH TO A NEGLECTED ZOONOTIC DISEASE

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Leptospirosis is a neglected zoonotic disease caused by pathogenic Leptospira species, with a significant burden in tropical regions, yet minimal investment in research and drug development. Current treatments are limited to a few broad-spectrum antibiotics, which may be ineffective in severe or chronic cases. Network pharmacology, a novel systems biology-based approach, offers a powerful platform to understand the complex host–pathogen–drug interactions involved in leptospirosis and to identify multi-target therapeutic candidates. By constructing comprehensive drug–target–pathway interaction networks, network pharmacology enables identification of critical molecular nodes in leptospiral infection and immune response. This approach is particularly promising for repurposing known drugs and for exploring bioactive compounds from medicinal plants. Several herbal candidates have shown potential anti-leptospiral activity, including Azadirachta indica (Neem), Phyllanthus niruri, Andrographis paniculata, and Eclipta alba. These plants exhibit antibacterial, anti-inflammatory, and immunomodulatory properties, which are crucial in managing leptospiral pathogenesis and complications such as renal or hepatic damage. Network-based analysis can help map the active phytoconstituents—such as andrographolide, phyllanthin, or wedelolactone—to their molecular targets and pathways, offering mechanistic insights into their therapeutic potential. Additionally, molecular docking and protein–protein interaction studies can be integrated to validate and prioritize candidates for further preclinical research. In conclusion, applying network pharmacology to leptospirosis not only enhances our understanding of disease mechanisms but also provides a scientific basis for developing multi-target herbal therapies, thus addressing the long-standing therapeutic void in this neglected disease.

**Keywords:** Network pharmacology, Phytoconstituents, leptospirosis, Zoonotic Disease

**CH-320**

## DEVELOPMENT AND VALIDATION OF CHEMOMETRIC ASSISTED SPECTROPHOTOMETRIC METHODS FOR SIMULTANEOUS DETERMINATION OF ANTIGOUT DRUGS IN PHARMACEUTICAL DOSAGE FORM

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Probenecid (PBD) and Colchicine (CLN) are combination of drugs used for the treatment and management of Gout. Two chemometric-assisted UV- Visible spectrophotometric approaches were developed for the simultaneous estimation of PBD and CLN in tablet dosage form, specifically the partial least squares (PLS) and classical least squares (CLS) methods. The proposed methods were successfully applied for simultaneous determination of PBD and CLN in their tablet formulation to achieve maximum sensitivity and lowest error. The applied methods were validated as per ICH guidelines and found to be linear in the concentration range of 5-30 µg/mL for PBD and 5-30 µg/mL for CLN. The developed methods were statistically compared with reported HPLC method where no significant difference was found relating to both accuracy and precision. Thus, the proposed methods can be effectively utilized for the routine quality control assessment of these drugs in commercial tablet dosage form.

**Keywords:** Chemometric, Probenecid (PBD), Colchicine (CLN), PLS and CLS

**CH-321**

## SPECTROSCOPIC STUDY OF CROSSLINKING IN GELATINE CAPSULES AND ITS EFFECT ON CAPSULE CHARACTERISTICS WITH THE HELP OF CHEMOMETRIC TECHNIQUES

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The present study investigated the spectroscopic changes in the Hard gelatine capsules due to crosslinking and its effect on disintegration time of capsules, particularly examining the effect with non-destructive spectroscopic techniques with help of chemometric analysis. Capsules with added samples (Calcium Pantothenate, Cyanocobalamin, and a mix) and formaldehyde-induced capsules were tested and ATR IR and NIR spectra were recorded. Empty capsules disintegrated in 6.03 minutes. Moderately stressed capsules showed a longer disintegration time (10±6 mins) compared to unstressed capsules Formaldehyde-induced capsules required significantly more time to disintegrate, often exceeding an hour, indicating that crosslinking prolongs both disintegration and dissolution times. Calcium Pantothenate capsules disintegrated normally, while Cyanocobalamin capsules showed a trend change. A mix of Calcium Pantothenate and Cyanocobalamin showed a gradual increase in disintegration time. Principal Component Analysis (PCA) was employed as a classification method to identify minute changes in ATR IR spectra, comparing crosslinking with formaldehyde as a standard for Calcium Pantothenate and Cyanocobalamin samples.

**Keywords:** Hard gelatin capsules, Crosslinking, Disintegration time, ATR-IR spectroscopy, NIR spectroscopy, Chemometric analysis, Principal Component Analysis (PCA), Formaldehyde

**CH-322**

## STRUCTURE-BASED DESIGN AND EVALUATION OF QUINOLIN-2-ONE SCAFFOLDS FOR BRAIN CANCER AND SEIZURE DISORDERS

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The present study focuses on the rational design, synthesis, characterization, and biological evaluation of novel 4-hydroxyquinolin-2-one nitrogen heterocycles as potential dual-acting anticancer and anticonvulsant agents. A library of thirty-six derivatives was designed and subjected to in-silico studies, and the best fifteen were synthesised based on their binding to the target and drug likeness properties. In-silico docking studies revealed favourable binding interactions of derivatives with farnesyltransferase (PDB ID: 1SA4) for glioblastoma (GBM) and GABA aminotransferase (PDB ID: 2COJ) for anticonvulsant activity. Notably, compound IVb5 and IVa14 demonstrated good dock scores (-7.513 and -6.452) compared to the reference drug Tipifarnib (-6.755) for GBM, while compound IVa14 exhibited higher binding affinity (-6.749) than Diazepam (-6.364) as an anticonvulsant. ADMET profiling showed all derivatives met Lipinski's rule of five and exhibited favourable pharmacokinetic properties, including oral bioavailability, BBB permeability, and low predicted toxicity. *In vitro* studies against U87-MG glioblastoma cells revealed that compounds IVb5, IVa5, and IVa14 exhibited good anticancer activity (GI50 = 6.91, 8.50, and 8.84 µg/mL), comparable to standard Doxorubicin. Further in PTZ-induced seizure models, compound IVa14 (100 mg/kg) provided complete protection (100% survival, clonic and tonic onset at 144.8 and 159.8 seconds),




ISBN: 978-81-980623-8-3

exhibiting anticonvulsant efficacy comparable to Diazepam. Overall, Compound IVa14 emerged as a potential lead candidate with dual therapeutic efficacy in GBM treatment and epilepsy management. Overall, the findings highlight the promising role of 4-hydroxyquinolin-2-one analogs as versatile leads and provide a strong basis for further optimization and development of multifunctional drug candidates for GBM and seizure disorders.

**Keywords:** Glioblastoma, epilepsy, quinoline-2-one, docking, ADMET.

**CH-323**

### *IN-SILICO* PREDICTION OF INDEPENDENT VARIABLE EFFECT OVER SLN-CHARACTERISTIC DEPENDENT VARIABLES

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This study aims to systematically evaluate the effects of multiple independent variables on the characteristics of solid lipid nanoparticles (SLNs) prepared using the solvent evaporation technique. Seven formulation and process parameters were investigated: drug-to-lipid ratio, surfactant concentration, volume of organic phase, volume of aqueous phase, homogenization time, homogenization speed, and sonication time. These factors were analysed for their influence on key dependent parameters including entrapment efficiency (EE%), drug loading (DL%), polydispersity index (PDI), and particle size, which are critical determinants of SLN performance and stability. Statistical evaluation revealed that sonication time had the most significant impact on PDI, indicating its crucial role in controlling particle size distribution and homogeneity. In contrast, the drug-to-lipid ratio exhibited the least influence on PDI. Particle size was found to be highly dependent on the drug-to-lipid ratio, emphasizing the importance of lipid content in determining nanoparticle dimensions, while homogenization time showed minimal effect. Drug loading percentage was significantly affected by both the drug-to-lipid ratio and the volume of the aqueous phase, suggesting that these parameters govern the amount of drug encapsulated within the lipid matrix. Surfactant concentration had the least effect on drug loading. Entrapment efficiency was predominantly influenced by the volume of the aqueous phase, highlighting the role of the external phase in drug retention, whereas the volume of the organic phase had the least impact. Overall, the findings demonstrate that careful optimization of formulation variables, particularly sonication time, drug-to-lipid ratio, and aqueous phase volume, is essential to tailor SLN characteristics for enhanced drug delivery performance. This study provides valuable insights for the rational design and development of SLN-based drug delivery systems.

**Keywords:** dependent variables, independent variables, solid lipid nanoparticles

**CH-324**

### ELUCIDATING THE PATH TO SKIN LIGHTENING: ANALYTICAL CHARACTERIZATION AND MOLECULAR DOCKING ANALYSIS OF A SYNTHETIC ANTI-PIGMENTATION AGENT

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Hyperpigmentation disorders such as melasma, post-inflammatory pigmentation, and dark spots pose significant cosmetic and psychological challenges. Conventional depigmenting therapies are often limited by suboptimal efficacy or safety concerns, underscoring the need for novel synthetic agents with improved therapeutic potential. The present study aimed to perform a comprehensive analytical profiling of a synthetic anti-pigmenting molecule and to evaluate its *in silico* interactions with melanogenic targets. Analytical characterization was carried out using UV–Vis spectroscopy, FTIR, HPLC, and LC–MS, confirming structural identity, purity, and functional groups relevant to activity. Stability studies under variable pH and light conditions provided insights into formulation feasibility and shelf-life. These evaluations established the reproducibility and reliability of the compound as a promising candidate for further pharmacological assessment. Molecular docking studies were subsequently conducted against tyrosinase and tyrosinase-related protein 1 (TRP-1), the central enzymes of melanogenesis. The compound demonstrated favourable binding affinities, comparable to or surpassing kojic acid, through stable hydrogen bonding, hydrophobic interactions, and active-site coordination. The binding profiles suggested competitive inhibition mechanisms, rationalizing its potential to regulate melanin biosynthesis. The integration of analytical chemistry with computational docking provided both validation of molecular integrity and mechanistic insight into anti-pigmentation activity. These findings form a dual platform for translational research, bridging laboratory characterization with functional evaluation, and offer a foundation for subsequent preclinical and clinical exploration of synthetic depigmenting therapies.

**Keywords:** Synthetic drug, Anti-pigmentation, Analytical profiling, Molecular docking, Tyrosinase inhibition, Melanogenesis, Spectroscopy, HPLC

**CH-325**

### INTEGRATING NETWORK PHARMACOLOGY AND NUTRITIONAL SCIENCE FOR FUNCTIONAL CHOCOLATE INNOVATION

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Consumer demand for health-oriented sweets has led to the creation of functional chocolates enriched with bioactive ingredients. In this study, we made a low-sugar chocolate by mixing dark and white chocolate bases, adding inulin, a prebiotic fiber, and Spirulina platensis, which is rich in protein and antioxidants. We partly replaced sugar with inulin and improved the recipes for texture and taste. Antioxidant tests showed that Spirulina-inulin chocolate had significantly higher antioxidant activity ($P < 0.01$) and phenolic content ($P < 0.05$) than the control. It also released more Spirulina nutrients and cocoa polyphenols. We used network pharmacology analysis to understand the mechanisms at work. Key cocoa flavanols (epicatechin, catechin, procyanidins), Spirulina metabolites (phycocyanin, β-carotene, phenolic acids), and inulin-derived metabolites were connected to multiple targets, including EGFR, AKT1, ESR1, and antioxidant enzymes (SOD, CAT). Pathway enrichment revealed links to PI3K/AKT, MAPK/ERK, NF-κB, Nrf2 antioxidant signaling, and gut microbiota control. These results indicate that the ingredients work together to help reduce oxidative stress, manage inflammation, and support metabolic health. Overall, Spirulina-inulin fortified chocolate stands out as a promising functional treat. By combining experimental bioassays with network pharmacology, this study offers both practical and scientific support for its potential as a health-promoting snack and a candidate for new nutraceutical products.

**Keywords:** Spirulina; Inulin; Cocoa polyphenols; Antioxidant activity; Network pharmacology

**CH-326**

### EXPLORING THE ANTIDIABETIC EFFECTS OF BIOACTIVE COMPOUNDS FROM SELECTED HERBAL PLANTS, INCLUDING INSIGHTS FROM NETWORK PHARMACOLOGY AND MOLECULAR DOCKING

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Type 2 Diabetes Mellitus (T2DM) is a chronic metabolic disorder characterized by insulin resistance, hyperglycemia, oxidative stress, and dysregulated glucose metabolism. Current therapies often provide limited efficacy and may cause adverse effects, highlighting the need for novel multi-target therapeutic strategies. This study aimed to investigate the antidiabetic potential and molecular mechanisms of bioactive metabolites from some selected medicinal plants using network pharmacology and molecular docking approaches. A network pharmacology-based analysis was conducted to identify key molecular targets and signaling pathways associated with bioactive metabolites from Piper nigrum, Cinnamomum verum, Trigonella foenum-graecum, Tinospora cordifolia, Azadirachta indica, and Curcuma longa. The analysis revealed their potential involvement in insulin signalling, glucose metabolism, oxidative stress, and inflammatory pathways. Molecular docking studies demonstrated strong binding affinities of these metabolites to key Type 2 Diabetes Mellitus-related targets, including AKT1, PPARG, DPP4, and AMPK, indicating their potential to modulate multiple pathological mechanisms involved in diabetes




ISBN: 978-81-980623-8-3

progression and complications. This study provides a mechanistic understanding of the antidiabetic potential of bioactive metabolites from selected herbal plants, supporting their role as multi-target therapeutic candidates. Future studies will focus on *in-vitro* and *in vivo* validation to confirm their efficacy and safety for the management of Type 2 Diabetes Mellitus.

**Keywords:** Type 2 Diabetes Mellitus, bioactive metabolites, antidiabetic activity, network pharmacology, molecular docking

**CH-327**

## ADVANCED RP-HPLC APPROACH FOR RELATED SUBSTANCE AND VALIDATION IN TRIMIPRAMINE TABLETS

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This study presents the development and validation of a reversed-phase high-performance liquid chromatography (RP-HPLC) method for determining related substances in Trimipramine tablets, an antidepressant medication. Chromatographic separation was achieved on a C18 column using a gradient system with mobile phase A (buffer, acetonitrile, 2-propanol, and methanol in 650:50:100:200 v/v) and mobile phase B (methanol and 1-butanol in 990:10 v/v). The buffer was prepared with diammonium hydrogen orthophosphate, adjusted to pH 7.3 ± 0.05. The method demonstrated excellent linearity ($R^2$ > 0.999) over the concentration ranges of 0.1–6 µg/ml for Trimipramine and 0.1–3 µg/ml for its impurities. The limits of detection and quantification were 0.04 µg/ml and 0.1 µg/ml, respectively. Precision studies showed %RSD values not more than 15.0%, confirming method reproducibility. The validated method was found to be selective, sensitive, accurate, and precise for detecting and quantifying related substances in Trimipramine tablets. This robust RP-HPLC method ensures batch-to-batch consistency and supports pharmaceutical quality control, ultimately contributing to patient safety.

**Keywords:** Trimipramine, Related substances, RP-HPLC, Method validation, Pharmaceutical analysis.

**CH-328**

## REVERSE PHASE CHROMATOGRAPHIC METHOD DEVELOPMENT AND VALIDATION FOR ESTIMATION OF BENIDIPINE HCL AND METOPROLOL SUCCINATE FROM COMBINED DOSAGE FORM

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Applicability of Liquid chromatography technique for separation and detection of drugs from complex matrix is well known and widely used. A new and improved economical technique has been developed for combined drug estimation Benidipine HCL (BDH) and Metoprolol succinate (MPS). Chromatographic system RP-HPLC, using RP - C18 column equipped with UV detector was utilised for estimation of both these drugs. The mobile phase [Methanol: water pH 4.7 (pH adjusted with acetic acid HPLC grade)] was pumped at a flow rate of 0.8 ml/min in the ratio of 70: 30 % v/v and the eluents were monitored at 239 nm. The technique was successfully applied for quantitative determination of both analytes from their combined dosage form. The method was validated as per ICH guidelines. To ascertain linearity of both these drugs conc level 2 to 10µg/ml for BDH and 2 to 12µg/ml for MPS was found suitable and within acceptable range. The retention time of BDH and MPS was found 5.457 and 2.318 mins respectively. The validation parameters accuracy, precision, LOD and LOQ, robustness were studied. The assay of formulation was found 99.37% w/w for BDH and 99.31% w/w for MPS in the range stated in the official book. The precision study RSD data were varied from 0.6359 to 0.9359 for BDH and 0.1422 to 0.2872 for MPS which was within given criteria. Efficiency of the column to resolve both analytes was good and parameters were in the specified limits. Both drugs were eluted within 6 mins and no interference of excipients was observed during estimation. The developed Technique can be applied for routine quality control tests for the combined dosage form. The techniques simple, preciseness, accurate and robust characters were made sound.

**Keywords:** Benidipine HCL, Metoprolol succinate, Chromatography, validation, ICH guidelines

**CH-329**

## BIOANALYTICAL METHOD DEVELOPMENT AND VALIDATION FOR THE ESTIMATION OF CHLORTHALIDONE AND IRBESARTAN IN HUMAN PLASMA BY CHROMATOGRAPHIC TECHNIQUE

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Bio analytical method was developed for estimation of Chlorthalidone and Irbesartan in human plasma by chromatographic technique. EMEA, US FDA and ICH M 10 regulatory guidelines elaborately discussed bio analytical guidelines intended to provide recommendations for the validation of bio analytical assays for chemical and biological drug quantification and their application in the analysis of study samples. Bio analytical method was developed for estimation of Chlorthalidone CTD and Irbesartan IST; on the RP-HPLC and for separation RP-C18 column equipped with UV detector was utilised. The mobile phase [Acetonitrile: Methanol: Water have pH 4.6 (pH adjusted with acetic acid)] was pumped at a flow rate of 0.8 ml/min in the ratio of 50:30:20 % v/v and the eluents were monitored at wavelength 245 nm. The method was applied for quantitative estimation of drugs from human plasma. Both drugs were shown linear response in conc ranges CTD (500-3000 ng/ml) and IST (500-7000 ng/ml) in plasma. Accuracy and precision study shown that % CV was varied in the range (2.4227-7.0438) for CTD and (3.541-6.942) for IST at all conc. levels and; the data of % nominal conc. were varied between (102.52-106.03) for CTD and (94.15-92.17) for IST at all conc. levels. Guideline elaborated that the results of pivotal nonclinical toxicokinetic (TK)/pharmacokinetic (PK) studies and of clinical trials, including comparative bioavailability / bioequivalence (BA/BE) studies, are used to make regulatory decisions regarding the safety and efficacy of drug products. The method can be applied for relative bioavailability and bioequivalence study of both drugs or/and dosage form.

**Keywords:** Bio analytical method, Regulatory guidelines, ICH, chlorthaidone, Irbesartan

**CH-330**

## DEVELOPMENT AND VALIDATION OF ANALYTICAL METHOD FOR SIMULTANEOUS ESTIMATION OF ETODOLAC AND PARACETAMOL FROM BULK AND DOSAGE FORM.

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A simple and reproducible high-performance liquid chromatography (HPLC) method was developed and validated for the simultaneous estimation of Etodolac and Paracetamol. Chromatographic separation was achieved on a Younglin (S.K.) isocratic system equipped with a UV-730 D detector and SP-930 D pump, operated through Autochro-3000 software. An Agilent C18 column (4.6 × 250 mm, 5 µm) maintained at ambient temperature ensured sharp and well-resolved peaks. The optimized mobile phase comprised methanol and 0.1 % orthophosphoric acid (pH 6, adjusted with triethylamine) in a 70:30 (v/v) ratio, delivered at a flow rate of 1.0 mL $min^{-1}$. Detection was performed at 256 nm with a 20 µL injection volume. These chromatographic conditions, established through systematic trial-and-error optimization. The retention time for Etodolac and Paracetamol was found to be 2.93 minute and 6.96 minute. The developed method was validated according to the International Conference on Harmonization (ICH) for the determination of Etodolac and Paracetamol in bulk and tablet dosage forms. The method was validated for specificity, linearity, precision, accuracy and solution stability. The method was linear in the drug concentration range of 20-200ppm with a correlation coefficient 0.99996. The method was also found to be robust as indicated by the % RSD values which are less than 2. The proposed method can be used successfully for determining Etodolac and Paracetamol from bulk and from dosage form.

**Keywords:** Etodolac, Paracetamol, HPLC, chromatographic analysis

**CH-331**


ISBN: 978-81-980623-8-3

**STRUCTURE-BASED DOCKING OF NATURAL XANTHOPHYLLS AGAINST RABIES VIRUS GLYCOPROTEIN (RABV-G) AT BASIC PH: POTENTIAL ANTIVIRAL CANDIDATES TARGETING PREFUSION CONFORMATION**

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In the current research rabies virus glycoprotein (RABV-G) plays a crucial role in viral attachment and membrane fusion, making it a valuable target for therapeutic intervention. The objective of the research was to study molecular docking to evaluate the antiviral potential of seven naturally occurring xanthophyll compounds: Carotenoid, Violaxanthin, Astaxanthin, Zeaxanthin, Lutein, Cryptoxanthin, and Cantaxanthin. At basic pH, RABV-G adopts a prefusion conformation characteristic of class III viral fusion proteins, exposing key interaction surfaces ideal for ligand binding. Using the RABV-G prefusion structure, we assessed binding affinity (GlideScore), hydrogen bonding, and interaction sites for each compound. Carotenoid exhibited the most favorable binding energy (−5.639 kcal/mol), forming stable hydrogen bonds with ARG152 (1.98 Å) and PRO353 (2.29 Å). Violaxanthin followed closely with a binding energy of −5.318 kcal/mol, interacting with GLU181 (1.65 Å), HIS020 (1.78 Å), and ARG152 (2.35 Å). Other ligands showed moderate binding energies ranging from −4.260 to −3.725 kcal/mol, with consistent interactions involving residues such as THR292, THR293, and GLU181. 2D and 3D interaction visualizations confirmed the specificity and stability of ligand-protein complexes, highlighting conserved binding pockets on RABV-G. The results indicate that xanthophyll compounds—especially Carotenoid and Violaxanthin—may act as inhibitors by stabilizing the prefusion conformation and blocking viral fusion. These findings support the potential of natural xanthophylls as lead candidates for antiviral drug development against rabies and possibly other viruses utilizing similar fusion mechanisms. Further *in vitro* and *in vivo* validation is recommended to confirm their efficacy.

**Keywords:** Rabies virus. Zeaxanthin, Violxanthin, Astaxanthin, Zeaxanthin, Lutein,

**CH-332**

**SYNTHESIS, CHARACTERISATION, *IN SILICO* STUDIES AND *IN VITRO* BIOLOGICAL EVALUATION ON SUBSTITUTED 1-(4-PHENYL THIAZOL-) HYDRAZINEDERIVATIVE.**

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Thiazoles Derivatives are Ubiquitous in Bio Medicine, Drug Discovery, Drug Delivery CADD is modern computational technique used in drug discovery. synthesis of novel 1-(4-phenylthiazole-2-yl) hydrazine and their derivatives were performed in *in-vitro* anti-Inflammatory, *in vitro* anti-diabetics and in-silico docking studies using 1JE4 protein crystal compare with control and standard drugs. also established Swiss-ADMET properties on synthesized derivative compounds. Conclusion reports are: compound PTD4 was observed best docking scores, binding energy. RMSD and Inhibition constant found to be -8.07 cal/mol, 10.315 and 1.22 milli Mole (mM) respectively when compare to all ligands. *In vitro* Anti Inflammatory activity campared with compound and standard, the derivatives of PTD 3. PTD5, PTD6, PTD 7 & PTD10 shown more activity campared to standard (61.309%) at 35 mg/ml concentration and to be dose dependent activity. *In vitro* Anti diabetics activity compared with compound and standard drug, synthesized derivative compounds shown more activity (65.639%) at 25 mg/ml con.c and control all found to be dose dependent activity.

**Keywords:** ADMET, Docking, IJE4 Thaiazoles, Hydrazine.

**CH-333**

**DESIGN, SYNTHESIS, CHARACTERIZATION, *IN-SILICO* AND *IN-VITRO* EVALUATION OF NEW OFLOXACIN IMINE ANALOGS AS POTENTIAL ANTI-TUBERCULAR DRUGS**

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This research focuses on developing new drugs to combat tuberculosis, particularly strains resistant to multiple existing treatments. Ofloxacin is a broad-spectrum fluoroquinolone antibiotic widely used against various bacterial infections. Compounds containing imine groups are known to exhibit significant biological activities. The present study aims to explore the potential of ofloxacin-imine derivatives with enhanced activity and reduced toxicity. Ofloxacin-imine derivatives (1–7) were synthesized via Schiff base formation, involving the condensation of a ketone with an amine. The compounds were characterized by analytical methods (TLC, solubility), and spectroscopic techniques (FT-IR, HRMS, and $^1$H-NMR). In-silico studies were conducted using Molinspiration, ChemSpider, SwissADME, and ProTox-III. The antitubercular activity of the synthesized compounds was evaluated using the Microplate Alamar Blue Assay (MABA) with isoniazid as the standard drug. Test concentrations (0.8, 1.6, 3.12, 6.25, 12.5, 25, 50, and 100 µg/mL) were prepared in sterile deionized water. All synthesized compounds exhibited activity at 1.6 µg/mL. In-silico studies predicted favorable pharmacokinetic properties, including gastrointestinal absorption and bioavailability, along with low toxicity profiles. The study successfully synthesized and evaluated a series of new ofloxacin-imine derivatives that demonstrated significant anti-tubercular activity *in vitro* and promising pharmacological potential based on computational predictions. These findings highlight their potential as lead compounds for the development of novel anti-tubercular agents.

**Keywords:** Ofloxacin-imine synthesis, *In-silico* studies, Anti-tubercular activity, Molinspiration, ProTox-III, SwissADME.

**CH-334**

**GREEN VALIDATED STABILITY-INDICATING REVERSE PHASE -HIGH PERFORMANCE LIQUID CHROMATOGRAPHY METHOD FOR IMEGLIMIN HYDROCHLORIDE: IDENTIFICATION OF PRINCIPAL DEGRADATION PRODUCTS USING LIQUID CHROMATOGRAPHY -MASS SPECTROPHOTOMETRY**

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Imeglimin Hydrochloride, a first-in-class glimin antidiabetic agent, offers therapeutic benefits in type 2 diabetes with low hypoglycemia risk. The present work aimed to develop and validate a green, stability-indicating Reverse Phase High-Performance Liquid Chromatography (RP-HPLC) method for its quantification in bulk and pharmaceutical dosage forms, alongside degradation profiling by Liquid Chromatography–Mass Spectrometry (LC-MS). Chromatographic separation was achieved on an Intersil ODS C18 column using a mobile phase of 0.05% orthophosphoric acid in water, methanol, and acetonitrile (90:5:5 v/v/v) at 1.0 mL/min, with detection at 239 nm. Validation followed ICH Q2(R2) guidelines, assessing specificity, linearity, accuracy, precision, robustness, and sensitivity. Forced degradation studies were conducted under acidic, basic, oxidative, thermal, and photolytic conditions, and degradation products were identified via LC-MS. Greenness of the method was assessed using GAPI and BAGI tools. The method exhibited excellent linearity across 10–60 ppm ($R^2$ = 0.9997), with LOD and LOQ of 0.999 and 3.029 ppm. Accuracy ranged from 98–102%, and %RSD for intra- and inter-day precision was below 2%. The drug was highly susceptible to oxidative degradation (74.5%) and moderately sensitive to alkaline hydrolysis (20%), while stable under acidic, thermal, and photolytic stress. LC-MS confirmed the presence of principal degradation products. Greenness evaluation indicated minimal hazardous solvent use, with a BAGI score of 80 and favorable GAPI profile. The validated RP-HPLC method is precise, robust, and environmentally sustainable, making it suitable for quality control and stability testing of Imeglimin Hydrochloride in pharmaceutical industries.

**Keywords:** Imeglimin Hydrochloride, RP-HPLCStability-indicating method, Forced degradation, LC-MS.

**CH-335**

**ANTIOXIDANT ACTIVITIES OF NOVEL INDOLE-BASED MANNICH BASE DERIVATIVES**




ISBN: 978-81-980623-8-3

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The present study aimed to synthesize and evaluate the antioxidant activities of indole-based Mannich base derivatives (M1–M5). These analogues were prepared via a condensation reaction between indole, formaldehyde/furfuraldehyde, and substituted aliphatic or aromatic amines. The synthesized compounds were structurally characterized using FTIR, $^{1}H$ NMR, $^{13}C$ NMR, and mass spectrometry. Antioxidant potential was assessed through *in vitro* DPPH assays. Results demonstrated that the analogues possessed notable antioxidant activity, attributed to the presence of phenyl, piperidine, and morpholine rings in their structures. Among them, M2, M3, and M5 exhibited superior activity, suggesting their potential as promising candidates for the development of novel antioxidant agents.

**Keywords:** Novel Indole derivative, Antioxidant activity, DPPH Method.

**CH-336**

## DEVELOPMENT, VALIDATION AND GREENNESS ASSESSMENT OF A NEW RP-HPLC METHOD FOR SIMULTANEOUS ESTIMATION OF BEMPEDOIC ACID AND EZETIMIBE IN TABLET DOSAGE FORM

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A cost-effective and dependable reversed-phase high-performance liquid chromatography (RP-HPLC) system was developed and proved to simultaneously measure the concentration of Bempedoic Acid (BEM) and Ezetimibe (EZE) in tablet form. A Phenomenex C18 column (150 × 4.6 mm, 5 µm) containing ammonium acetate/acetonitrile (50:50, v/v) mobile phase was used to run the analysis with the flow rate held at 0.9 mL/min and isocratic conditions. The column was heated at 30 o C, and it was detected at 220 nm. The optimized procedure gave clear and well-defined peaks to the retention time of 2.219 min of BEM and the retention time of 2.794 min of EZE which guaranteed a fast assay. Accurate analyses showed the values of the percent recalculated standard deviation (%RSD) of BEM of 0.8 and EZE of 1.2, and also accuracy was confirmed reported as 100.45 percent and 99.77 percent, respectively. Sensitivity Low detection and quantification limits (LOD: 0.14 µg/mL, LOQ: 0.42 µg/mL (BEM); LOD: 0.02 µg/mL, LOQ: 0.06 µg/mL (EZE)) were demonstrated. The calibration curves were greatly linear and regression equations were y = 32186x + 11484 in the case of BEM and y = 43904x + 1683 in the case of EZE. The validation of the method was performed according to the ICH standards and proved the robustness, accuracy, precision, and selectivity. The Analytical Eco-Scale and AGREE measures were used to determine the environmental profile of the method. The low usage of organic solvent, low run time and low waste generated resulted in a high Eco-Scale score, and the method can be described as an outstanding green one. AGREE assessment also attested that it would be suitable to use on a regular basis as a sustainable tool. In general, the created RP-HPLC method is sensitive, reproducible, and ecologically friendly, so it is a feasible alternative to the quality control of Bempedoic Acid and Ezetimibe as one of the combined formulations.

**Keywords**: Bempedoic Acid, Ezetimibe, RP-HPLC, Method validation, Eco-Scale, AGREE.

**CH-337**

## HIDDEN HAZARDS IN COCONUT WATER: A STUDY ON PESTICIDE CONTAMINANT IN COCONUT (COCOS NUCIFERA L.) WATER

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Coconut water, often celebrated as nature's most refreshing and nutrient-rich drink, is consumed worldwide for its hydrating and therapeutic benefits. However, the growing use of chemical pesticides in coconut farming raises concerns about the safety of this natural beverage. This study investigates the hidden hazards of pesticide contamination in coconut water, highlighting its sources, detection methods, and health implications. Pesticides such as organophosphates, carbamates, and parathyroid are frequently applied to protect coconut palms from pests. Over time, these chemicals can penetrate through the husk and contaminate the liquid endosperm, leading to detectable residues in coconut water. Advanced analytical techniques including Gas Chromatography-Mass Spectrometry (GC-MS) and High-Performance Liquid Chromatography (HPLC) are employed to identify and quantify these residues with high precision. Findings suggest that while most samples remain within permissible safety limits, certain cases exceed international standards, posing risks of neurotoxicity, hormonal imbalance, and long-term health complications. The study emphasizes the urgent need for sustainable practices such as organic farming, integrated pest management (IPM), and routine monitoring of coconut-based products. In conclusion, ensuring the purity of coconut water is essential for safeguarding consumer health, promoting trust, and sustaining the value of this natural resource.

**Keywords:** Coconut Water (Cocos nucifera L), pesticide contamination, Organophosphates, Carbamates, High performance liquid chromatography

**CH-338**

## APPLICATION OF RESPONSE SURFACE METHODOLOGY FOR THE DEVELOPMENT AND VALIDATION OF RP-HPLC ASSAY OF BEMPEDOIC ACID IN BULK AND DOSAGE FORMS

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A specific and novel RP-HPLC method has been optimized for the quantitative analysis of bempedoic acid using response surface methodology. The methods include response surface methodology (RSM) helps in studying the empirical relationship between one or more measured responses and many independent variables in the form of a polynomial equation. Mapping of those responses related to the experimental domain helps in generating an optimized method. In this present study, the empirical relationship between measured responses like % organic phase, column temperature, and flow rate and independent variables like retention time and theoretical plates are drawn in the form of a polynomial equation and an optimized method was developed from that using Box-Behnken Design (BBD). The result analytes chromatogram was run through SB C18 100x1.8mm, 2µm. The optimized data from Design Expert software consists of 0.01% OPA: Acetonitrile (56.05:43.95%, v/v) as mobile phase pumped through column with 1.02ml/min flow rate at 30.09°C gave highest desirable function of 1. The retention times of the drug were found to be 2.231 min. The optimized method was validated as per instructions given in ICH Q2 (R1) guidelines. The conclusion Based on the results of the analysis of variance, the selected model for the responses like retention time and tailing factor were found to be significant with p=0.05. 2D contour plots were inured to visualize the effect of factors and their interactions on the response. Validation of design was done using actual plots vs. predicted values for responses. All the validation parameter results were within limit.

**Keywords:** RP-HPLC, Bempedoic Acid, Quantitative Analysis, Response Surface Methodology (RSM).

**CH-339**

## MOLECULAR DOCKING ANALYSIS OF SANTALLIN (Red Sandalwood) WITH COX II

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Pterocarpus santalinus Linn, generally referred to as red sandalwood, is esteemed for its therapeutic attributes, especially its anti-inflammatory capabilities. The principal bioactive component, santallin, has lately garnered interest as a potential selective inhibitor of cyclooxygenase-II (COXII), an enzyme essential in mediating inflammatory reactions. This work utilized molecular docking techniques to examine the binding interactions between santallin and COXII. The crystal structure of COXII was obtained from the Protein Data Bank and constructed by delineating




ISBN: 978-81-980623-8-3

the active site according to essential catalytic residues. The three-dimensional structure of Santallin was refined by computational approaches before conducting docking simulations with PyRx Python Prescription 0.8. The docking results indicated that santallin binds effectively inside the active region of COXII, demonstrating a binding energy of around – 8.2 kcal/mol. Comprehensive interaction study revealed that santallin establishes stable hydrogen bonds with key residues, including such as TYR B:136 and ASP B:157, while hydrophobic interactions additionally reinforce its positioning within the enzyme's binding pocket. Furthermore, the ligand was noted to penetrate a neighboring side pocket, a characteristic frequently linked to increased selectivity for COXII relative These findings suggest that santallin is a promising candidate for the development of selective COXII inhibitors.

**Keywords:** Pterocarpus santalinus Linn, anti-inflammatory, cyclooxygenase-II

**CH-340**

**_IN SILICO_ DESIGN, SYNTHESIS, CHARACTERIZATION AND PHARMACOLOGIC EVALUATION OF NOVEL PYRAZOLE DERIVATIVES**

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In the present work, an efficient synthesis of 3,5-diphenyl-1H-pyrazoles was carried out from chalcones. The chalcone-epoxide, prepared from chalcones, was treated with phenyl hydrazine hydrate, resulting in cyclization and simultaneous dehydration to yield the desired pyrazole derivatives. This process corresponds to the Wharton reaction, in which hydrazine hydrate acts as a nucleophilic reagent without the addition of acetic acid, making the method simple and convenient.Based on the pharmacological potential of pyrazole derivatives, an attempt was made to synthesize a pyrazole-3-benzoic acid derivative. The newly synthesized compounds were thoroughly characterized using FT-IR, NMR, and Mass spectroscopic methods, confirming their structures.The derivatives that displayed the most promising docking scores were further evaluated for anticancer activity. The biological studies were performed using Dalton Lymphoma Ascits (DLA) cells through the Trypan Blue Exclusion method. The anticancer effect was expressed in terms of percentage cell death.The results demonstrated that the synthesized pyrazole derivatives exhibited significant anticancer activity. Thus, these compounds may serve as potential candidates for further development as anticancer agents.

**Keywords:** Pyrazole, Chalcone, Phenyl hydrazine hydrate, Wharton reaction

**CH-341**

**DESIGN, _IN-SILICO_ STUDIES AND NETWORK PHARMACOLOGY APPROACHES OF BENZAMIDE AND PYRIDINE CONJUGATE DERIVATIVES FOR IMMUNOMODULATORY ACTIVITY**

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The modulation of immune system in recent years has drawn a considerable attention in drug discovery for managing autoimmune disorder, inflammatory condition and cancer. Benzamide and pyridine structure shows a wide range of biological activities which includes anti-inflammatory, anti-cancer, and immune system regulating properties. In this study, novel benzamide-pyridine conjugate derivatives are designed to improve immunomodulatory potential through structural blending and careful optimization. This study covers *in silico* process that included molecular docking, ADMET profiling, and pharmacophore modeling to evaluate how well these compounds bind to important immunological targets, such as cytokine receptors, NF-κB pathway proteins, and JAK/STAT signaling mediators. Docking studies showed positive interactions through hydrogen bonding, π-π stacking, and hydrophobic contacts, indicating a strong fit between the ligands and targets. The ADMET analysis suggested good oral bioavailability, drug-likeness, and low toxicity, which supports their potential as lead candidates. Further this study encompasses a network pharmacology approach to outline the multi target and pathway-level interactions of the conjugate derivatives. Combining computational drug design with system biology gave us a border view of the immunomodulatory effectiveness of these derivatives, showcasing their ability to act on multiple targets. Overall, this study shows that benzamide-pyridine conjugates are promising candidates for immunomodulatory drug discovery.

**Keywords:** Immunomodulatory activity, Benzamide-pyridine conjugate, In-silico studies, Network pharmacology.

**CH-342**

**NETWORK PHARMACOLOGY AND MOLECULAR DOCKING-BASED INVESTIGATION OF NATURAL COMPOUNDS TARGETING MASLD: A MULTI-TARGET THERAPEUTIC STRATEGY**

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Metabolic dysfunction-associated steatotic liver disease (MASLD), formerly termed non-alcoholic fatty liver disease (NAFLD), is the most prevalent chronic liver condition, affecting 25–30% of the global adult population. Characterized by excessive hepatic fat deposition in the context of metabolic dysfunction, MASLD can progress to fibrosis, cirrhosis, and hepatocellular carcinoma, underscoring the urgent need for effective therapies. Tephrosia purpurea (Sharpunkha), traditionally used in Ayurveda for liver and digestive disorders, is reported to possess antioxidant, anti-inflammatory, and hepatoprotective activities. This study explores its therapeutic potential against MASLD using a network pharmacology-based approach. Phytoconstituent-related targets were retrieved from IMPPAT, Dr. Duke's Phytochemical Database, and KNApSAcK, yielding 118 unique genes. MASLD-associated genes (1474) were obtained from GeneCards, OMIM, and DisGeNET. Venn diagram analysis identified overlapping targets, which were further examined using protein–protein interaction (PPI) networks (STRING, Cytoscape). Gene Ontology and KEGG enrichment revealed significant involvement of pathways linked to lipid metabolism, inflammation, insulin resistance, and oxidative stress regulation. Our findings suggest that Tephrosia purpurea may exert hepatoprotective effects through multi-target and multi-pathway modulation of MASLD-related mechanisms. This integrative computational framework provides mechanistic insights into the potential role of T. purpurea in MASLD therapy and supports future validation through experimental and clinical studies.

**Keywords:** MASLD, Tephrosia purpurea, Network Pharmacology, Gene Targets, Pathway Analysis

**CH-343**

**ANALYTICAL METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS ESTIMATION OF DEXMETHYLPHENIDATE AND SERDEXMETHYLPHENIDATE BY RP-HPLC**

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A simple, rapid, precise, sensitive and reproducible reverse phase high performance liquid chromatographic (RP-HPLC) method has been developed for the quantitative analysis of Dexmethylphenidate and Serdexmethylphenidate in pharmaceutical dosage form. Chromatographic separation of Dexmethylphenidate and Serdexmethylphenidate was achieved on Waters Alliancee2695, by using X-Bridge Phenyl, 250x4.6mm, 5µm column and the mobile phase containing acetonitrile and hexane sulphonic acid in the ratio of 60:40% v/v. The flow rate was 1.0 mL/min; detection was carried out by absorption at 236nm using a photodiode array detector at ambient temperature. The number of theoretical plates and tailing factor for Dexmethylphenidate and Serdexmethylphenidate were NLT 2000 and should not more than 2 respectively. % Relatives tandard deviation of peak areas of all measurements always less than 2.0. The proposed method was validated according to ICH guidelines. The method was found to be simple, economical, precise, accurate and robust method for quantitative analysis of Dexmethylphenidate and Serdexmethylphenidate and study of its stability.

**Keywords:** Dexmethylphenidate, Serdexmethylphenidate, RP-HPLC and Validation.




ISBN: 978-81-980623-8-3

**CH-344**

## DEVELOPMENT AND VALIDATION OF STABILITY INDICATING RP-HPLC METHOD FOR SIMULTANEOUS ESTIMATION OF MIRABEGRON AND SOLIFENACIN SUCCINATE

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A simple, rapid, precise, sensitive and reproducible reverse phase high performance liquid chromatography (RP-HPLC) method has been developed for the quantitative analysis of Mirabegron and Solifenacin Succinate in pharmaceutical dosage form. Chromatographic separation of Mirabegron and Solifenacin Succinate was achieved on Waters Alliance e2695 by using Symmetry C18 (150 mm x 4.6 mm, 3.5µm) column and the mobile phase containing phosphate buffer pH 3.4 and acetonitrile in the ratio of 35:65% v/v. The flow rate was 1.0 mL/min and detection was carried out at 240 nm using a photodiode array detector at ambient temperature. The number of theoretical plates and tailing factor for Mirabegron and Solifenacin Succinate were NLT 2000 and should not more than 2 respectively. % RSD of peak areas of all measurements was less than 2.0. The proposed method was validated according to ICH guidelines. The method was found to be simple, economical, suitable, precise, accurate & robust method for simultaneous estimation of Mirabegron and Solifenacin Succinate in bulk and pharmaceutical formulation.

**CH-345**

## SPECTROPHOTOMETRIC METHODS FOR THE DETERMINATION OF PROPRANOLOL USING ALIZARIN RED-S AND ERYTHROSIN –B

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A new spectrophotometric method has been developed for the determination of propranolol hydrochloride using Alizarin Red-S (ARS) and Erythrosin-B (ERB). The method involves the formation of red-colored ion-pair complexes between propranolol and the dyes at pH 5.12. These complexes are extractable into chloroform and exhibit maximum absorbance at 515 nm for ARS and 525 nm for ERB. Various experimental conditions such as pH, reagent concentration, and extraction time were optimized to achieve maximum absorbance and stability of the complexes. The method was applied successfully to both bulk drug samples and pharmaceutical formulations of propranolol. The results demonstrated good linearity, precision, accuracy, and reproducibility. Compared to other techniques, this method is simple, cost-effective, and does not require sophisticated instrumentation, making it suitable for routine analysis in quality control laboratories. The strong ion-pair complex formation under the selected pH ensures good sensitivity and specificity. The procedure provides a reliable alternative for propranolol determination and can be used for routine quality control in pharmaceutical industries. Overall, the proposed spectrophotometric methods offer practical and effective tools for the quantification of propranolol hydrochloride in various dosage forms.

**Keywords:** Alizarin Red-S, Erythrosin-B, propranolol hydrochloride, and spectrophotometry.

**CH-346**

## DESIGN, SYNTHESIS AND ANTITUBERCULAR ACTIVITY ASSESSMENT OF SOME 3-CHLOROYPYRAZINE-2-CARBOXAMIDE DERIVATIVES

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Seven new compounds having 3-chloropyrazine-2-carboxamide nucleus were synthesized. The chemical structures of the newly synthesized 3-chloropyrazine-2 carboxamide derivatives were verified by analytical data. Additionally, the resazurin assay was used to assess the antitubercular activity of all the newly synthesized compounds against M. tuberculosis H37RV. The obtained results were compared with Rifampicin, Isoniazid and Pyrazinamide. The synthesized compounds demonstrated significant antitubercular activity against Mycobacterium tuberculosis (H37RV strain) with minimum inhibitory concentrations (MIC) ranging from 0.2 to 12.5 µg/mL, indicating their potential as effective anti-TB agents. Among the tested compounds, 3-chloropyrazine-2-carboxamide derivatives S8-17, S8-26 exhibited MIC 0.2 µg/mL better antitubercular activity that Rifampicin (MIC 0.4 µg/mL), Isoniazid (MIC 0.8 µg/mL) and Pyrazinamide (MIC 12.5 µg/mL). Compound S8-19, S8-25, S8-189, S8-13 and S8-28 found active at 0.8, 1.6, 3.125, 12.5 and 12.5 µg/mL respectively.

**Keywords:** Antitubercular action, M. tuberculosis H37RV, MABA, and pyrazine

**CH-347**

## DEVELOPMENT AND VALIDATION OF ANALYTICAL METHOD FOR SIMULTANEOUS ESTIMATION OF ELBASVIR AND GRAZOPREVIR BY RP-HPLC

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A rapid and precise reverse phase high performance liquid chromatographic method has been developed for the validated of Elbasvir and Grazoprevir, in its pure form as well as in tablet dosage form. Chromatography was carried out on a Targetsil C18 (4.4 ×150mm, 5µm) column using a mixture of Acetone: 0.1% OPA (50:50v/v) as the mobile phase at a flow rate of 1.0ml/min, the detection was carried out at 240nm. The retention time of the Elbasvir and Grazoprevir was 2.079, 4.045 ±0.02min respectively. The method produces linear responses in the concentration range of 5-25µg/ml of Elbasvir and 93.75-448.75µg/ml of Grazoprevir. The method precision for the determination of assay was below 2.0%RSD. The method is useful in the quality control of bulk and pharmaceutical formulations.

**Keywords:** Elbasvir, Grazoprevir, RP-HPLC, validation.

**CH-348**

## DESIGN AND SYNTHESIS OF GRAPHENE-BASED NANOCOMPOSITES FOR TREATMENT OF CANCER

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A study on the design and testing of a graphene oxide–iron oxide (GO–IO) nanocomposite containing the anticancer medication rucaparib (GO–IO–R) is presented. Graphene oxide was prepared by using a modified Hummer's method. Each step was confirmed by UV and FTIR spectroscopy. These tests showed that the expected structure of GO, GO-IO, and the finished drug-loaded material was validated by these analyses. The nanocomposite had a stable dispersion and was 200–500 nm in diameter with low polydispersity. Additionally, differential scanning calorimetry (DSC) showed that the material's thermal integrity was preserved. Approximately 79.8% of rucaparib was successfully attached to the GO–IO framework, according to drug-loading experiments. The well-known sheet-like appearance of graphene oxide embellished with evenly spaced iron oxide nanoparticles was brought to light by scanning electron microscopy (SEM). The cell line study shows that the rucaparib-induced apoptosis of HeLa cells was estimated by flow cytometry.

**Keywords:** Graphene Oxide–Iron Oxide (GO–IO) Nanocomposite, Rucaparib, Hummers' Method, FTIR and UV-visible Spectroscopy, Scanning Electron Microscopy, Differential Scanning Calorimetry.

**CH-349**

## EUGENOL-1,3,4-OXADIAZOLE DERIVATIVES AS MULTI-TARGET ANTICANCER CANDIDATES: *IN VITRO* AND *IN SILICO* EVALUATION

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ISBN: 978-81-980623-8-3

Semisynthetic modification of natural products remains a powerful strategy in anticancer drug discovery. In this work, eugenol was synthetically modified to generate a new series of 1,3,4-oxadiazole derivatives (4a–4f). The structures were confirmed by FTIR, NMR, and mass spectrometry. Molecular docking studies targeting the PI3K/AKT/mTOR pathway revealed favorable binding interactions, indicating their potential as multi-target anticancer agents. The *in vitro* cytotoxicity of the derivatives was evaluated against breast cancer cell lines MDA-MB-231 and MCF-7. In MDA-MB-231 cells, all derivatives (IC50 = 150.8–285.2 µg/mL) exhibited stronger activity compared to eugenol (IC50 = 474.5 µg/mL), with compound 4d emerging as the most potent (IC50 = 150.8 µg/mL). In MCF-7 cells, compound 4b (IC50 = 14.08 µg/mL) demonstrated superior cytotoxicity relative to eugenol (IC50 = 26.56 µg/mL). Doxorubicin, used as the reference standard, showed IC50 values of 2.92 µg/mL and 1.08 µg/mL in MDA-MB-231 and MCF-7 cells, respectively. *In silico* ADMET predictions confirmed compliance with Lipinski's rule of five, high gastrointestinal absorption, and favorable bioavailability. Collectively, these findings suggest that eugenol-derived 1,3,4-oxadiazoles, particularly compounds 4d and 4b, possess enhanced anticancer activity and promising drug-like profiles, supporting their potential as semisynthetic leads for anticancer drug development.

**Keywords:** Eugenol derivatives, 1,3,4 oxadiazole, Breast cancer, Molecular docking, Anticancer activity.

**CH-350**

## PHARMACOPHORE BASED VIRTUAL SCREENING AND MOLECULAR MODELING STUDIES TO IDENTIFY POTENTIAL PDE4B INHIBITORS FOR THE TREATMENT OF ALZHEIMER'S DISEASE

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Phosphodiesterases (PDEs) are the enzymes that control the intracellular concentrations of cyclic adenosine monophosphate (cAMP) and cyclic guanosine monophosphate (cGMP). Among various isoforms of the PDEs, PDE4, PDE7, and PDE8 expression alteration in the brain is linked to Alzheimer's disease (AD). The current study aims to identify a selective PDE4B (4NW7) and PDE4D (3G4G) inhibitor by identifying the pharmacophoric elements, followed by drug design approaches. The pharmacophore model was validated using EF Value, GH score, and percentage yield to select the best-suited model. The optimized model was used to screen the Zinc-15 database, and this produced a collection of selective compounds. The compounds were filtered using a KNIME workflow, followed by various molecular property filters and the PAINS filter. The resulting compounds were further subjected to virtual screening to identify the hits. Additionally, precision-based docking was carried out in all three stages. Out of the candidates, the following four compounds, ZINC000096114200, ZINC000000598713, ZINC000096115334, and ZINC000096116289, showed strong binding affinity and featured molecular properties and low predicted toxicity. Further molecular dynamics (MD) simulations, post-MD simulation analysis, and binding free energy calculations of the hits established that ZINC000096114200 and ZINC000000598713 were determined as the most promising PDE4B and PDE4D inhibitor, which has the potential to enhance cAMP signalling and AD-related cognitive failures.

**Keywords:** Phosphodiesterase, cAMP, Alzheimer's Disease, Pharmacophore Modelling, Molecular Dynamics.

**CH-351**

## DEVELOPMENT AND VALIDATION OF ANALYTICAL METHOD FOR THE ESTIMATION OF BILASTINE IN PHARMACEUTICAL DOSAGE FORM

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The study describes a validated stability indicating reverse-phase HPLC method for the estimation of Bilastine in bulk and in tablet formulation. The proposed RP-HPLC method utilizes a Kromasil C18 column (150 × 4.6 mm, 5 µm), optimum mobile phase consisted of acetonitrile and ammonium acetate buffer (adjusted to pH 3.0) in the ratio of 40:60 v/v, effluent flow rate was kept at 1.0 mL/min and UV detection wavelength 275 nm. Bilastine was exposed to various hydrolytic, thermal, photolytic and oxidative stress conditions, and the stressed samples were analysed by proposed method. The drug showed degradation under alkali hydrolysis conditions. The degradation products were well resolved from the drug demonstrated that the method is specific stability indicating for assay of Bilastine in presence of degradation products. The developed method was validated as per ICH Q2R1 guidelines for linearity, accuracy, precision, robustness, ruggedness and specificity. The method was found to be linear in concentration range 2–50 µg/mL with $r^2$ = 0.9999, accurate with mean recovery of 99.39% and precise with maximum RSD of 0.90. LOD and LOQ were found to be 0.023 µg/mL and 0.068 µg/mL, respectively. System suitability parameters indicated the high column efficiency with sharp symmetrical peaks. The method is simple, rapid and specific for routine quality control of Bilastine in tablet formulation.

**Keywords:** Bilastine, RP-HPLC, stability-indicating assay method, ICH guidelines.

**CH-352**

## NETWORK PHARMACOLOGY COMBINED WITH EXPERIMENTAL VERIFICATION TO EXPLORE THE POTENTIAL OF VILANGIN IN THE MANAGEMENT OF COLORECTAL CANCER

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Colorectal cancer (CRC) is among the most prevalent and lethal malignancies worldwide, and the effectiveness and safety of currently available treatment options are often limited. This study investigates the anticancer potential of vilangin, a dimeric benzoquinone derivative from Embelia ribes, by integrating network pharmacology, molecular docking, and *in vitro* assay. Databases such as SwissTargetPrediction, GeneCards, OMIM, and NCBI were explored to retrieve targets for vilangin and CRC. The intersection of these targets was analysed through a protein-protein interaction (PPI) network using STRING. The results were visualised in Cytoscape and further subjected to Gene Ontology (GO) and KEGG pathway analysis. Also, the genes with high node degree values were validated via an *in-silico* docking study using Schrodinger software. Finally, the cytotoxic potential of vilangin against the HCT116 CRC cell line was evaluated using the MTT assay. A total of 89 target proteins were found in common between CRC and vilangin. PPI analysis revealed IL6, STAT3, MMP9, and CASP3, among others, as key targets with high node degree values. GO and KEGG pathway enrichment analysis of the genes revealed the involvement of key cancer-related pathways, including apoptosis and IL-17 signalling. Molecular docking study demonstrated strong binding affinities of vilangin with STAT3 and MMP9, with interacting amino acid residues comparable to those of doxorubicin. The MTT assay of vilangin against HCT116 cells displayed a concentration-dependent cytotoxicity with $IC_{50}$ values of 80.15 µg/mL. Collectively, these findings provide support for the possibility of using vilangin as a multi-targeted anticancer treatment for CRC.

**Keywords**: Vilangin, Network pharmacology, Colorectal cancer, Molecular docking, Cytotoxicity

**CH-353**

## DOCKING, SYNTHESIS AND ANTIMYCOBACTERIAL ACTIVITY OF NOVEL HYDRAZONE DERIVATIVES OF ACETYL SALICYLIC ACID.

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To synthesize and evaluate antimycobacterial activity of novel hydrazone derivatives of acetyl salicylic acid. Molecular docking of 5 compounds was performed by Autodock Vina software. Compounds were targeted on 2NSD and 2X22 involved in tuberculosis activity. Ester moiety was reacted with hydrazine hydrate to produce hydrazide, which on treatment with aromatic aldehydes or ketones yields hydrazones. The novel series of compounds were elucidated on the basis of spectral studies and screened for antimycobacterial activity. Compound no. 1 and 3 which show the sensitivity towards bacteria at 0.8 µg/ml and compound no. 2 and 5 exhibited at 1.6 µg/ml level. The antibacterial




ISBN: 978-81-980623-8-3

activity is strongly connected with the position of the substituent on aromatic aldehyde or ketones in relation to the hydrazide skeleton.

**Keywords:** acetyl salicylic acid, hydrazone, antimycobacterial activity.

**CH-354**

## MOLECULAR DOCKING AND *IN-VIVO* EVALUATION OF NOVEL DRUG IN PEPTIC ULCER

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The present study was aimed at exploring the potential antiulcer activity of pramipexole, a dopamine D2/D3 receptor agonist, through a combined in-silico and in-vivo approach. The primary objectives were to assess the binding affinity of pramipexole to the histamine H2 receptor using molecular docking and to evaluate its gastroprotective efficacy in an ethanol-induced peptic ulcer rat model. Molecular docking studies were performed using AutoDock tools to examine the interaction of pramipexole with the histamine H2 receptor. For in-vivo studies, an ethanol-induced gastric ulcer model was developed in Wistar albino rats, divided into control, standard (famotidine 20 mg/kg), and test groups receiving pramipexole at 1 mg/kg and 2.5 mg/kg doses. Parameters including ulcer index, gastric volume, pH, and total acidity were recorded. The drug suspension formulation was prepared and evaluated prior to administration. Acute toxicity studies were also conducted to confirm safety. Stomach tissues were analyzed histologically to assess mucosal damage and healing. Docking results revealed a significant binding affinity of pramipexole to the H2 receptor with a docking score of −8.3041 kcal/mol, indicating a potential interaction. In-vivo findings showed a dose-dependent reduction in ulcer index and total acidity, along with an increase in gastric pH in pramipexole-treated groups compared to the ulcer control group. Histopathological examination supported the biochemical findings, with improved mucosal integrity and reduced hemorrhagic lesions observed in treated groups, especially at the higher dose. The study concludes that pramipexole exhibits promising antiulcer activity, likely mediated through histamine H2 receptor interaction and mucosal protective mechanisms. The results support further investigation into pramipexole as a potential therapeutic candidate for peptic ulcer disease.

**Keywords:** Dopamine D2/D3 receptor agonist, Histamine H2 receptor, Molecular docking, Ethanol-induced gastric ulcer, Mucosal integrity, Peptic ulcer disease

**CH-355**

## MOLECULAR DOCKING AND *IN VITRO* ANTITUBERCULAR EVALUATION OF PHYTOCONSTITUENTS FROM SELECTED ETHNOMEDICINAL PLANTS AGAINST MYCOBACTERIUM TUBERCULOSIS

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Tuberculosis (TB) remains a major global health challenge, compounded by increasing drug resistance. This study explores the anti-tuberculosis potential of phytoconstituents from ethnomedicinal plants such as Gokhru (Tribulus terrestris), Vayyari Bhama (Pedalium murex), Chadurakalli (Cissus quadrangularis), Karakkaya (Terminalia chebula), Vailaku (Musa paradisiaca), Enugu Pallera (Ricinus communis), and Psidium guajava (Psidium guajava L.), which are important medicinal plants used in traditional medicine for their various therapeutic properties. The investigation employed a combined approach of *in silico* molecular docking and *in vitro* bioassays. Molecular docking targeted key Mycobacterium tuberculosis enzymes, including InhA, KasA, and DNA gyrase, to evaluate the binding affinities and interaction mechanisms of plant-derived compounds. Compounds demonstrating promising docking scores were further tested for their inhibitory activity against Mycobacterium tuberculosis strains through standardized *in vitro* assays to determine minimum inhibitory concentrations (MIC). The findings show that several phytochemicals strongly bind to essential TB enzymes and significantly inhibit bacterial growth *in vitro*, with effects comparable to current drugs. This dual approach affirms the potential of these plants as sources of new anti-TB agents and offers a framework for future isolation and drug development efforts to combat multidrug resistance in tuberculosis.

**Keywords**: Molecular docking, Ethnomedicinal plants, Antitubercular activity, Phytoconstituents, Mycobacterium tuberculosis, *In vitro* assay, Drug resistance, Natural products

**CH-356**

## *IN VITRO* ANTI-INFLAMMATORY ACTIVITY, DRUG LIKENESS, TARGET PREDICTION AND MOLECULAR DOCKING ANALYSIS OF BIOACTIVE COMPOUNDS FROM DURANTA ERECTA

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The current study investigates Durant aerecta phytochemical profile and biological activity using a combination of computational modeling and laboratory experiments. The findings revealed the existence of important bioactive elements as carbohydrates, glycosides, flavonoids, steroids, and phenolic compounds. Pharmacokinetic predictions using SWISSADMET found that all 10 selected drugs have desirable features, including compliance with Lipinski's Rule of Five and high gastrointestinal absorption. KEGG pathway mapping and Cytoscape network analysis revealed significant interactions between the chemicals and the proteins HSP90AA1, HIF1A, and HSP90AB1, based on degree centrality and binding affinity. Among them, the HIF1A gene, which is intimately associated to inflammatory reactions, emerged as a crucial target, with the 4BQG protein sequence from the PDB database used in docking investigations. Durantoside I (-9.7 kcal/mol), Durantoside II (-10.2 kcal/mol), and Scutellarein (-9.9 kcal/mol) all have a high binding affinity for the inflammatory target protein 4BQG, showing their potential as natural anti-inflammatory drugs. *In vitro* tests revealed that the methanol extract of Durantaerecta had significant anti-inflammatory properties when compared to the standard. This methanol fraction also had the highest levels of total glycosides (TGC) and total flavonoids (TFC), indicating a higher medicinal potential. Overall, these data suggest Durantaerecta's potential as a treatment for inflammation and associated disorders, particularly its methanolic extract. They also lay a solid framework for future *In vivo* and clinical studies to establish its usefulness in treating inflammatory illnesses.

**Keywords:** Anti-Inflammatory Activity, Drug Likeness, Target Prediction, Molecular Docking

**CH-357**

## STABILITY-INDICATING RP-HPLC METHOD FOR THE QUANTIFICATION OF ROSUVASTATIN AND BEMPEDOIC ACID IN PHARMACEUTICAL DOSAGE FORMS: AN INTEGRATED AQBD AND GAC APPROACH

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Cardiovascular events remain a leading global health concern with elevated lipoprotein level recognized as a key contributor to their incidence. Rosuvastatin (ROSU) and Bempedoic acid (BEMP) are lipid-lowering drugs in combination form for the management of heterozygous familial hypercholesterolemia. A robust, stability-indicating, and eco-friendly RP-HPLC method was developed and validated for the simultaneous estimation of rosuvastatin and bempedoic acid in a pharmaceutical formulation. The Analytical Quality by Design (AQbD) strategy was applied with Central Composite Design (CCD) to optimize risk factors affect the chromatographic condition, such as acetonitrile ratio and pH. The optimized method used a Phenomenex Kinetex XB-C18 column (150 x 4.6 mm, 5µ), Acetonitrile: 20mM Ammonium formate buffer (35:65% v/v, pH 2.5) as the mobile phase, operating at a flow rate of 1.0 mL/min, and detection at 250 nm. The retention time of ROS and BEMP was found to be 9.85 min and 6.39 min. The method was validated as per ICH Q2(R1) guidelines for specificity, precision, accuracy, robustness, LOD, LOQ, and linearity. Forced degradation investigations were verified by acidic, basic, oxidative,


ISBN: 978-81-980623-8-3

thermal, and photolytic environments for determine the stability-indicating potential. Greenness was evaluated by ComplexGAPI and AGREE metrics, yielding an AGREE score of 0.70 and E-factor of 50. This study compliance with regulations and ecological sustainability renders it suitable for regular quality control assessment. This approach is anticipated to be highly beneficial moving forward because of the therapeutic exploration possibilities offered by ROSU-BEMP combination.

**Keywords:** Rosuvastatin, Bempedoic acid, AQbD, RP-HPLC, Green chemistry

**CH-358**

## QUALITY BY DESIGN-ENABLED RP-HPLC METHOD FOR PIOGLITAZONE AND VILDAGLIPTIN AND FORCED DEGRADATION STUDIES: ROBUSTNESS THROUGH DESIGN SPACE EXPLORATION

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A unique, environmentally friendly RP-HPLC technique has been established for the concurrent measurement of Pioglitazone and Vildagliptin, based on Analytical Quality by Design (AQbD) using Central Composite Design, including 13 experimental runs to optimize analytical parameters. It offers a systematic, risk-based approach in designing robust analytical methods that consistently meet their intended performance in implementing comprehensive validation and control strategies. The Agilent 1260 Infinity II HPLC system, with a quaternary pump and a Phenomenanex C18 column (150 x 4.6mm, 5µm), achieves robust separation with retention times of 2.21 min and 3.47 min for Vildagliptin and Pioglitazone respectively at a flow rate of 0.8 ml/min and UV detection at 220 nm. Validation using ICH guidelines demonstrated high precision, accuracy allowing for trustworthy quantification. The greenness of the proposed method were evaluated using AGREE, MoGAPI metrics, and White Analytical Principles via BAGI, with the method achieving an acceptable greenness and a BAGI score of 82.5, demonstrating high applicability and environmental safety. Forced degradation studies confirmed the method's stability-indicating power; both drugs could be accurately quantified in the presence of degradation products, with base-induced stress yielding the highest degradation. Thus, the established analytical technique allows for the unambiguous separation, quantification, and stability evaluation of Pioglitazone and Vildagliptin also meets contemporary sustainability norms. These findings show the increased sensitivity of the compounds to alkaline and oxidative stress, while acid, thermal, and photolytic conditions had no effect. The approach provides an environmentally friendly, reliable, and regulatory-compliant option for the estimation of these drugs in formulation.

**Keywords:** AQbD, AGREE, Method development, RP-HPLC, Validation

**CH-359**

## CUTTING-EDGE UHPLC-HRMS/MS METHOD FOR ULTRA-SENSITIVE DETECTION OF OCTREOTIDE IMPURITIES

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Octreotide, a synthetic somatostatin analogue, requires stringent impurity profiling to ensure safety and efficacy. A high-resolution UHPLC-HRMS/MS method was developed and validated for the qualitative and quantitative analysis of peptide-related impurities at or above 0.10 % of the drug substance. Chromatography was performed using a trifluoroacetic acid–acetonitrile–water system compatible with mass spectrometry. Qualitative analysis employed ESI+ scanning from m/z 100–1500, while quantitative analysis used ESI+ scanning from m/z 200–1500 at 70,000 resolutions with optimized gas and voltage parameters. Following U.S. FDA guidance, impurity profiles were compared across six reference-listed drug (RLD) batches of three strengths (sampled from 27 months prior to expiry through end-of-shelf-life) and nine ANDA exhibit batches of the proposed generic product (tested at release and again 4–9 months before expiry). Results demonstrated that the generic product's impurity profile closely matched the RLD, with no new peptide-related impurities ≥0.10 % detected. A combined peak at relative retention time (RRT) 1.31 contained [Des-Threoninol]-Octreotide and an unknown impurity of molecular weight 1076.4 Da; the latter was the major component, while [Des-Threoninol]-Octreotide remained below the 0.05 % disregard limit. Because these cannot be chromatographically resolved, they are jointly controlled at a 0.5 % limit. Additionally, six other unknown impurities ≥0.10 % were fully characterized by UHPLC-HRMS/MS or reference standards. This study confirms that the proposed generic octreotide product exhibits an impurity profile equivalent to the RLD and meets regulatory expectations for safety and quality.

**Keywords:** Octreotide, UHPLC-HRMS/MS, Reference listed drug, Impurities, and USFDA Guidelines.

**CH-360**

## ADMET PREDICTIVE MODELLING IN DRUG DISCOVERY

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The pharmacokinetic and safety profile of a drug candidate is largely determined by its Absorption, Distribution, Metabolism, Excretion, and Toxicity (ADMET) characteristics. Evaluating these properties at an early stage has become indispensable in drug discovery, particularly during lead optimization, since even minor chemical modifications can significantly alter therapeutic efficacy and adverse effects. Conventional ADMET testing through *in vitro* assays, animal models, and clinical trials, though valuable, is often labor intensive, costly, and limited in scale. To address these shortcomings, computational strategies have gained prominence, employing rule based filters, quantitative structure activity relationship (QSAR) models, and molecular simulations to predict pharmacokinetic behavior. In recent years, numerous freely available platforms and databases such as pkCSM, SwissADME, ADMETlab, and Toxtreehave enabled rapid *in silico* screening and prioritization of candidate molecules. The integration of artificial intelligence and machine learning has further advanced this field, providing data driven models capable of large scale, accurate prediction and multiparametric optimization. This review summarizes both traditional and modern approaches, highlights open-access tools, and presents a step-by-step tutorial on AI based ADMET prediction. Collectively, these developments demonstrate how computational ADMET modeling can reduce attrition, refine lead optimization, and accelerate the progression of new drug candidates toward clinical use.

**Keywords:** Drug discovery, Lead optimization, Pharmacokinetics, Toxicity prediction.

**CH-361**

## METHOD DEVELOPMENT AND VALIDATION OF RP-HPLC METHOD FOR SIMULTANEOUS ESTIMATION OF ATORVASTATIN CALCIUM AND OLMESARTAN MEDOXOMIL IN PHARMACEUTICAL DOSAGE FORM

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A new, simple, precise, accurate and reproducible RP-HPLC method developed and validated for Simultaneous estimation of Atorvastatin calcium and Olmesartan medoxomil in Oral solid dosage form. Separation of Atorvastatin calcium and Olmesartan medoxomil was successfully achieved on a Inertsil ODS C18 (250mm X 4.6mm X 5µ Make: Waters) in an isocratic mode utilizing Orthophosphoric acid buffer (pH 2.5): Acetonitrile (40:60 % v/v) at a flow rate of 1 mL/min and eluate was monitored at 225 nm, with a retention time of 2.461 and 3.765 minutes for Olmesartan medoxomil and Atorvastatin calcium. The method was validated and the response was found to be linear in the drug concentration range of 50 µg/mL to 150 µg/mL for Olmesartan medoxomil and 50 µ g/mL to 150 µg/mL for Atorvastatin calicium. The value of the correlation coefficient was found to be 0.999 and 0.999 for Olmesartan medoxomil and Atorvastatin calcium. The LOD and LOQ for Atorvastatin calcium were found to be 2.75 µg/mL, 9.17 µg/mL respectively. The LOD and LOQ for Olmesartan medoxomil were found to




ISBN: 978-81-980623-8-3

be 2.82 µg/mL, 9.41 µg/mL respectively. This method was found to be good percentage recovery for Atorvastatin calcium and olmesartan medoxomil were found to be 99.88 % and 100.05 % respectively indicates that the proposed method is highly accurate. The specificity of the method shows good correlation between retention times of standard with the sample so, the method specifically determines the analyte in the sample without interference from excipients of tablet dosage forms. The method was extensively validated according to ICH guidelines for Linearity, Range, Accuracy, Precision, Specificity and Robustness.

**Keywords:** Olmesartan medoxomil, Atorvastatin calcium, RP-HPLC.

**CH-362**

**INTEGRATED GC-MS, *IN SILICO*, AND ADMET ANALYSES WITH *IN VITRO* ANTIMICROBIAL INVESTIGATION OF DIOSPYROS MELANOXYLON FOR GUT-LIVER AXIS PROTECTION**

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The gut-liver axis is a crucial bidirectional pathway that links host metabolism, intestinal microbiota, and liver function. This axis's dysregulation is linked to inflammatory disorders, hepatotoxicity, and microbial infections. The plant Diospyros melanoxylon has been traditionally used for diuresis and the treatment of infectious diseases. Diarrhoea, diabetes, and liver disorder have been investigated in the current study through chemometric profiling, gas chromatography-mass spectroscopy analysis, *in vitro* antimicrobial studies, and *in silico* studies using the methanolic extract. Through GC-MS analysis, the presence of potential 13 regulations was examined using an integrated phytochemical, *in vitro*, and *in silico* method. *In vitro* antioxidant activity demonstrated significant radical scavenging activity (73%) at a 400µg concentration, while *in vitro* antimicrobial activity showed a considerable inhibitory effect against Escherichia coli (MIC 125 µg/mL) and Staphylococcus aureus (MIC 250 µgm/L). Strong binding affinities of α-amyrin with microbial DNA gyrase and hepatic HF-kB were predicted using molecular docking, found to be -8.6 kcal/mol and -7.4 kcal/mol, respectively, indicating dual antibacterial and hepatoprotective effects. It also showed that α-amyrin, as a lead compound with favourable oral bioavailability, high gastrointestinal absorption, blood-brain permeability, lack of mutagenicity, and no predicted hepatotoxicity, conforms to Lipinski's and Veber's rules through ADMET analysis. Together, these findings provide a detailed insight into the protective effect of D. melanoxylon, particularly α-amyrin as a lead compound to safeguard the gut-liver axis and reduce the hepatic damage and antibiotic-induced dysbiosis.

**Keywords:** Gut-liver axis, GC-MS analysis, Diospyros melanoxylon, ADMET analysis

**CH-363**

**THROMBOPOIETIC AND CYTOTOXIC EVALUATION IN THROMBOCYTOPENIA AND MV411 CANCER CELLS: *IN VITRO* AND DOCKING STUDY**

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Thrombocytopenia, characterized by a significant reduction in platelet count, presents a serious clinical challenge in conditions such as dengue fever, chemotherapy-induced cytopenia, and hematological malignancies. This preclinical study evaluated the platelet-augmenting and cytotoxic effects of aqueous extracts of Moringa oleifera (drumstick leaves), Psidium guajava (guava leaves), and Punica granatum (pomegranate seeds). Thrombocytopenia was chemically induced, and platelet counts along with hematological parameters were monitored to assess efficacy. Cytotoxicity assays, including studies on the MV411 cancer cell line, confirmed safety at therapeutic doses and revealed potential anticancer activity. Molecular docking demonstrated strong binding of quercetin (Moringa) and punicalagin (Pomegranate) to the thrombopoietin receptor, supporting their role as natural thrombopoietic agents. The findings validate the traditional use of these plants for platelet disorders and highlight their promise as safe, plant-based therapies with dual thrombopoietic and anticancer potential.

**Keywords:** Thrombocytopenia; Platelet enhancement; Moringa oleifera; Psidium guajava; Molecular docking.

**CH-364**

**A GREEN RP-HPLC APPROACH FOR VANCOMYCIN THERAPEUTIC DRUG MONITORING IN HUMAN PLASMA: METHOD DEVELOPMENT, VALIDATION, AND CLINICAL INSIGHTS FROM JSS HOSPITAL, MYSURU**

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A glycopeptide antibiotic, vancomycin, derived from Amycolatopsis orientalis and approved in 1958, treats aerobic Gram-positive infections, such as endocarditis, osteomyelitis, pneumonia, and meningitis, caused by methicillin-resistant Staphylococcus aureus (MRSA) and Staphylococcus epidermidis (S. epidermidis) bacteria. Vancomycin's narrow therapeutic range is crucial for therapeutic drug monitoring (TDM) to avoid therapeutic inefficacy, nephrotoxicity, and ototoxicity. Antibiotic resistance (ABR) is a global health threat necessitating vancomycin dose optimization. This study aims to develop a precise green bioanalytical HPLC method for vancomycin quantification, validate per ICH-M10 bioanalytical method validation guidelines, and analyze clinical samples to suggest dosing. An RP-HPLC method was developed for vancomycin and acetaminophen (IS) in human plasma using an I-series HPLC 2030 instrument and C18(150×4.6 mm; 5µm) column at 45°C. Mobile phase: ammonium acetate 10mM (pH 2.85 adjusted using glacial acetic acid) and methanol (84:16 v/v), flow rate: 0.8 mL/min, UV-detection: 240 nm. Plasma samples (100µL) spiked with 200µL vancomycin and IS, deproteinized with 20% methanol (300µL), and diluted to 2000µL with Milli-Q water. Samples were vortexed for two minutes, and 4-8 oC cold centrifuged at 5000 rpm for 10 min. Supernatant filtered through 2µm PTFE injection filters and 500µL injected into HPLC. The environmental impact and sustainability of the developed method were evaluated using multiple green analytical chemistry assessment tools like AGREE, ComplexGAPI, AGREEprep, RAPI and BAGI tools. Patients were administered a vancomycin IV-dose, and blood samples were collected 30 minutes before (trough) and 60 minutes after the dose (peak) and processed similarly to standard stock solutions. The retention times for vancomycin and IS were 3.7 and 4.9 min, respectively. The developed RP-HPLC method showed linearity in the 0.5-256µg/mL range with a regression coefficient (r2=0.9999), and a limit of detection and quantification of 2 and 6 µg/mL, respectively.

**Keywords**: Vancomycin, Antibiotic resistance (ABR), Therapeutic Drug Monitoring (TDM), RP-HPLC, Clinical samples.

**CH-365**

**DEVELOPMENT AND VALIDATION OF A STABILITY-INDICATING RP-HPLC METHOD FOR THE QUANTITATIVE DETERMINATION OF TIVOZANIB AND ITS IMPURITIES**

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A novel, rapid, accurate, sensitive, and reproducible reverse-phase high-performance liquid chromatography (RP-HPLC) method was developed for the quantitative determination of Tivozanib and its related impurities in active pharmaceutical ingredient. The chromatographic separation was performed on a Waters Alliance e2695 system using a Luna C18 column (250 × 4.6 mm, 5 µm particle size). The mobile phase consisted of 0.1% trifluoroacetic acid and acetonitrile in a 70:30 v/v ratio, delivered at a flow rate of 1.0 mL/min. Detection was carried out at 286 nm using a photodiode array detector under ambient conditions. The retention times for Tivozanib, Impurity-1, Impurity-2, and the main compound were approximately 2.522, 3.967, and 8.738 minutes, respectively.




ISBN: 978-81-980623-8-3

Theoretical plate counts for Tivozanib and its impurities were 5236, 7721, and 17,695, with tailing factors of 1.05, 1.11, and 0.89. The percent relative standard deviations (%RSD) of peak areas were 0.47, 0.54, and 0.68, indicating good precision. The method was validated in accordance with ICH guidelines. This study aimed to develop and rigorously validate a simple, robust, and stability-indicating RP-HPLC method for the quantification of Tivozanib as an active pharmaceutical ingredient.

**Keywords:** Tivozanib, method development, impurities, RP-HPLC.

**CH-366**

## SYNTHESIS, CHARACTERIZATION, *IN SILICO* MOLECULAR DOCKING AND BIOLOGICAL ACTIVITY OF NOVEL OXAZOLIDINE DERIVATIVES

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Oxazolidine derivatives represent a significant class of heterocyclic compounds with diverse pharmacological potential, including antimicrobial, anti-inflammatory, anticancer, and enzyme inhibitory activities. The present research was undertaken to design, synthesize, and characterize a series of novel oxazolidine derivatives through rational drug design approaches. The synthetic pathway involved condensation of selected aldehydes/ketones with amino alcohol precursors under controlled conditions to afford structurally diversified oxazolidine analogues. The synthesized compounds were characterized by spectroscopic techniques, including FT-IR, ^1H-NMR, ^13C-NMR, and mass spectrometry, to confirm their chemical structures and purity. *In silico* molecular docking studies were performed against relevant biological targets such as bacterial topoisomerases, COX-2 enzyme, and selected kinases to predict binding affinity, mode of interaction, and structure–activity relationship. Docking simulations revealed that several oxazolidine derivatives displayed favorable binding energies, hydrogen bonding, and hydrophobic interactions within the active sites of the targets, suggesting promising pharmacological relevance. The biological evaluation was carried out to assess antimicrobial, antioxidant, and cytotoxic potential using standardized *in vitro* assays. Overall, this study establishes oxazolidine derivatives as promising scaffolds for further optimization and development as therapeutic agents. Future investigations focusing on pharmacokinetic profiling and *in vivo* validation are warranted to strengthen their drug development potential.

**Keywords:** Oxazolidine, Synthesis, Biological activities

**CH-367**

## *IN SILICO* STUDIES UNVEILING THE HEPATOPROTECTIVE POTENTIAL OF CAREYA ARBOREA: DOCKING AND ADMET ANALYSIS

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The traditional medicinal plant Careya arborea has great therapeutic potential, with a history of use in liver medicines, and has been shown to be hepatoprotective, although its mechanism of action is largely unexplored *in silico* studies. The current study will seek to explain the hepatoprotective effect of Careya arborea through molecular docking and ADMET analysis. The literature and phytochemical databases were curated with key bioactive flavonoids, such as quercetin, kaempferol, catechin, and rutin, which were found previously in Careya arborea and also share similarity with Morus alba. These compounds were docked to liver-related target proteins and were targeted on pathways implicated in hepatotoxicity, oxidative stress, and inflammation. The binding affinities (binding energies in the range of -8.1 to -10.3 kcal/mol) between Careya arborea flavonoids and key hepatic targets under docking were found to be strong, suggesting their functional use as regulators of liver protection processes. This top-ranked ADMET profiling of such hits forecasted good pharmacokinetic characteristics, which included high gastrointestinal uptake, non-hepatotoxicity, and low risk of off-target toxicity. Combined with the ADMET prediction, the built-in molecular docking workflow supports the therapeutic applicability of the flavonoids of Careya arborea in hepatoprotection. On the whole, this work offers a mechanistic framework of the traditional application of Careya arborea in liver diseases and the identification of potential bioactive compounds that have potential in experimental validation and development into natural hepatoprotective agents.

**Keywords:** Careya arborea, Hepatoprotective activity, *Insilico* studies, Docking, ADMET analysis

**CH-368**

## MULTI-DIMENSIONAL SPECTRO-CHROMATOGRAPHIC BIOMARKER PROFILING FOR ACCURATE PCOS DIAGNOSIS

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Polycystic Ovarian Syndrome (PCOS) affects 8–13% of women of reproductive age worldwide, underscoring the urgent need for innovative therapeutic and diagnostic strategies. This study pioneers a dual approach by integrating artificial intelligence (AI)-driven drug discovery with advanced analytical platforms for biomarker profiling. An AI pipeline employing support vector machines, random forests, and deep neural networks screened large compound libraries against molecular targets implicated in PCOS. Network pharmacology and molecular docking simulations identified 15 novel therapeutic candidates with strong binding affinities toward ESR1, PPARG, and CYP17A1, achieving 98% accuracy in drug–target interaction predictions. Validation employed established animal models, including the letrozole-induced model. Parallelly, an innovative multi-dimensional analytical framework was developed for PCOS biomarker discovery. Fourier Transform Infrared (FTIR) spectroscopy, Raman spectroscopy, LC-MS/MS, and UPLC-QTOF-MS were applied to serum, urine, and follicular fluid samples from 150 PCOS patients and 120 controls. This revealed 94 novel biomarkers, including inflammatory markers, steroid metabolites, and metabolomic signatures. FTIR with orthogonal partial least squares discriminant analysis (OPLS-DA) achieved high classification accuracy ($R^2Y = 0.926$). Thirty-five urinary metabolites, including palmitic acid and benzoylglycine, showed differential expression with AUC values up to 0.991. Advanced LC-MS/MS profiling revealed elevated 11-oxygenated androgens as key biomarkers, outperforming conventional testosterone assays. A combinatorial biomarker panel using free fatty acid ratios and sulfated steroids achieved an AUC of 0.874 in validation studies. This integrative framework revolutionizes PCOS research by enabling rapid, economical, and precise diagnostics while accelerating AI-guided therapeutic discovery.

**Keywords:** PCOS Biomarkers, FTIR Spectroscopy, LC-MS/MS, Metabolomics, Multivariate Analysis, Steroid Profiling, Analytical Chemistry

**CH-369**

## CHROMATOGRAPHIC (RP-HPLC) METHOD DEVELOPMENT FOR THE ESTIMATION OF FAVIPIRAVIR FROM SOLID DOSAGE FORM

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An improved reverse phase high performance liquid chromatographic (RP-HPLC) method has been developed and validated for the estimation of Favipiravir from pharmaceutical dosage form. Chromatographic separation was performed on RP-C**18** column. The optimized mobile phase (acetonitrile: water of pH 4.8 adjusted with glacial acetic acid) was pumped at a flow rate of 0.8 ml/min in the ratio of 35:65 % v/ v and the eluent was monitored at 245 nm. The assay was performed with tablet dosage form and % of assay was found 101.21 % w/w of Favipravir. Linearity was ascertained over the concentration range 1-12 µg/ml. The method was statistically validated and found SD; RSD was within acceptable limit, indicated high degree of accuracy and precision of the proposed RP-HPLC method. Due to its simplicity, rapidness, high precision and accuracy the proposed RP-HPLC method can be applied for determination of Favipiravir in routine quality control tests of dosage form.

**Keywords:** Favipiravir, Validation, RP-HPLC, covid-19, Chromatograph

**CH-370**

## QUANTIFICATION OF CINNARIZINE IN HUMAN PLASMA BY DEVELOPED VALIDATED BIOANALYTICAL TECHNIQUE


ISBN: 978-81-980623-8-3

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Bio analytical methods are extensively applied in quantitative evaluation of drugs and its related substances in biological fluids. In this concern Bio analytical method was developed for estimation of cinnarizine in human plasma by chromatographic technique. Bio analytical method was developed for estimation of cinnarizine CRE, with RP-HPLC, using RP-C18 column equipped with UV detector. The mobile phase [methanol: acetate buffer pH 4.0 (pH adjusted with acetic acid)] was pumped at a flow rate of 0.8 ml/min in the ratio of 76:24 % v/v and the eluent was monitored at wavelength 252nm. The method was studied for quantitative estimation of drug from human plasma. The drug CRE was shown linear response in conc ranges CRE (1000-5000 ng/ml) in plasma. Accuracy and precision study shown that % CV was varied in the range (2.4227-7.0438) for CRE at all conc. levels and; the data of % nominal conc. was varied between (102.52-106.03) at all conc. levels. The simple protein precipitation technique was applied for the separation of drug from plasma. There was no any interference within plasma and drug found.The method can be applied for relative bioavailability and bioequivalence study of cinnarizine drug or/and dosage form.
**Keywords:** Bio analytical method, Regulatory guidelines, ICH, cinnarizine, plasma

**CH-371**

## EXPLORING 1,2,4-TRIAZINE SCAFFOLDS AS MULTI-TARGET DIRECTED LIGANDS: SYNTHESIS AND BIOLOGICAL PROFILING IN ALZHEIMER'S THERAPY

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Alzheimer's disease (AD) is a condition that results in the degradation of brain cells and is characterized by deterioration in cognitive performance and loss of autonomy in daily activities. Two fundamental hypotheses have been proposed as potential causes of AD, the cholinergic hypothesis and the amyloid hypothesis. The complex pathogenesis of AD requires MTDL for disease management. In this study, novel 1,2,4-triazine derivatives were designed, synthesized and evaluated as multifunctional agents for AD. Molecular docking studies showed that the derivatives occupied the entire BACE1 and AChE enzyme with good binding score. The *in vitro* Ellman's assay, amyloid induced MTT assay and DPPH assay were conducted to evaluate the cholinesterase inhibition, neuroprotection and antioxidant properties of the compound respectively. The designed compounds were synthesized by conventional methods and characterized by various spectral studies. The results showed that the scaffolds of 1,2,4-triazine exhibited acetylcholinesterase inhibition with efficient neuroprotection along with comparable radical scavenging properties.
**Keywords:** Alzheimers disease, 1,2,4- triazine derivatives, Multi target directed ligands, Cognitive decline, BACE1 inhibition, AChE inhibition, Ellman assay, Amyloid induced MTT assay, Neuroprotection, Radical Scavenging

**CH-372**

## CHROMATOGRAPHIC (RP-HPLC) METHOD DEVELOPMENT FOR THE ESTIMATION OF FAVIPIRAVIR FROM SOLID DOSAGE FORM

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An improved reverse phase high performance liquid chromatographic (RP-HPLC) method has been developed and validated for the estimation of Favipiravir from pharmaceutical dosage form. Chromatographic separation was performed on RP-C18 column. The optimized mobile phase (acetonitrile: water of pH 4.8 adjusted with glacial acetic acid) was pumped at a flow rate of 0.8 ml/min in the ratio of 35:65 % v/ v and the eluent was monitored at 245 nm. The assay was performed with tablet dosage form and % of assay was found 101.21 % w/w of Favipravir. Linearity was ascertained over the concentration range 1-12 µg/ml. The method was statistically validated and found SD; RSD was within acceptable limit, indicated high degree of accuracy and precision of the proposed RP-HPLC method. Due to its simplicity, rapidness, high precision and accuracy the proposed RP-HPLC method can be applied for determination of Favipiravir in routine quality control tests of dosage form.
**Keywords:** Favipiravir, Validation, RP-HPLC, covid-19, Chromatograph

**CH-373**

## SULPHONAMIDE-CONTAINING OXAZOLINE HYBRIDS AS NEUROPROTECTIVE AGENTS AND LEAD MOLECULE AS AUTOPHAGY INDUCER

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Autophagy is an extremely preserved catabolic method, induced under numerous cellular stress conditions and cytotoxic insults, which prevents cellular damages and also initiates survival mechanism within the cell. Sulphonamide derived oxazoline hybrid compounds showed neuroprotective effects by inducing autophagy. In the present study, a series of sulphonamide containing oxazoline hybrids were synthesized and their neuroprotective efficacy in neuronal cell lines was explored. All the compounds showed moderate to good neuroprotection against adrenal medulla cell lines (PC-12). Compound 6j had good neuroprotective activity against PC 12 cell lines showing increased expression of autophagy regulatory proteins (ATG7, LC 3B, p62, Beclin-1) and antiapoptotic proteins (Bcl-2) and also decreased expression ofpro-apoptotic proteins (Bax and Bad). This study demonstrated clearly that compound 6j showed neuroprotective effect through the induction of autophagy and opens up new avenues for a new class of compounds as neuroprotective therapeutic agents.
**Keywords:** Autophagy, Sulphonamides, Oxazoline, Neuroprotective agents.

**CH-374**

## DEVELOP AND VALIDATE THE STABILITY INDICATING RP HPLC METHOD FOR THE ESTIMATION IN BULK AND CAPSULE DOSAGE FORM OF ITRACONAZOLE BY QBD APPROACH.

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Quality by Design is the modern approach for quality of pharmaceuticals. The aim of the pharmaceutical development is to design a quality product and its manufacturing process to consistently deliver the intended performance of the product. Quality cannot be tested into products, but quality should be built in by design. A simple, Accurate, precise method was developed and validate a stability indicating reverse phase-high performance liquid chromatography (RP-HPLC) method for the determination of Itraconazole in bulk and pharmaceutical dosage form using QbD approach. Chromatogram was run through Kromosil 150 x 4.6 mm, 5. Mobile phase containing KH2PO4: Acetonitrile taken in the ratio 60 (%v/v) and 40 was pumped through column at a flow rate of 0.924 ml/min. Temperature was maintained at 32.9°C. Optimized wavelength selected was 260nm. Retention time of Itraconazole was found to be 2.467 min. %RSD of the Itraconazole was found to be 0.5. %Recovery was obtained as 99.84% for Itraconazole. LOD, LOQ values obtained from regression equations of Itraconazole were 0.08, 0.24. Regression equation of Itraconazole is y = 41250x + 2844. Retention times were decreased, and that run time was decreased, so the method developed was simple and economical that can be adopted in regular Quality control test in Industries.
**Keywords:** Itraconazole, QbD Approach, Method development, RP-HPLC

**CH-375**

## DISCOVERY OF THIAZOLE-BASED SGLT2 INHIBITORS FOR DIABETIC NEPHROPATHY VIA *IN SILICO* APPROACHES

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ISBN: 978-81-980623-8-3

Diabetic nephropathy (DN), a major microvascular complication of chronic diabetes mellitus, remains the leading cause of end-stage renal disease (ESRD). Current therapies such as renin–angiotensin–aldosterone system (RAAS) inhibitors slow progression but fail to completely halt renal decline, emphasizing the need for new treatment strategies. Sodium–glucose co-transporter 2 (SGLT2) inhibitors have shown both glycemic and renoprotective effects, yet glycosidic inhibitors are often associated with adverse outcomes including genitourinary infections and euglycemic ketoacidosis. This limitation has spurred interest in alternative, non-glycosidic scaffolds. Thiazole, a heteroaromatic framework with drug-like properties, represents a promising core for designing novel SGLT2 inhibitors. In this study, a ligand-based pharmacophore model was generated from reported thiazole derivatives and applied to virtual screening of the Drug Central and Enamine libraries. Four potential candidates were identified, exhibiting the strongest and most consistent binding during 100 ns molecular dynamics (MD) simulations. Based on these structural insights, a new thiazole-derived compound TD1 was rationally designed. TD1 achieved a high pharmacophore fit score, favourable docking energy and stable MD interactions, indicating strong potential as a non-glycosidic SGLT2 inhibitor. Collectively, this integrated computational approach, combining pharmacophore modeling, virtual screening, docking, and MD simulations provides a robust framework for the discovery of novel scaffolds. TD1 emerges as a promising lead for further optimization and preclinical evaluation in the treatment of DN.

**Keywords:** diabetic nephropathy, thiazole, SGLT2, pharmacophore, molecular dynamics simulation, molecular docking.

**CH-376**

## DESIGN AND MOLECULAR DOCKING OF TRIAZINE DERIVATIVES TARGETING PARP-2 IN CANCER THERAPY

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Poly (ADP-ribose) polymerase (PARP) is a key enzyme involved in DNA damage repair and represents an important therapeutic target in oncology, particularly for tumors with defective homologous recombination repair mechanisms. Triazine-based scaffolds, recognized for their broad pharmacological relevance, have recently emerged as promising frameworks for PARP inhibition. The present study aimed to identify triazine derivatives with potential inhibitory activity against the PARP-2 enzyme through computational approaches. The crystal structure of PARP-2 (PDB ID: 4ZZX, resolution 1.65 Å) was prepared using the Protein Preparation Wizard in Maestro 11.8. A focused triazine library was generated via LigPrep, followed by molecular docking using Glide SP and XP modes. Top-ranked compounds were further evaluated through MM-GBSA binding free energy calculations in the Prime module, and their interactions within the catalytic pocket were analyzed. Six triazine-based derivatives exhibited strong binding affinity and stable interactions with key active-site residues, comparable to the reference inhibitor Olaparib. The MM-GBSA profiles supported their favorable energetic stability, highlighting robust protein–ligand complex formation. Overall, this *in silico* study underscores the potential of triazine scaffolds as leads for the development of PARP-2 inhibitors, warranting further structural optimization and experimental validation for application in cancer therapy.

**Keywords:** PARP-2 inhibition, Triazine derivatives, Molecular docking

**CH-377**

## DESIGN, SYNTHESIS, AND PHARMACOLOGICAL POTENTIAL OF CHALCONES VIA CLAISEN–SCHMIDT REACTION

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Chalcones, belonging to the flavonoid family, they are open-chain compounds characterized by an α, β-unsaturated carbonyl system. This structure acts as a pharmacophore and is responsible for a broad spectrum of biological activities, including anti-inflammatory, antimicrobial, antioxidant, anticancer, and antidiabetic effects. The structural simplicity combined with functional versatility makes chalcones important scaffolds in medicinal chemistry for drug discovery and therapeutic applications.In the present study, chalcone derivatives were synthesized using the Claisen–Schmidt condensation reaction, a base-catalyzed aldol condensation between substituted aromatic aldehydes and acetophenones. This reaction was chosen due to its simplicity, cost-effectiveness, high yield, and the ability to introduce diverse substituents on the aromatic rings.The synthesized chalcones were purified using recrystallization and column chromatography techniques. Structural characterization was performed using melting point determination, ultraviolet-visible (UV-Vis) spectroscopy, infrared (IR) spectroscopy, and nuclear magnetic resonance (NMR) spectroscopy, confirming the successful formation of the α, β-unsaturated carbonyl system.Preliminary pharmacological evaluation revealed significant biological activity in selected derivatives, demonstrating that substitution patterns on th9e aromatic rings substantially influence activity and specificity. This study underscores the Claisen–Schmidt reaction as a reliable and versatile approach for synthesizing structurally diverse chalcones with promising therapeutic potential.This focuses on the chemistry of the Claisen–Schmidt reaction and its role in generating bioactive chalcones. Emphasis is placed on structure–activity relationships, pharmacological applications, and recent advancements in synthetic modifications.This emerge as promising leads for next-generation therapeutics in oncology, infectious diseases, and inflammatory disorders.

**Keywords**: Chalcones, flavonoids, biomedical properties, novel therapeutic prospecting, chemical fabrication.

**CH-378**

## 2D AND 3D QSAR ANALYSIS OF CHALCONE DERIVATIVES AS PTP1B INHIBITORS: AN *IN-SILICO* APPROACH

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Protein tyrosine Phosphatase 1B (PTP1B), is a highly studied target because of its involvement in signaling pathways involving Alzheimer's disease, cancer etiology & metabolic disorders like diabetes and obesity. As a result, it is currently the preferred target for scientists. Furthermore, Chalcone derivatives are being investigated for their potential as inhibitors of PTP1B and have undergone ligand-based design to identify potential lead compounds. These compounds were then analyzed using computational technology through software Sybyl X 2.0 involving 2D HQSAR methodology and 3D techniques like CoMFA and CoMSIA. Structural modification was done on the basis of Contours obtained and then new molecules (P1-P11) were generated. The findings derived from these QSAR models demonstrate statistically noteworthy models with CoMFA having q2 of 0.879 and r2 value 0.982, CoMSIA having q2 of 0.686 and r2 value 0.915 and HQSAR with q2 of 0.848 and r2 Value 0.954. The statistical data obtained from the models exhibit consistency and provide evidence of the models' adequacy and predictive capacity. Using the findings from the predictive models that were obtained, it is possible to construct Chalcone compounds with the capability to hinder Protein tyrosine phosphatase 1B.

**Keywords:** PTP1B inhibitors; Chalcones, HQSAR; CoMFA; CoMSIA.

**CH-379**

## HYBRID TRIAZINE-THIAZINE DERIVATIVES AS PROMISING ANTIMALARIAL LEADS: DESIGN, SYNTHESIS, MOLECULAR DOCKING AND *IN-VITRO* EVALUATION

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Malaria remains a major global health challenge, particularly in endemic regions, due to increasing resistance of Plasmodium falciparum to conventional antimalarials. The search for novel scaffolds with improved efficacy and dual-targeting potential is urgently needed. This study aimed to design, synthesize, characterize, and evaluate a series of hybrid 1,3,5-triazine–thiazine derivatives (6a–6e) for their antimalarial




ISBN: 978-81-980623-8-3

potential, supported by molecular docking. A multi-step synthetic route from cyanuric chloride was employed to generate the hybrids. Compounds were characterized by FTIR, 1H-NMR, 13C-NMR, MS, and HRMS. *In vitro* antimalarial activity was evaluated against P. falciparum NF54 strain by the broth dilution method, using chloroquine as standard. Molecular docking was performed using AutoDock Vina against DNA gyrase (PDB: 2XCT) and plasmepsin-2 (PDB: 1LEE) Among the synthesized compounds, 6c and 6e displayed the most potent inhibition (MIC = 6.25 µg/mL), approaching chloroquine (MIC = 3.125 µg/mL). Docking results showed strong binding affinities, with compound 6e exhibiting binding scores of –10.6 kcal/mol (DNA gyrase) and –10.8 kcal/mol (plasmepsin-2), supported by π–π stacking and hydrogen bonding interactions. These results highlight the potential of triazine–thiazine hybrids as promising scaffolds in antimalarial drug discovery. However, limitations include lack of In-vivo validation and toxicity assessment, which must be addressed in future studies. Hybrid triazine–thiazine scaffolds as promising lead structures for antimalarial drug discovery. Compounds 6c and 6e, in particular, demonstrate favorable *In-vitro* activity and molecular interactions**.**

**Keywords:** Triazine–thiazine hybrids; Antimalarial activity; Molecular docking

**CH-380**

## DEVELOPMENT AND VALIDATION OF NEW SPECTROPHOTOMETRIC METHOD FOR THE ESTIMATION OF EFAVIRENZ IN PHARMACEUTICAL FORMULATIONS

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Efavirenz (CAS 154598-52-4) is used for the treatment of human immunodeficiency virus infection. It is a non-nucleoside reverse transcriptase inhibitor. Efavirenz is chemically, 4S)-6-chloro-4-(2-cyclo propyl ethynyl)-4-(trifluoromethyl)-1H-3,1-benzoxazin-2-one with molecular formula $C_{14}H_9ClF_3NO_2$ and molecular weight 315.675 grams/mole. It acts by binding to a non-catalytic site on the HIV-1 reverse transcriptase enzyme and prevents the enzyme from functioning properly which indirectly inhibits and also halts the conversion of HIV's RNA into DNA which is necessary for producing new virus particles. A new spectrophotometric method has been developed for the estimation of Efavirenz in pharmaceutical dosage forms (Tablets). Double beam spectrophotometer (SHIMADZU Model No. UV- 1800) with quartz cells was used for the present study (200-400 nm). Efavirenz has shown absorption maxima (λmax) at 247 nm in phosphate buffer (pH 2.1) and Beer-Lambert's law was obeyed over the concentration range 2.5-40 µg/ml with linear regression equation, y = 0.0522x + 0.0501 ($R^2$ = 0.9987). The method was validated as per ICH guidelines and found to be simple, precise and accurate and can be applied successfully for the assay of Efavirenz for the pharmaceutical formulations.

**Keywords:** Efavirenz, spectrophotometry, ICH Guidelines.

**CH-381**

## MOLECULAR DOCKING ANALYSIS OF PRIMAQUINE-CHLOROQUINE FUMARDIAMIDES AS ANTIPLASMODIAL AGENTS

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Malaria is still a serious threat to humans all round the world. This alarming situation calls for the development of novel antimalarials effective against resistance strain. This research describes a revision of hunt for new antiplasmodial drugs with enhanced potencies against the erythrocytic and hepatic stages of Plasmodium. In the present study a series of already reported eleven chloroquine and primaquine fumardiamides derivatives were subjected to molecular docking on P. falciparum Lactate Dehydrogenase enzyme complex with NADH (PDB code: 1LDG, resolution 1.74 Å) by working on Autodock tool versions 1.5.7. Molecular docking analysis results reveal that the active compounds PC-4, PC-5, PC-12, PC-14 docked well within the binding sites of P. falciparum Lactate Dehydrogenase drug target with strong affinity ranging from -8.67 to -7.20 kcal/ mol. Best docked poses showed hydrogen bond interactions with Met30, The97, Gly29, Gly 99. Whereas electrostatic interactions were seen with Ala98 and Ile3. For all the reported compounds, the binding energies of molecular interaction into the active site cleft were found to be better than co-crystallized ligand, 1,4-dihydronicotinamide adenine dinucleotide (-6.00 kcal/mol).

**Keywords**: Malaria, P. falciparum, Chloroquine, Primaquine, Hybrids, Molecular docking.

**CH-382**

## COMPUTER-AIDED DRUG DESIGN (CADD) IN PHARMACEUTICAL CHEMISTRY

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Computer-Aided Drug Design (CADD) has emerged as the transformative approach in the field of pharmaceutical chemistry, significantly improving the efficiency and precision of the drug discovery and development. Traditional methods of the drug discovery are often time-consuming, expensive, and heavily reliant on trial-and-error experimentation, resulting in low success rates. CADD integrates computational tools with the principles of medicinal chemistry and molecular biology to predict molecular interactions, to optimize chemical structures, and design novel drug candidates with improved efficacy, selectivity, and safety profiles. The two main approaches in CADD are Structure-Based Drug Design (SBDD) and Ligand-Based Drug Design (LBDD). SBDD uses the three-dimensional structure of the target proteins to design molecules that fit precisely into the active site, employing techniques such as molecular docking, molecular dynamics simulations, and virtual screening. LBDD, applied when the target structures are unknown, which relies on known active ligands and Quantitative Structure-Activity Relationship (QSAR) modelling which predicts biological activity and optimize chemical structures. CADD's applications include lead identification, lead optimisation, ADMET (Absorption, Distribution, Metabolism, Excretion, Toxicity) prediction, and drug repurposing. The integration of artificial intelligence (AI) and machine learning has further enhanced predictive accuracy, accelerating the discovery of new molecules while reducing experimental workload. Despite being challenging such as the need for high-quality structural data and limitations in fully predicting *in vivo* behaviour, continuous improvements in the computational algorithms and databases are addressing these issues. In conclusion, CADD has revolutionised pharmaceutical chemistry by enabling rational, efficient, and cost-effective drug design. Its applications promise safer, more effective, and patient-centered therapeutics, shaping the future of modern drug discovery and development.

**Keywords:** Computer-Aided Drug Design (CADD), Pharmaceutical Chemistry, Medicinal Chemistry, SBDD, LBDD, Molecular Docking, QSAR, ADMET, Drug Optimisation, Drug Repurposing.

**CH-383**

## SYNTHESIS, DOCKING STUDIES, AND BIOLOGICAL EVALUATION OF MANNICH BASES OF BENZIMIDAZOLE BEARING 1,3,4-OXADIAZOLE FOR ANTIDEPRESSANT ACTIVITY

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Benzimidazole is a well-established heterocyclic scaffold with diverse pharmacological properties, while 1,3,4-oxadiazole is a recognized CNS-active pharmacophore. Incorporation of a Mannich base moiety is known to enhance lipophilicity, bioavailability, and receptor affinity. This study aimed to design, synthesize, characterize, and evaluate a series of benzimidazole-oxadiazole Mannich base derivatives for their potential antidepressant activity. To synthesize novel Mannich base derivatives of benzimidazole bearing 1,3,4-oxadiazole, investigate their in-silico binding affinity towards GSK-3β, and evaluate their antidepressant activity using validated rodent models. The target compounds (5a–5c) were synthesized via a five-step route starting from o-phenylenediamine and succinic acid. Structural confirmation was achieved through melting point determination, TLC, IR, and $^1$H-NMR analyses. Elemental analysis (sodium fusion tests) verified the presence of nitrogen and sulfur, while esterification confirmed the carboxyl functionality. Mass spectral data supported the structures, showing molecular ion peaks at m/z 304 (5a) and m/z 364 (5c). In-silico docking studies were performed using




ISBN: 978-81-980623-8-3

Schrödinger Maestro v13 against GSK-3β (PDB: 3F88). Antidepressant activity was assessed using the Tail Suspension Test (TST) and Forced Swim Test (FST) with fluoxetine hydrochloride as standard. Docking studies revealed strong ligand-protein interactions at key hinge region residues (Val135 and Asp133). All synthesized compounds reduced immobility time compared with the control, indicating antidepressant-like activity. Compound 5b (imidazole-substituted) demonstrated the highest activity, approaching the efficacy of fluoxetine. Compound 5a also showed significant activity, whereas compound 5c exhibited no observable antidepressant effect at the tested dose. A structure–activity relationship suggested that the presence of the imidazole ring enhanced binding affinity and biological potency. The introduction of a Mannich base moiety into benzimidazole–oxadiazole hybrids significantly improves CNS activity, likely through enhanced lipophilicity and optimized receptor binding. Compounds 5a and 5b, particularly 5b, are promising lead molecules for further development as antidepressant agents, while the inactivity of 5c provides valuable SAR insight. Future work will focus on receptor-binding assays, mechanistic studies, and toxicity profiling to support their therapeutic potential.

**Keywords:** Benzimidazole, 1,3,4-oxadiazole, Mannich base, antidepressant, docking, Tail Suspension Test, Forced Swim Test.

**CH-384**

## MOLECULAR DOCKING AND DYNAMIC SIMULATION STUDY OF NAPHTHALENE TRIAZOLES AS ANTI-CANCER AGENTS AND VALIDATION BY REDOCKING

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Naphthalene-triazole derivatives contain poly cyclic aromatic hydrocarbon fragment and a naphthalene scaffold which contribute to hydrophobic membrane permeability, π-π stacking and metabolic stability in drug receptor bindings. In the present study we have selected 5-[[5-amino-3-(4-cyanoanilino)-1,2,4-triazol-1-yl]sulfonyl]naphthalene-2-carbonitrile , 3-[6-(2-pyrrolidin-1-ylethoxy) naphthalen-2-yl]-5-[5-(pyrrolidin-1-ylmethyl)-1H-1,2,4-triazol-3-yl]-1H-indazole.,(3-N-(4-chlorobenzyl)amino-1-(napthalen-1-sulfonyl)-5-amino-1H-1,2,4-triazole, 3-Napthalen-2-yl-5-(5-pyrrolidin-1-ylmethyl-1H-[1,2,4]triazol-3-yl)-1H-indazole and 3-N-(4-chlorophenethyl)amino-1-(napthalen-1-sulfonyl)-5-amino-1H-1,2,4-triazole from the Pub-chem compound library and tested for anti-cancer activity using Insilco Molecular docking Software, MZ-DOCK, an open-source docking tool. The best bound active HIT compounds were-Napthalen-2-yl-5-(5-pyrrolidin-1-ylmethyl-1H-[1,2,4] triazol-3-yl)-1H-indazole (-10.5) and (3-N-(4-chlorobenzyl) amino-1-(napthalen-1-sulfonyl)-5-amino-1H-1,2,4-triazole (-9.8). Gilteritinib, the anti-cancer reference drug, was used for validation and re-docking (-8.1). The parameters evaluated for dynamic simulations of 6JQR were the Mean pLDDT (84.887), Uniqueness (18.621). RMSD (0) for the rank 1 pose. The molecular dynamics study for the receptor yielded promising results. The comparable results have paved the way for further optimization and ADME studies. If developed as a lead compound, it can be tested and subsequently approved for clinical use as a treatment for cancer after *in vitro* testing and subsequent clinical trials.

**Keywords:** Docking, Anti -cancer, Napthalene, Triazoles, Re-docking,

**CH-385**

## DEVELOPMENT OF SUSTAINABLE ULLMANN-TYPE C-N COUPLING METHODOLOGY USING GLYCEROL

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In the current research, a sustainable Ullmann-type C-N coupling methodology was developed for the synthesis of N-aryl anthranilic acid derivatives. The objective behind the research was to explore the reactivity of various aromatic primary amines with 2-chlorobenzoic acid and 2-bromobenzoic acid using an in-situ activated metallic copper catalytic system under ligand-free conditions in glycerol. The influence of parameters such as reaction temperature, base type, and substrate/base/catalyst molar ratio was studied to optimize the yield and selectivity of the desired products. Among the screened conditions, the optimal reaction was achieved at 140°C, using potassium carbonate as base and copper (II) sulfate pentahydrate (3 mol%) as the precursor for in-situ metallic copper generation. The methodology was successfully applied to a variety of electronically diverse aromatic amines, demonstrating good substrate scope and functional group tolerance. The use of glycerol as a reaction medium underscores the environmental and economic benefits of this methodology. Therefore, this novel sustainable approach toward C-N bond formation offers practical, cost-effective alternative to conventional Ullmann type couplings. Thus, it can be concluded that this study contributes significantly to eco-friendly synthetic strategies for pharmaceutically active molecules.

**Keywords:** 2-Chlorobenzoic acid, Glycerol, in-situ copper catalyst, Sustainable Synthesis.

**CH-386**

## BIOANALYTICAL ASSESSMENT OF BUDESONIDE FROM SUSTAINED-RELEASE AND PULSATILE FORMULATIONS USING LC-MS/MS

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Chronotherapeutics refers to a treatment strategy where *in vivo* drug availability is synchronized with the body's biological rhythms to optimize therapeutic outcomes and minimize side effects. This approach is grounded in the understanding that disease symptoms, pharmacologic responsiveness, and drug pharmacokinetics all follow a circadian pattern and are interrelated. The objective of this study was to compare the pharmacokinetic profiles of an optimized pulsatile formulation of Budesonide with an existing marketed sustained-release formulation. Two groups of white New Zealand rabbits (n = 6) were used in a crossover study design. Drug plasma levels were quantified using a validated LC-MS/MS method, and pharmacokinetic parameters were calculated for both formulations. Analysis of the plasma concentration-time curves revealed significant differences between the two formulations. The pulsatile capsule, developed in the laboratory, demonstrated a distinct lag phase before drug release, as intended. The mean residence time (MRT) of the pulsatile formulation was significantly longer (22.6 ± 0.11 hours) compared to that of the marketed sustained-release formulation (17.1 ± 0.09 hours). These findings support the potential of pulsatile drug delivery systems in chronopharmacotherapy, particularly when the timing of drug release is aligned with the circadian rhythm of the disease. Pulsatile delivery offers a promising avenue for achieving targeted, time-specific therapy.

**Keywords**: LC-MS/MS, Budesonide, Pulsatile Drug Delivery, *In-vivo* Studies, Pharmacokinetics, Chronotherapeutics

**CH-387**

## QBD-BASED RP-HPLC METHOD DEVELOPMENT AND VALIDATION FOR THE SIMULTANEOUS ESTIMATION OF ANTIDIABETIC DRUGS IN BULK AND PHARMACEUTICAL DOSAGE FORMS

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The present research work involves the development of a robust, accurate, precise and economical RP-HPLC method for the simultaneous determination of metformin hydrochloride and sitagliptin, employing a Quality by Design (QbD) strategy. Method optimization was carried out using Design of Experiments (DoE), with risk assessment through an Ishikawa diagram to identify critical method parameters (CMPs). A two factor, three level design was applied to screen influential factors, viz mobile phase composition and buffer pH, which were further modelled mathematically. The effect of these variables on critical analyte attributes (CAAs), namely symmetry factor, retention time and peak area were studies using Central Composite Design (CCD), which served ad indicators of method robustness. The response was optimised simultaneously using a desirability function. The final optimized chromatographic conditions consisted mobile phase of methanol and acetonitrile (70:30, v/v; and a flow rate of 0.5 mL/min and pH 3.5. Separation was achieved on a Thermo Scientific ODS HypersilTM column (250×4.6 mm), maintained at 35° Celsius with detection at 210 nm. Validation of developed method was conducted as per ICH guidelines. Hence gliptin derivatives along with metformin can be routinely analysed for quality control analysis of metformin and sitagliptin, alone or in combination in pharmaceutical dosage forms.




ISBN: 978-81-980623-8-3

**Keywords**: Quality by Design, AQbD, Critical method parameters, Critical Quality Attributes, RP-HPLC, Sitagliptin, Metformin

**CH-388**

**DEVELOPMENT OF FORCED DEGRADATION STUDIES OF TOFACITINIB BY UV SPECTROPHOTOMETRY**

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Tofacitinib Citrate which is offered under the brand name Xeljanz, is a prescription drug that treats moderate to severe cases of inflammatory disorders and rheumatic diseases. In this context, the objective of this work was to develop and validate an effective, stability indicating method by Spectrophotometry in the ultraviolet region for quantitative estimation of Tofacitinib Citrate tablets. Methanol is used a s diluent, quartz cuvette was used and measured at a wavelength of 289 nm. The method was found to be linear in the range of 4 to 24 µg/mL with a correlation coefficient of 0.99567 with detection and quantification limits of 1 and 4 µg/mL. Accuracy of the proposed method was ascertained by recovery studies and the results were expressed as percentage recovery and found in the range of 99.55% - 100.75%. Standard deviation and %RSD for inter day and intraday precision studies was found to be less than 2%. In compliance with ICH recommendations, the drug ingredient was subjected to extreme circumstances, such as acid hydrolysis, base hydrolysis, oxidative degradation, thermal stress, and photolytic degradation and it showed that the proposed method is able to assess the susceptibility of Tofacitinib Citrate. The findings support the use of UV spectrophotometry as a reliable method for early-stage stability assessment, while also emphasizing the importance of complementary techniques like HPLC for detailed impurity profiling and regulatory compliance.

**Keywords**: UV spectrophotometry, analysis, degradation, stress, acid hydrolysis, base hydrolysis, Oxidative Hydrolysis, photolytic degradation, thermal degradation.

**CH-389**

**QBD-ENABLED, DOE-OPTIMIZED, AND GREENNESS-ASSESSED RP-HPLC METHOD FOR QUANTITATIVE ESTIMATION OF EMPAGLIFLOZIN: A ROBUST AND SUSTAINABLE ANALYTICAL APPROACH**

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Empagliflozin, a sodium-glucose co-transporter 2 (SGLT2) inhibitor, requires accurate and reproducible quantification in bulk and dosage forms to ensure safety and efficacy. Traditional methods often lack robustness and sustainability. Thus, a QbD-driven strategy with DoE optimization and greenness evaluation was employed to develop a reliable and eco-friendly RP-HPLC method. To design and validate a simple, rapid, precise, and environmentally sustainable RP-HPLC method for Empagliflozin using Quality by Design (QbD) principles, Design of Experiments (DoE), and greenness metrics. Chromatographic separation was performed on an Agilent 1220 HPLC system with ChemStation software using a C18 column. The mobile phase comprised methanol and water (70:30 v/v), with a flow rate of 1.0 ml/min, injection volume of 10 µL, and detection at 233 nm. The retention time was 4.0 min. A Box–Behnken design (BBD) with three factors at three levels was employed to optimize method parameters. ANOVA, diagnostic plots, and model graphs were used to evaluate factor influence. Method validation was carried out as per ICH Q2(R1) guidelines. Greenness was assessed using the Analytical Eco-Scale and AGREE metric tools. The method demonstrated excellent system suitability with %RSD values <2%. It was found to be specific and selective, with no interference at the retention time of Empagliflozin. The method was linear over 5–25 µg/ml with $r^2$ = 0.9991, LOD = 1.18 µg/ml, and LOQ = 3.57 µg/ml. Precision studies showed %RSD <2% for both intra- and interday variations. Accuracy was confirmed with recoveries between 98.80–101.05%. Ruggedness and robustness tests indicated stability under small deliberate changes. Greenness evaluation confirmed the method's eco-friendly nature. A QbD-based, DoE-optimized, and greenness-assessed RP-HPLC method was successfully developed and validated for Empagliflozin. The method is simple, precise, robust, cost-effective, and eco-friendly, making it highly suitable for routine quality control of pharmaceutical formulations.

**Keywords:** Empagliflozin, RP-HPLC, Quality by Design (QbD), Design of Experiments (DoE), Green analytical chemistry.

**CH-390**

**GREEN PHARMACY: ADVANCING SUSTAINABLE DRUG DESIGN AND ECO-FRIENDLY FORMULATIONS FOR A GREENER FUTURE**

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Green pharmacy incorporates various sustainability aspects throughout the pharmaceutical lifecycle, including drug discovery and disposal, with a goal to reduce environmental pollution as well as maintain therapeutic efficacy and patient safety. Materialized through the 12 principles of green chemistry, this approach focuses on the use of safer chemical syntheses, energy-efficient reactions, renewable feedstocks, coupling with the design of molecules that are biodegradable by nature. The most preferred options are the implementation of green synthesis methods like biocatalysis and continuous flow chemistry, supporting the replacement of toxic solvents with greener alternatives such as water, ethanol, and supercritical $CO_2$, and the synthesis of formulations using biodegradable excipients and natural polymers to effectively cut down on environmental persistence. Green pharmacy also supports eco-friendly packaging, waste reduction, and efforts to improve wastewater treatment to minimize pharmaceutical residues in ecosystems. Some of the breakthrough achievements include enzyme-catalyzed API syntheses that have reduced process mass intensity considerably as well as the use of fusion-based methods to get rid of solvent waste in formulation development. Moreover, it is worth noting that these initiatives are fraught with difficulties such as the high cost of implementation, the lack of global standardization, and issues regarding scalability; nevertheless, green pharmacy has a lot of potential to positively turn around the pharmaceutical industry toward sustainability. Enhancing the credibility of regulatory frameworks, involving more than one disciplinary area in the research project, and utilizing life cycle assessment (LCA) together with predictive modeling tools will be among the most important means of speeding up the adoption period. This approach will be consistent with worldwide programs aimed at achieving the right equilibrium among innovation, patient access, and environmental stewardship which will eventually result in the development of a cleaner and greener drug and healthcare system by the way of responsible drug development and healthcare system.

**Keywords:** Green Pharmacy, Sustainable Drug Design, Eco-friendly Formulations, Green Chemistry, Life Cycle Assessment

**CH-391**

**DISCOVERY OF NOVEL APOPTOSIS-INDUCING SMALL MOLECULES FOR BREAST CANCER THERAPY: A COMPUTATIONAL AND *IN VITRO* APPROACH**

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Breast cancer is one of the leading causes of cancer-related mortality globally. Recent advances in targeted therapies have focused on selectively inhibiting signalling pathways that are vital for cancer cell survival and proliferation. Identifying novel small molecules with such inhibitory capabilities remains a critical step toward more effective treatments. A computational approach was utilized to design and identify small molecule inhibitors targeting key signalling pathways implicated in breast cancer progression. Virtual screening and molecular docking analyses were conducted to identify potential lead compounds. The selected compounds were further evaluated *in vitro* using MCF7 breast cancer cells to determine cytotoxicity (via IC50) and to assess apoptotic effects. ADMET profiling was performed to predict pharmacokinetic properties. Two lead compounds, C12 and C18, demonstrated strong binding affinities to serine-threonine protein kinase and MAP3K5, both of which are critical regulators of apoptosis. *In*




ISBN: 978-81-980623-8-3

*vitro* studies revealed significant cytotoxic effects, with IC50 values of 22.49 ± 1.01 µg/ml for C12 and 14.61 ± 0.01 µg/ml for C18. Microscopic and biochemical analyses showed hallmark features of apoptosis, including nuclear condensation, DNA fragmentation, and mitochondrial membrane potential loss. ADMET predictions indicated favourable pharmacokinetic profiles for both compounds. The identified compounds C12 and C18 exhibit potent cytotoxic and pro-apoptotic activity in breast cancer cells, suggesting their promise as novel therapeutic agents. Further *in vivo* studies are warranted to validate their efficacy and safety. Top of Form

**Keywords**: Breast cancer, Molecular docking, MCF7, Signalling inhibitors, ligand-protein interactions

**CH-392**

## DESIGN, SYNTHESIS, EVALUATION OF NOVEL THIAZOLIDINEDIONE DERIVATIVES AS POTENT ANTIBACTERIAL AGENTS TARGETTING S. AUREUS TYROSYL -tRNA SYNTHASE

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The emergence of antibiotic-resistant bacteria necessitates the development of novel antibacterial agents. This study reports the design, synthesis, and evaluation of thiazolidinedione derivatives as potential antibacterial compounds. Using in-silico approaches, including virtual library creation, toxicity prediction, and molecular docking, we identified promising candidates. Ten thiazolidinedione derivatives were synthesized and characterized, and their antibacterial activity was evaluated against S. aureus tyrosyl-tRNA synthetase. Notably, compound N6 exhibited potent antibacterial activity, ensuring further investigation. Our findings suggest that thiazolidinedione derivatives hold promise as antibacterial agents, and future studies will focus on optimizing their efficacy and safety.

**Keywords:** Thiazolidinedione Derivatives, antibacterial agents, Staphylococcus aureus tyrosyl-tRNA synthetase, molecular docking

**CH-393**

## FORCED DEGRADATION STUDIES AND CHARACTERIZATION OF DEGRADATION PRODUCTS OF ATORVASTATIN CALCIUM

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This work presents a comprehensive investigation into the degradation behavior, kinetics, and structural elucidation of Atorvastatin Calcium under various forced stress conditions, utilizing a Quality by Design (QbD) framework and advanced analytical methodologies. The study begins with an overview of the clinical significance of hypercholesterolemia and the pharmacological profile of atorvastatin, emphasizing the necessity for robust stability-indicating methods in pharmaceutical development. Extensive literature review and rational experimental planning set the foundation for solution preparation and controlled exposure of the API to acidic, alkaline, oxidative, thermal, and photolytic environments. Analytical techniques such as UV-Visible spectrophotometry, HPLC, FT-IR, NMR, and mass spectrometry were employed for kinetic analysis and detailed characterization of degradation products. Statistical evaluation using Design of Experiments (DoE) enabled optimization of experimental factors and provided insight into the significant parameters influencing degradation. Results demonstrate that atorvastatin is most susceptible to hydrolytic and thermal stress, and novel degradation products were successfully identified and characterized. The findings affirm the importance of controlled formulation, storage conditions, and validated analytical protocols, contributing a methodological framework for regulatory compliance and the assurance of drug safety and efficacy in the pharmaceutical sciences

**Keywords:** Stability Indicating, Degradation studies, Design of experiment, HPLC, NMR, Mass Structure Eluditicion.

**CH-394**

## *IN SILICO* DESIGN AND MOLECULAR DOCKING STUDIES OF NOVEL SUBSTITUTED PYRAZOLE DERIVATIVES AS POTENT INHIBITORS OF MYCOBACTERIAL MEMBRANE PROTEIN LARGE 3 (MMPL3)

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The long-term worldwide burden of Tuberculosis (TB), seriously aggravated by the spread of multi-drug resistant (MDR) and extensively drug-resistant (XDR) strains, highlights a pressing unmet need for new chemotherapeutic agents with novel mechanisms of action. Mycobacterial membrane protein Large 3 (MmpL3), an essential transporter that provides for mycolic acid shuttling in Mycobacterium tuberculosis cell wall biosynthesis, has been established as a high-priority, druggable target for next-generation anti-TB therapy. This computational research strives to rationally design and virtually screen a targeted library of new substituted pyrazole derivatives for their potential to inhibit MmpL3. A set of 38 structurally diverse pyrazole-derived molecules were designed, and the molecular interaction was profiled through exhaustive docking simulations against two high-resolution crystal structures of MmpL3 (PDB IDs: 6AJI and 7WNX) employing the Glide module of the Schrodinger Suite. The docking protocol was confirmed by re-docking the native co-crystallized ligands, validating the accuracy of the predicted binding poses and energies. The virtual screen produced several high-affinity hits, with numerous compounds showing better docking scores than the reference ligands. Importantly, lead compound MD36 showed outstanding binding affinity, with scores of -12.8 kcal/mol for 6AJI and -11.7 kcal/mol for 7WNX. A close examination of the binding conformation of MD36 showed a web of beneficial interactions, such as hydrophobic contacts with Ile253 and Leu642 residues, and a key hydrogen bond with Asp645, which resembles interactions that are identified as pivotal for MmpL3 inhibition. These *in silico* outcomes firmly indicate that the rationally designed pyrazole framework, especially the lead compound MD36, is capable of establishing stable and high-affinity complexes with the MmpL3 transporter and inhibiting its activity. This work not only discovers promising pre-clinical candidates but also presents a sound structural rationale for their selection for synthesis and subsequent *in vitro* and *in vivo* pharmacological testing as an important step towards the development of a novel class of anti-tubercular agents to combat drug resistance.

**Keywords:** Tuberculosis, MmpL3 Inhibitors, Pyrazole Derivatives, Molecular Docking, *In Silico* Screening, Structure-Based Drug Design, Anti-Tubercular Agents.

**CH-395**

## MOLECULAR DOCKING-GUIDED CYTOTOXIC AND ANTI-TUMOR EVALUATION OF TETRASTIGMA SERRULATUM EXTRACT

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Cancer remains one of the leading causes of morbidity and mortality worldwide, necessitating the search for novel therapeutic agents from natural sources. Tetrastigma serrulatum (Roxb.) Planch., a traditionally valued medicinal plant, was investigated for its anticancer potential through integrated *in silico*, *in vitro*, and *in vivo* approaches. Network pharmacology analysis identified eight phytocompounds targeting multiple oncogenic proteins, with significant enrichment in the PI3K-Akt signaling pathway (15 genes; $p = 2.94 \times 10^{-9}$), involving MAPK1, PIK3R2, NFKB1, PDGFRA, and MTOR. Molecular docking studies revealed that the co-crystal ligand with PIK3CB/PIK3R2 exhibited the lowest binding energy (−9.1 kcal/mol), while kaempferol-3-rutinoside (−8.8 kcal/mol) and rutin (−8.3 kcal/mol) showed comparable strong affinities, suggesting their potential to modulate PI3K-Akt–mediated tumorigenesis. *In vitro* cytotoxicity evaluation on HeLa cell lines demonstrated an $IC_{50}$ value of 77.98 µg/mL, confirming dose-dependent antiproliferative activity. Further validation in a Dalton's Lymphoma Ascites (DLA) solid tumor model revealed that oral administration of T. serrulatum extract significantly reduced tumor volume and showed favorable histopathological outcomes with reduced proliferation in tumor tissues at higher doses. Collectively, the integration of computational, cellular, and animal studies underscores T. serrulatum as




ISBN: 978-81-980623-8-3

a promising source of natural anticancer compounds. These findings provide a strong rationale for further purification, isolation, and characterization of its bioactive phytoconstituents for potential development in oncology.

**CH-396**

**CHALLENGES AND LIMITATIONS OF SOLVENT SELECTION IN RP-HPLC USING ARTIFICIAL INTELLIGENCE**

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In reverse-phase high-performance liquid chromatography (RP-HPLC), it is necessary to choose the right mobile phase for optimal separation. With general solvents such as methanol, acetonitrile, water, and buffers, artificial intelligence (AI) has been under investigation in recent times to predict solvent composition. Assessing the disadvantage and limitations of AI-enabled solvent choice for RP-HPLC was the objective of this research. AI-predicts solvent mixtures with experimentally modified mobile phases were tested with standard analytes. Chromatographic properties such as resolution, peak symmetry, retention time, and selectivity were quantified. The results indicated that although AI models worked very well for analytes with similar training datasets, their ability to generalize to new substances was poor. Predictive accuracy was compromised due to poor validation and erroneous data, and some of the solvent ratios recommended by AI proved empirically unsuitable. In addition, AI models did not successfully model sophisticated analyte–solvent interactions, underscoring the crucial nature of experimental verification supported predictions, notwithstanding these drawbacks AI supported predictions promised to ease method design trial-and-error. Finally, the research concludes that AI may assist the solvent selection in RP-HPLC, and it is limited by a lack of generalization and the inability of AI to capture the analyte-solvent interactions. In the future, the researchers may focus on an accurate database, and robust method validation with expertise knowledge into AI can produce sustainable, effective, and accurate results.

**Keywords:** Artificial intelligence, solvent, RP-HPLC, accuracy.

**CH-397**

**ESTIMATION OF MONOSODIUM GLUTAMATE IN FOOD SAMPLES BY VISIBLE SPECTROPHOTOMETRY**

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In the current research, a rapid visible spectrophotometric method for the quantitative estimation of monosodium glutamate (MSG) was developed. The objective behind the research was to s to find out a simple and rapid chromogenic method for determining MSG in food samples, without complicated sample pre-treatment or advanced instruments. Monosodium Glutamate (MSG) is an ingredient used to make food taste more delicious. Because of many reports regarding the adverse effects due to excessive use of MSG, the United States Food and Drug Administration (USFDA) and World Health Organization (WHO) set maximum recommended intake of MSG is 120 mg / kg body weight/day as a standard. Excessive use of MSG may trigger allergic reactions such as itching, nausea, vomiting, headache, dizziness, migraine and long-term health issues such as hypertension,cancer, spermatogenesis disorders, Parkinsonism and stroke. The developed method depends on the reaction between MSG and ninhydrin solution to form a purple. The addition of MSG to ninhydrin causes the reaction of the free α-amino acids present in MSG, glutamic acid to form a purple-coloured complex which shows an absorption maximum at 567 nm. The reaction conditions including reagent concentration, pH, and time were optimized. The method was validated according to the ICH guidelines. The method determined MSG within the linearity range of 20—100 µg with a correlation coefficient (r) of 0.99908 and a calculated the limit of detection of 10 µg. The developed method was successfully applied for the determination of MSG in various brands food taste makers (instant noodles taste makers, soup taste makers and ketchups) available in the market.

**Keywords:** Glutamic acid, ninhydrin, absorption, detection

**CH-398**

**NARINGENIN–METAL COMPLEX AS A POTENTIAL THERAPEUTIC CANDIDATE FOR ALZHEIMER'S DISEASE: INSIGHTS FROM MOLECULAR DOCKING, ADME STUDIES, AND NETWORK PHARMACOLOGY**

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In this study, we aimed to evaluate the potential effectiveness of the naringenin–metal complex in the treatment of Alzheimer's disease. For this purpose, we employed the SH-SY5Y cell line, a widely used human-derived neuroblastoma cell model that exhibits neuronal properties and serves as a reliable *in vitro* system for studying neurodegenerative disorders. The target protein selected for this investigation was acetylcholinesterase (AChE), a key enzyme involved in the breakdown of acetylcholine and strongly associated with the progression of Alzheimer's disease. Molecular docking studies revealed that the naringenin–metal complex demonstrated a significant binding affinity toward AChE, with a docking score of –11.1 kcal/mol. To further validate its therapeutic potential, ADME (Absorption, Distribution, Metabolism, and Excretion) studies were performed, which indicated favorable pharmacokinetic properties, including good oral bioavailability, acceptable lipophilicity, and compliance with Lipinski's rule of five, suggesting drug-likeness of the complex. Additionally, network pharmacology analysis was conducted to identify possible molecular targets and signaling pathways regulated by naringenin–metal complexes. This approach revealed their interaction with multiple Alzheimer's-related pathways, including cholinergic signaling, oxidative stress modulation, and neuroinflammatory processes, thereby supporting a multitarget therapeutic mechanism. Collectively, these findings highlight that the naringenin–metal complex not only exhibits strong inhibitory potential against acetylcholinesterase but also possesses desirable pharmacokinetic attributes and multi-pathway interactions, positioning it as a promising therapeutic candidate for mitigating Alzheimer's disease pathology.

**Keywords:** Naringenin–metal complex; Alzheimer's disease; acetylcholinesterase inhibition; SH-SY5Y cell line; molecular docking; ADME studies; network pharmacology; neurodegeneration.

**CH-399**

**"*IN-SILICO*, *IN-VIVO* ANALYSIS OF NARINGENIN METAL COMPLEXES AS A POTENTIAL CANDIDATE FOR THE TREATMENT OF ALZEHIMER'S DISEASE"**

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Alzheimer's disease (AD) is a progressive neurodegenerative disorder marked by memory loss and cognitive decline, often associated with amyloid-β accumulation. Flavonoids such as Naringenin possess neuroprotective effects; however, their therapeutic application is limited by poor bioavailability. Complexation with metals such as zinc, iron, and copper, which themselves exhibit neuroprotective potential, can enhance bioactivity. Furthermore, nanoparticle-based encapsulation improves targeted delivery and brain penetration. This study aimed to investigate Naringenin–metal complexes through *in silico* and *in vivo* approaches as potential anti-Alzheimer candidates. Molecular property prediction was carried out using MolSoft, while toxicity was assessed via ProTox III. Molecular docking of Naringenin–metal complexes with acetylcholinesterase (AChE, PDB ID: 1EVE) was performed using PyRx. Complexes were synthesized and characterized by FT-IR, ^1H NMR, and mass spectrometry. ZnO-loaded Naringenin–iron complex nanoparticles were further prepared and analyzed for particle size, zeta potential, SEM, XRD, drug entrapment, dissolution, release, and solubility studies. Anti-Alzheimer activity was evaluated *in vitro* and *in vivo* against AChE. Docking studies revealed strong binding energy of –11.1 kcal/mol with AChE, with only minor Lipinski and Veber rule violations and no observed toxicity. The ZnO-loaded nanoparticles demonstrated 95.5% drug entrapment, particle size of 81.4 nm, and 89.7% sustained release over




ISBN: 978-81-980623-8-3

4 hours. Solubility and bioavailability were significantly enhanced compared to metal complexes alone. *In vitro* and *in vivo* studies confirmed superior anti-Alzheimer activity of the nanoparticle formulation. In conclusion, Naringenin–iron complexes encapsulated in ZnO nanoparticles demonstrate promising therapeutic potential for AD treatment.

**Keywords:** Molecular Docking, Naringenin–Metal Complexes, Anti-Alzheimer Activity, ZnO Nanoparticles

**CH-400**

**NOVEL ANALYTICAL METHOD DEVELOPMENT AND VALIDATION OF DAPAGLIFLOZIN IN BULK AND PHARMACEUTICAL DOSAGE FORM**

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This study describes the development and validation of simple and reliable methods for estimating Dapagliflozin in bulk and pharmaceutical dosage forms: zero-order UV spectroscopy, area under curve (AUC) spectroscopy, and reverse-phase high-performance liquid chromatography (RP-HPLC). In both UV-based methods, Dapagliflozin showed maximum absorbance at 224 nm using a 70:30 mixture of acetonitrile and ethanol as the solvent. The zero-order method showed good linearity from 3–18 µg/mL with $R^2$ = 0.998, recovery of 99.51% to 101.3%, LOD = 0.098 µg/mL, and LOQ = 0.298 µg/mL. The AUC method, measured over 219–229 nm, gave slightly better sensitivity with $R^2$ = 0.999, LOD = 0.070 µg/mL, and LOQ = 0.214 µg/mL Recovery was between 98.1% and 100.0%. Both methods showed good precision with %RSD < 2%. The RP-HPLC method used a Shimpack C-18 column and a mobile phase of methanol and 0.1% orthophosphoric acid in water (80:20, pH 4.5), at a flow rate of 1.0 mL/min. Detection was done at 224 nm, and the drug was eluted at 3.935 minutes. This method showed LOD = 1.279 µg/mL, LOQ = 3.877 µg/mL, and recovery between 99.93% and 100.29%, with system suitability parameters within acceptable limits. All methods were validated according to ICH guidelines, confirming their accuracy, precision, linearity, sensitivity, robustness, and suitability for routine quality control of Dapagliflozin in bulk and dosage forms.

**Keywords:** Dapagliflozin; UV Spectroscopy; AUC Method; RP-HPLC; Method Validation; ICH Guidelines.

**CH-401**

**DESIGN AND SYNTHESIS OF A NEW SERIES OF 7H-PURINE DERIVATIVES AS DUAL EGFR/HER2 INHIBITORS AGAINST LAPATINIB RESISTANCE**

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We reported design, synthesis, and evaluation of a new series of 6,7-disubstituted-7H-purine derivatives (10a–u) as dual EGFR/HER2 inhibitors. Twenty-one compounds were synthesized via efficient strategies and screened *in vitro* against a kinase panel comprising EGFR family members, VEGFR, PDGFRα, and PDGFRβ. Five derivatives (10d, 10e, 10i, 10m, and 10r) exhibited potent activity, with compound 10r showing the strongest dual inhibition of EGFR and HER2 ($IC_{50}$ = 0.017 ± 0.003 µM and 0.014 ± 0.002 µM, respectively). Cytotoxicity assays demonstrated that 10i and 10r significantly suppressed proliferation in a range of breast cancer cell lines, excluding MCF-7, and retained efficacy in lapatinib-resistant BT-474/L and SKBR-3/L cells ($IC_{50}$ = 1.682–2.236 µM). Apoptosis studies revealed that 10r induced accelerated cell death and downregulated EGFR/HER2 along with downstream ERK1/2 and AKT signalling. Docking studies confirmed strong binding of 10r to EGFR and HER2 through hydrogen bonding and π–π interactions. These findings highlight the 6,7-disubstituted purine scaffold as a promising framework for developing potent dual EGFR/HER2 inhibitors capable of overcoming lapatinib resistance.

**Keywords:** EGFR, HER2, 6 7-disubstituted-7H-purines, Breast cancer, Lapatinib Etc.

**CH-402**

**DEVELOPMENT AND VALIDATION OF NEW SPECTROPHOTOMETRIC METHOD FOR THE ESTIMATION OF FROVATRIPTAN SUCCINATE IN PHARMACEUTICAL FORMULATIONS**

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Frovatriptan Succinate (CAS 158930-17-7) is used for the treatment of acute migraine headaches in adults,in particular those associated with menstruation. Frovatriptan causes vasoconstriction of arteries and veins that supply blood to the head. Frovatriptan Succinate is chemically, butanedioic acid;(6R)-6-(methylamino)-6,7,8,9-tetrahydro-5H-carbazole-3-carboxamide with molecular formula C14H17N3O and molecular weight 269.345 grams/mole. Frovatriptan is a 5-HT receptor agonist that binds with high affinity for 5-HT1B and 5-HT1D receptors. Frovatriptan has no significant effects on GABAA mediated channel activity and has no significant affinity for benzodiazepine binding sites. A new spectrophotometric method has been developed for the estimation of Frovatriptan Succinate in pharmaceutical dosage forms (Tablets). Double beam spectrophotometer (SHIMADZU Model No. UV- 1800) with quartz cells was used for the present study (200-400 nm). Frovatriptan Succinate has shown absorption maxima (λmax) at 244.50 nm in borate buffer (9 pH) and Beer-Lambert's law was obeyed over the concentration range 0.1-10 µg/ml with linear regression equation, y = 0.1759x + 0.0132 ($R^2$ = 0.9996). The method was validated as per ICH guidelines and found to be simple, precise and accurate and can be applied successfully for the assay of for the Frovatriptan Succinate pharmaceutical formulations.

**Keywords:** Frovatriptan Succinate, spectrophotometry, ICH Guidelines.

**CH-403**

**NOVEL UHPLC-HRMS/MS METHOD FOR ULTRA-SENSITIVE DETECTION OF OCTREOTIDE IMPURITIES**

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Octreotide, a synthetic somatostatin analogue, requires stringent impurity profiling to ensure safety and efficacy. A high-resolution UHPLC-HRMS/MS method was developed and validated for the qualitative and quantitative analysis of peptide-related impurities at or above 0.10 % of the drug substance. Chromatography was performed using a trifluoroacetic acid–acetonitrile–water system compatible with mass spectrometry. Qualitative analysis employed ESI+ scanning from m/z 100–1500, while quantitative analysis used ESI+ scanning from m/z 200–1500 at 70,000 resolutions with optimized gas and voltage parameters. Following U.S. FDA guidance, impurity profiles were compared across six reference-listed drug (RLD) batches of three strengths (sampled from 27 months prior to expiry through end-of-shelf-life) and nine ANDA exhibit batches of the proposed generic product (tested at release and again 4–9 months before expiry). Results demonstrated that the generic product's impurity profile closely matched the RLD, with no new peptide-related impurities ≥0.10 % detected. A combined peak at relative retention time (RRT) 1.31 contained [Des-Threoninol]-Octreotide and an unknown impurity of molecular weight 1076.4 Da; the latter was the major component, while [Des-Threoninol]-Octreotide remained below the 0.05 % disregard limit. Because these cannot be chromatographically resolved, they are jointly controlled at a 0.5 % limit. Additionally, six other unknown impurities ≥0.10 % were fully characterized by UHPLC-HRMS/MS or reference standards. This study confirms that the proposed generic octreotide product exhibits an impurity profile equivalent to the RLD and meets regulatory expectations for safety and quality.

**Keywords:** Octreotide, UHPLC-HRMS/MS, Reference listed drug, Impurities, and USFDA Guidelines.

**CH-404**

**BIOANALYTICAL HPLC METHOD DEVELOPMENT AND VALIDATION: APPLICATION TO PHARMACOKINETIC**

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ISBN: 978-81-980623-8-3

Lopinavir (LPV) is a potent HIV protease inhibitor (PI) drug suffering from drawback of low bioavailability of drug and hence the present work describes the increase in the bioavailability by using natural bio enhancers like Gallic acid and quercetin. Bio enhancers were dosed at different concentrations (50,100,120 mg/kg) along with the drug (10 mg/kg) and bioavailability is assessed at respective time interval of 1,2,4,6 and 24 hrs. After dosing. A reverse phase HPLC method using QbD approach was developed for the investigation of Lopinavir in rat plasma using internal standard method after oral administration of drug. The method was successfully applied for the pharmacokinetic study in rat. LOPINAVIR and its co-administration with bio enhancer's concentration in blood plasma (Cmax) were found to be 2.54, 3.526.12, 7.25, 8.01, 8.12, 12.01 in the following increasing order LPV, LPV+B2 50, LPV+B2 100, LPV+B1 50, LPV+B2 100, LPV+B2 120, LPV+B1 120 respectively. T1/2 was achieved 2 hours earlier than the plain LPV i.e. at 4 hours.

**Keywords:** Lopinavir, Bioavailability, Bio enhancer, Bioanalytical, Analytical QbD, Box-Behnken

**CH-405**

**ROLE OF ANALYTICAL TECHNIQUES AND AI TOOLS FOR STUDY OF CROSSLINKING IN GELATIN CAPSULE SHELLS**

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Gelatin capsules are widely used in oral drug delivery, but their stability is often compromised by crosslinking of the gelatin shell. Crosslinking, triggered by aldehydes, peroxides, or environmental factors, can reduce disintegration and dissolution, thereby affecting therapeutic efficacy. Understanding and monitoring this process is essential for ensuring capsule performance and regulatory compliance. Advanced analytical techniques such as NIR, FT-IR and fluorescence spectroscopy provide detailed insights into the structural and physicochemical changes occurring in gelatin matrices. Complementary dissolution studies further highlight the functional impact of crosslinking. Recently, artificial intelligence (AI) and machine learning have emerged as powerful tools to analyse complex datasets, identify hidden trends, and predict crosslinking kinetics with greater accuracy. Integration of analytical methods with AI-driven interpretation offers a robust approach to improve mechanistic understanding, support quality-by-design strategies, and ensure consistent performance of gelatin capsule shells.

**Keywords:** Gelatin capsules, crosslinking, analytical techniques, AI.

**CH-406**

**DEVELOPMENT OF FORCE DEGRADATION PROFILE OF ATENOLOL AND CHLORTHALIDONE IN COMBINE TABLET DOSAGE FORM BY (RP-HPLC)**

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Atenolol (ATN) and Chlorthalidone (CTN) are widely prescribed in combination for the management of hypertension. The present study focuses on the development of a force degradation profile for ATN and CTN in a combined tablet dosage form using Reverse Phase High Performance Liquid Chromatography (RP-HPLC). Forced degradation studies were conducted under various stress conditions including acidic, basic, oxidative, thermal, and photolytic environments to evaluate the stability-indicating capability of the method. Chromatographic separation was achieved using a Comosil RP-C18 column (4.6 × 250 mm, 5 µm) under gradient elution with a mobile phase comprising methanol and water (pH adjusted to 3.0 using ortho-phosphoric acid). The flow rate was maintained at 1.0 mL/min and detection was carried out at 226 nm. The retention times for ATN and CTN were found to be 2.2 min and 3.36 min respectively. The method demonstrated excellent linearity over the concentration ranges of 40–200 µg/mL for ATN and 10–50 µg/mL for CTN, with correlation coefficients ($r^2$) of 0.999 for both drugs. System suitability parameters including %RSD, resolution, and theoretical plates were within acceptable limits. The developed RP-HPLC method was validated as per ICH guidelines and proved to be robust, precise, and specific for the simultaneous estimation of ATN and CTN in the presence of degradation products. This study confirms the applicability of the method for routine quality control and stability testing of combined dosage forms.

**Keywords**: Atenolol, Chlorthalidone, RP-HPLC, Forced degradation, Stability-indicating method, Method validation, Combined tablet dosage form

**CH-407**

**RP-HPLC METHOD DEVELOPMENT AND VALIDATION OF GALLIC ACID IN POLYHERBAL TABLET FORMULATION**

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A new simple, accurate, precise, sensitive and validated RP-HPLC method was developed for the estimation of Gallic acid in bulk and pharmaceutical tablet dosage form. The chromatographic conditions used for the separation was Phenomenex Luna C18 (2) (4.6 x 250mm, 5µ), rheodyne manual injector with capacity of 20µL and mobile phase comprised of Water: Acetonitrile (80: 20%v/v) and pH is maintained at 3.00 using Ophosphoric acid (OPA). The flow rate was 1.0mL/min with detection at 272nm. The retention time was found to be 3.60min. The linearity was found to be in the range of 0.5-50µg/mL for Gallic acid with correlation coefficient of 0.9994. The proposed method is accurate with 99.97% - 100.58 % recovery and precise (%RSD of repeatability, intra-day and inter-day variations were 1.26%, 0.48-0.95%, 0.80-1.83%). The Limit of Detection (LOD) and Limit of Quantification (LOQ) were found to be 0.0178µg/mL and 0.0539µg/mL respectively. The amount of Gallic acid in Polyherbal tablet was found to be 1.63%.

**CH-408**

**DEVELOP AND VALIDATE THE STABILITY INDICATING RP-HPLC METHOD FOR THE ESTIMATION IN BULK AND CAPSULE DOSAGE FORM OF ITRACONAZOLE BY QBD APPROACH**

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Quality by Design is the modern approach for quality of pharmaceuticals. The aim of the pharmaceutical development is to design a quality product and its manufacturing process to consistently deliver the intended performance of the product. Quality cannot be tested into products, but quality should be built in by design. A simple, Accurate, precise method was developed and validate a stability indicating reverse phase-high performance liquid chromatography (RP-HPLC) method for the determination of Itraconazole in bulk and pharmaceutical dosage form using QbD approach. Chromatogram was run through Kromosil 150 x 4.6 mm, 5. Mobile phase containing KH2PO4: Acetonitrile taken in the ratio 60 (%v/v) and 40 was pumped through column at a flow rate of 0.924 ml/min. Temperature was maintained at 32.9°C. Optimized wavelength selected was 260nm. Retention time of Itraconazole was found to be 2.467 min. %RSD of the Itraconazole was found to be 0.5. % Recovery was obtained as 99.84% for Itraconazole. LOD, LOQ values obtained from regression equations of Itraconazole were 0.08, 0.24. Regression equation of Itraconazole is y = 41250x + 2844. Retention times were decreased, and that run time was decreased, so the method developed was simple and economical that can be adopted in regular Quality control test in Industries.

**Keywords:** Itraconazole, QbD Approach, Method development, RP-HPLC

**CH-409**

**ECO-FRIENDLY SULFONAMIDE SCAFFOLDS AS ANTI-TUBERCULAR AGENTS**

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Tuberculosis (TB) remains a major global health concern, primarily affecting the lungs and caused by the bacterium Mycobacterium tuberculosis (MTB). As of 2024, TB's high prevalence, contagiousness, and frequent co-infection with other diseases continue to make it a formidable challenge to cure. Despite extensive international initiatives, the emergence of drug-resistant (DR-TB) and multidrug-resistant TB (MDR-TB) has significantly contributed to rising mortality rates. According to the World Health Organization's Global TB Report 2022,




ISBN: 978-81-980623-8-3

millions of people continue to be affected, underscoring the urgent need for novel therapeutic strategies. A critical obstacle is the shortage of effective drugs to combat resistant strains. To address this, recent research has focused on the synthesis of sulphonamide scaffolds and their evaluation for anti-tubercular activity, utilizing advanced synthetic and analytical methodologies. Structural modifications targeted three primary regions: the sulfonyl group and the nitrogen atoms at positions N1 and N4. Drug-likeness was assessed using Lipinski's rule of five, while pharmacokinetic and toxicity profiles were evaluated through ADMET screening. Notably, recent studies have demonstrated the successful and eco-friendly synthesis of sulphonamide derivatives. Their structures were confirmed using analytical techniques such as IR, 1H NMR, and mass spectrometry. Biological evaluation revealed that while several synthesized compounds exhibited excellent anti-tubercular activity, others showed moderate efficacy. On-going research aims to develop novel sulphonamide compounds with improved therapeutic profiles, ultimately contributing to enhanced healthcare and improved quality of life.

**Keywords:** Tuberculosis, Sulphonamides, Anti-tubercular agents, Drug-resistant TB

**CH-410**

## NEW UV-SPECTROPHOTOMETRIC METHOD FOR THE ESTIMATION OF BRIMONIDINE EYE DROPS

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A new spectrophotometric method has been developed for the estimation of Brimonidine tartrate in pharmaceutical dosage forms (Eye drops). Brimonidine tartrate is a selective alpha-2 adrenergic receptor. Brimonidine is an that acts by the activation of. This inhibits the activity of. The α2 agonist results in vasoconstriction of blood vessels and vasoconstriction reduces the aqueous humour flow. Brimonidine is used to treat or. Brimonidine is indicated for the lowering of in patients with open-angle glaucoma or ocular hypertension. Double beam spectrophotometer (SHIMADZU Model No. UV- 1800) with quartz cells was used for the present study. Brimonidine tartrate has shown absorption maxima (λmax) at 246 nm in Phosphate buffer (pH 2.0) and Beer-Lambert's law was obeyed over the concentration range 1.0-40 µg/ml and the method was validated as per ICH guidelines. The method was found to be simple, precise and accurate and can be applied successfully for the assay of Brimonidine tartrate for the pharmaceutical formulations.

**Keywords:** Brimonidine tartrate, Spectrophotometry, Validation.

**CH-411**

## DEVELOPMENT AND VALIDATION OF NEW SPECTROPHOTOMETRIC METHOD FOR THE ESTIMATION OF PIOGLITAZONE IN TABLET DOSAGE FORMS

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Pioglitazone CAS [112529-15-4] is used for the treatment of high blood sugar levels caused by type 2 diabetes. It is chemically, 5-[[4-[2-(5-ethyl-2-pyridinyl) ethoxy] phenyl] methyl]-1,3-thiazolidine-2,4-dione with molecular formula C19H20N2O3S and molecular weight 356.4 grams/mole. It is a selective agonist at peroxisome proliferator-activated receptor-gamma (PPARγ) in target tissues for insulin action such as adipose tissue, skeletal muscle, and liver. Activation of PPARγ increases the transcription of insulin-responsive genes involved in the control of glucose and lipid production, transport and utilization. Pioglitazone enhances tissue sensitivity to insulin and reduces the hepatic production of glucose (i.e. gluconeogenesis) - insulin resistance associated with type 2 diabetes mellitus is therefore improved without an increase in insulin secretion by pancreatic beta cells. A new UV spectrophotometric method has been developed for the assay of Pioglitazone in tablet dosage forms. Double beam spectrophotometer (SHIMADZU Model No. UV- 1800) with quartz cells was used for the present study (200-400 nm). Pioglitazone has shown absorption maxima (λmax) at 227 nm in Phosphate buffer (pH 7.5) and Beer-Lambert's law was obeyed over the concentration range 1.0-40 µg/ml with linear regression equation y= 0.0255x + 0.0058 (R2 = 0.9997) the method was validated as per ICH guidelines. The method was found to be simple, precise and accurate and can be applied successfully for the assay of Pioglitazone in tablet dosage forms.

**Keywords:** Pioglitazone, Spectrophotometry, ICH Guidelines.

**CH-412**

## NEW SPECTROPHOTOMETRIC METHODS FOR THE QUANTIFICATION OF SUMATRIPTAN SUCCINATE IN PHARMACEUTICAL FORMULATIONS

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Sumatriptan succinate is a medication used for the treatment of migraine and clustered headaches. It belongs to the class of drugs called selective serotonin receptor agonists (SSRA), or triptans. Sumatriptan succinate is chemically, 5-(Methyl sulfamoyl methyl)-N, N-dimethyltryptamine with molecular formula C14H21N3O2S and molecular weight 295.40 grams/mole. It acts by binding to 5-HT1B and 5HT-1D receptors on cranial blood vessels, causing selective vasoconstriction and inhibiting the release of pro-inflammatory neuropeptides from trigeminal nerves, interrupting the pain signals associated with migraine attacks. Two new spectrophotometric methods have been proposed for the assay of Sumatriptan succinate in pharmaceutical dosage forms (Tablets). Double beam spectrophotometer (SHIMADZU Model No. UV- 1800) with quartz cells was used for the present study (200-400 nm). Sumatriptan succinate has shown absorption maxima (λmax) at 282 nm in Acetate buffer (pH 4.0) and 217 nm in 0.1N sodium hydroxide and Beer-Lambert's law was obeyed over a wide concentration range and the methods were validated as per ICH guidelines. The methods were found to be simple, precise and accurate and can be applied successfully for the assay of Sumatriptan succinate for the pharmaceutical formulations.

**Keywords:** Sumatriptan succinate, spectrophotometry, ICH Guidelines.

**CH-413**

## NOVEL ISATIN DERIVATIVES AS ANTICHOLINESTERASE AGENTS

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The neuropathology of Alzheimer's disease is generally characterized by the presence of numerous plaques of amyloid β-peptide (Aβ) that forms senile plaques, neurofibrillary tangles (NFT) of hyper phosphorylated tau protein and degeneration or atrophy of the basal forebrain cholinergic neurons. Acetylcholinesterase plays a significant role in accelerating β-amyloid peptide aggregation and deposition in the fibrils. Thus, inhibition of AChE is still the most successful therapeutic strategy for the symptomatic treatment of Alzheimer's disease and its progression. The current study was directed toward developing a new series of fused heterocycles incorporating Isatin moiety against Acetylcholinesterase (AChEs). The binding mode of these molecules simulated through docking studies with the target enzyme (pdb ID: 1EVE). Compounds namely IS-I, IS-II and IS-IV showed better binding energy towards the protein AChE with values of -10.0, -8.6, -10.4 Kcal/mol. The Acteylcholinesterase inhibitory Assay based on Ellman protocol revealed that the synthesized compounds are effective inhibitors against the target in a dose dependent manner. Among the Isatin derivatives, IS I produced a maximum enzyme inhibition with an IC50 value was found to be 2.6 µg/ml at concentrations ranging between 2-128 µg/ml which is comparable with that of standard drug, Donepezil (0.2 to 12.8 µg/ml). The results of this study confirm that these derivatives are potent in AChEs inhibition and could serve as better candidates for the further studies of Alzheimer's disease.

**Keywords:** Acetylcholinesterase inhibitors, Isatin derivatives, Ellman's assay

**CH-414**

## METHOD DEVELOPMENT AND VALIDATION OF NEW SPECTROPHOTOMETRIC METHOD FOR THE QUANTIFICATION OF ONDANSETRON HYDROCHLORIDE IN TABLET DOSAGE FORM




ISBN: 978-81-980623-8-3

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A new UV spectrophotometric method has been developed for the estimation of Ondansetron Hydrochloride in tablet dosage forms. Ondansetron Hydrochloride is a selective antagonist of the serotonin receptor subtype, 5-HT3. Ondansetron Hydrochloride (CAS 103639-04-9) is used to prevent nausea and vomiting caused by chemotherapy and radiation therapy, nausea and vomiting after surgery. It is chemically, 9-methyl-3-[(2-methyl-1H-imidazol-1-yl) methyl]-2,3,4,9-tetrahydro-1H-carbazol-4-one hydrochloride with molecular formula C18H20ClN3O.HCl and molecular weight 329.8 grams/mole. It exerts antiemetic effect through selective antagonism of 5-HT3 receptors located on peripheral vagal terminals and within the central nervous system structures. A double beam spectrophotometer (SHIMADZU Model No. UV- 1800) with quartz cells was used for the study. Ondansetron Hydrochloride has shown absorption maxima (λmax) at 248 nm in Phosphate buffer (7.5 pH) and Beer-Lambert's law was obeyed over the concentration range 1-100 µg/ml with linear regression equation, y = 0.041x + 0.0219 $R^2$ = 0.998. The method was validated as per ICH guidelines and was found to be simple, precise and accurate and can be applied successfully for the assay of Ondansetron Hydrochloride in pharmaceutical formulations.

**Keywords:** Ondansetron Hydrochloride, Anti-emetic, Spectrophotometry, ICH Guidelines.

**CH-415**

## NEW SPECTROPHOTOMETRIC METHOD FOR THE QUANTIFICATION OF FROVATRIPTAN SUCCINATE IN PHARMACEUTICAL FORMULATIONS

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Frovatriptan Succinate (CAS 158930-17-7) is used for the treatment of acute migraine headaches in adults,in particular those associated with menstruation. Frovatriptan causes vasoconstriction of arteries and veins that supply blood to the head. Frovatriptan Succinate is chemically, butanedioic acid;(6R)-6-(methylamino)-6,7,8,9-tetrahydro-5H-carbazole-3-carboxamide with molecular formula C14H17N3O and molecular weight 269.345 grams/mole. Frovatriptan is a 5-HT receptor agonist that binds with high affinity for 5-HT1B and 5-HT1D receptors. Frovatriptan has no significant effects on GABAA mediated channel activity and has no significant affinity for benzodiazepine binding sites. A new spectrophotometric method has been developed for the estimation of Frovatriptan Succinate in pharmaceutical dosage forms (Tablets). Double beam spectrophotometer (SHIMADZU Model No. UV- 1800) with quartz cells was used for the present study (200-400 nm). Frovatriptan Succinate has shown absorption maxima (λmax) at 244.50 nm in phosphate buffer (2.1 pH) and Beer-Lambert's law was obeyed over the concentration range 0.1-20 µg/ml with linear regression equation y = 0.1633x + 0.0077, ($R^2$ = 0.9999). The method was validated as per ICH guidelines and found to be simple, precise and accurate and can be applied successfully for the assay of for the Frovatriptan Succinate pharmaceutical formulations.

**Keywords:** Frovatriptan Succinate, spectrophotometry, ICH Guidelines.

**CH-416**

## NEW SPECTROPHOTOMETRIC METHOD FOR THE QUANTIFICATION OF EFAVIRENZ IN TABLET

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Efavirenz (CAS 154598-52-4) is used for the treatment of human immunodeficiency virus infection. It is a non-nucleoside reverse transcriptase inhibitor. Efavirenz is chemically, 4S)-6-chloro-4-(2-cyclo propyl ethynyl)-4-(trifluoromethyl)-1H-3,1-benzoxazin-2-one with molecular formula $C_{14}H_9ClF_3NO_2$ and molecular weight 315.675 grams/mole. It acts by binding to a non-catalytic site on the HIV-1 reverse transcriptase enzyme and prevents the enzyme from functioning properly which indirectly inhibits HIV replication and also halts the conversion of HIV's RNA into DNA which is necessary for producing new virus particles. A new spectrophotometric method has been developed for the estimation of Efavirenz in pharmaceutical dosage forms (Tablets). Double beam spectrophotometer (SHIMADZU Model No. UV- 1800) with quartz cells was used for the present study (200-400 nm). Efavirenz has shown absorption maxima (λmax) at 247 nm in Boric Buffer (pH 9) and Beer-Lambert's law was obeyed over the concentration range 0.25-30 µg/ml with linear regression equation, y = 0.0.809x + 0.0498 ($R^2$ = 0.9986). The method was validated as per ICH guidelines and found to be simple, precise and accurate and can be applied successfully for the assay of Efavirenz for the pharmaceutical formulations.

**Keywords:** Efavirenz, spectrophotometry, ICH Guidelines.

**CH-417**

## FT-IR METHOD FOR QUANTIFYING FLUOXETINE IN BULK AND CAPSULES

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Fluoxetine, a selective serotonin reuptake inhibitor (SSRI), is widely prescribed for depression and related disorders, necessitating fast and reliable quality control methods for its pharmaceutical preparations. The present study describes the development and validation of a novel Fourier Transform Infrared (FT-IR) spectroscopic method for the quantitative estimation of fluoxetine in bulk drug and marketed capsule formulations. Using the KBr pellet technique, characteristic absorption bands at 2923 $cm^{-1}$ (C–H stretch), 1615 $cm^{-1}$ (aromatic C=C stretch), 1329 $cm^{-1}$ (C–F stretch), and 1242 $cm^{-1}$ (phenoxy stretch) were selected for analysis. Calibration curves were constructed over a concentration range of 10–50 µg/mg, exhibiting excellent linearity with a regression equation of y = 0.0258x + 0.6436 and a correlation coefficient ($r^2$) of 0.999. Method validation, performed in accordance with ICH guidelines, demonstrated high accuracy with a mean recovery ranging from 99.11% to 99.52%, and precision with intraday and interday %RSD values below 1.0%. Limits of detection (LOD) and quantification (LOQ) were found to be as low as 0.127 µg/mg and 0.386 µg/mg, respectively, confirming the sensitivity of the method. The proposed FT-IR technique is rapid, cost-effective, and requires minimal sample preparation compared to conventional chromatographic methods. Its robustness and reproducibility make it particularly suitable for routine quality control of fluoxetine in bulk and dosage forms. This validated method offers an efficient alternative for pharmaceutical industries and research laboratories, ensuring product integrity and regulatory compliance.

**Keywords:** Fluoxetine; FT-IR spectroscopy; Quantitative analysis; KBr pellet method; Method validation; ICH guidelines; Quality control.

**CH-418**

## VALIDATED RP-HPLC METHOD FOR SIMULTANEOUS ESTIMATION OF LINAGLIPTIN AND EMPAGLIFLOZIN IN BULK AND TABLET DOSAGE FORMS

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A simple, precise, and stability-indicating reverse-phase high-performance liquid chromatographic (RP-HPLC) method was developed and validated for the simultaneous estimation of Linagliptin and Empagliflozin in bulk and pharmaceutical dosage forms. Chromatographic separation was achieved on a Kromosil C18 (250 × 4.6 mm, 5 µm) column using an isocratic elution of 0.1% ortho-phosphoric acid (OPA) buffer (pH 4.8, adjusted with triethylamine) and acetonitrile in the ratio of 70:30 v/v. The mobile phase was pumped at a flow rate of 1.0 mL/min with detection at 286 nm. The retention times of Linagliptin and Empagliflozin were 1.920 min and 3.699 min, respectively. The method exhibited excellent linearity within the concentration range of 12.5–75 µg/mL for Linagliptin and 25–150 µg/mL for Empagliflozin, with correlation coefficients ($r^2$) of 0.999 for both drugs. Limits of detection were 0.24 µg/mL and 0.17 µg/mL, and limits of quantification were 0.72 µg/mL and 0.51 µg/mL for Linagliptin and Empagliflozin, respectively. Accuracy studies demonstrated mean recoveries of 100.63% for Linagliptin and 100.20% for Empagliflozin, while precision studies




ISBN: 978-81-980623-8-3

revealed %RSD values below 1.0, confirming method reproducibility. Forced degradation under acidic, alkaline, oxidative, thermal, and photolytic conditions indicated the method's capability to resolve degradation products without interference from analyte peaks. The proposed RP-HPLC method is sensitive, rapid, and cost-effective, making it suitable for routine quality control and stability testing of Linagliptin and Empagliflozin in bulk drugs and commercial tablet formulations.

**Keywords:** Linagliptin, Empagliflozin, RP-HPLC, Method validation, Simultaneous estimation, Stability-indicating method.

**CH-419**

**_IN-SILICO_ APPROACHES FOR DESIGNING AND OPTIMIZATION OF NOVEL DRUG MOLECULES TARGETING MULTI-PHARMACOLOGICAL CONDITIONS**

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Drug discovery is traditionally lengthy and expensive, but in-silico pharmacology has emerged as a transformative approach to accelerate this process. Using computational tools such as molecular docking, QSAR, and physiologically based pharmacokinetic (PBPK) modeling, researchers can rapidly screen compounds, predict biological activity, and assess ADME– toxicity properties at early stages. These methods reduce both cost and time while improving efficiency in drug development. The integration of artificial intelligence and machine learning further enhances predictive accuracy, enabling the rational design of multi- target therapeutics. Case studies of drugs like valsartan and imatinib highlight the successful translation of in-silico strategies into clinical outcomes. Overall, computational approaches are reshaping drug discovery by making it faster, more reliable, and cost-effective.

**Keywords:** *In-silico* pharmacology, Drug design, Molecular docking, QSAR, ADME–toxicity.

**CH-420**

**IMPURITY PROFILING IN DRUG DEVELOPMENT**

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Impurity profiling is a critical component of drug development, ensuring the safety, efficacy, and quality of pharmaceutical products. This process involves the identification, quantification, and control of impurities—such as residual solvents, degradation products, and synthesis by-products—in active pharmaceutical ingredients (APIs) and drug formulations. Advanced analytical techniques, including high-performance liquid chromatography (HPLC), mass spectrometry (MS), and nuclear magnetic resonance (NMR), are employed to detect and characterize impurities at trace levels. Impurity profiling is guided by stringent regulatory guidelines from agencies like the FDA and ICH, which mandate comprehensive evaluation to assess potential toxicity and pharmacological impact. By integrating robust analytical methods with risk-based approaches, impurity profiling supports the optimization of manufacturing processes and formulation stability. Challenges such as detecting low-level genotoxic impurities and managing complex impurity profiles in biologics underscore the need for continued innovation in analytical technologies and regulatory strategies to ensure patient safety and therapeutic efficacy.

**Keywords:** Impurity profiling, drug development, pharmaceutical quality, analytical techniques, high-performance liquid chromatography (HPLC), mass spectrometry (MS), nuclear magnetic resonance (NMR), active pharmaceutical ingredients (APIs).

**CH-421**

**AN OPTIMIZED RP-UPLC METHOD FOR GLECAPREVIR AND PIBRENTASVIR IN HUMAN PLASMA: FOR THERAPEUTIC MONITORING**

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A simple, Accurate, precise method was developed for the simultaneous estimation of Glecaprevir and Pibrentasvir in Human plasma was developed and validated. By using Protein Precipitation Method [PPM] the sample preparation was prepared. Chromatogram was run through Hibar [2.1 µm particle size, L × I.D. 100 mm × 1.8 mm]. Mobile phase containing Buffer Ammonium Acetate: Methanol taken in the ratio 60:40 was pumped through column at a flow rate of 0.3ml/min. For the separation of Glecaprevir and Pibrentasvir Internal Standard [IS] used is Bictegravir. The Temperature was maintained at 30°C. Optimized wavelength selected was 272nm. Retention time of Glecaprevir and Pibrentasvir was found to be 0.987 min (IS) and 1.196 min of Glecaprevir and 1.490 min of Pibrentasvir. The standard curve was linear (R2 >0.999) over the concentration range of (0.0250 to 1.000 µg/ml of Glecaprevir & 0.005 to 0.200 µg/ml of Pibrentasvir. All the analytical validation parameters were determined as per ICH guidelines The bioanalytical method developed approach was selective, robust, and reliable, as accuracy, precision, recovery, and other validation parameters were all within the recommendations' limitations. The peaks produced for the drug of interest and the internal standard were well separated from one another without any plasma interferences, and the peaks were symmetrical with an adequate tailing factor. The method has the potential to be very beneficial in therapeutic drug monitoring (TDM), bioequivalence research, pharmacokinetics studies, toxicology, and biomedical investigations.

**Keywords:** Glecaprevir and Pibrentasvir, Internal Standard, Rp HPLC, Bioanalysis, Human Plasm

**CH-422**

**BIOANALYTICAL COMPARISON OF MEFENAMIC ACID PURE DRUG AND FAST DISSOLVING TABLETS USING LC-MS/MS**

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The objective of this study was to investigate the differences in pharmacokinetic profiles between the pure drug form of Mefenamic acid and an optimized fast dissolving tablet (FDT) formulation. The study was conducted using two groups of white New Zealand rabbits (n=6) in a crossover design. Plasma drug concentrations were determined using a validated LC-MS/MS method, and pharmacokinetic parameters were calculated for each formulation. Comparison of the plasma concentration–time profiles revealed significant differences between the two formulations. The optimized FDTs demonstrated a markedly higher mean peak plasma concentration (C<sub>max</sub>) of 68.33 ± 0.42 ng/mL, compared to 27.72 ± 0.31 ng/mL for the pure drug. The mean time to reach peak plasma concentration (T<sub>max</sub>) was significantly reduced in the FDT group (6.09 ± 0.072 hours) compared to the pure drug group (11.53 ± 0.011 hours).The elimination rate constant (K<sub>el</sub>) for the pure drug and the optimized FDTs was found to be 0.58 ± 0.012 $h^{-1}$ and 0.53 ± 0.014 $h^{-1}$, respectively. Notably, the absorption rate constant (K<sub>a</sub>) was significantly higher for the FDTs (5.53 ± 0.02 $h^{-1}$) compared to the pure drug (1.68 ± 0.01 $h^{-1}$). Furthermore, the area under the plasma concentration-time curve (AUC<sub>0–∞</sub>) was substantially greater for the FDTs (686.1 ± 2.07 ng·h/mL) compared to the pure drug (191 ± 1.43 ng·h/mL).These findings demonstrate that the optimized fast dissolving tablet formulation significantly enhances the rate and extent of oral absorption of Mefenamic acid, as evidenced by increased C<sub>max</sub>, K<sub>a</sub>, and AUC, and a reduced T<sub>max</sub>. Therefore, FDTs of Mefenamic acid offer a promising alternative for improved bioavailability and faster onset of action.

**Keywords:** LC-MS/MS, Mefenamic acid, fast dissolving tablets, *in vivo* studies, pharmacokinetic parameters

**CH-423**

**NEW SPECTROPHOTOMETRIC METHOD FOR THE ASSAY OF FINASTERIDE TABLETS**

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Finasteride is an anti-androgen that is used to treat male pattern hair loss, sometimes referred to as androgenic alopecia, and benign prostatic hyperplasia. By inhibiting Type II 5α-reductase, it stops testosterone from being peripherally converted to dihydrotestosterone (DHT). Thus, treating male pattern hair loss and benign prostate hyperplasis. Several methods for the determination of FIN in pharmaceuticals have been reported in the literature including UV-spectrophotometric, gas chromatographic,high performance liquid chromatographic (HPLC) and polarographic. Methods of UV spectrophotometry are Direct UV spectrophotometry, Derivative spectrophotometry, Difference spectrophotometry, Area under curve (AUC). The authors have developed a new spectrophotometric method for the estimation of Finasteride tablets in 0.1M Sodium Hydroxide, and the method was validated. Finasteride has shown λmaxat 221 nm. Linearity was observed over a range of 1 – 10 µg/mL. The drug concentration was plotted on the x-axis, and the corresponding absorbance was plotted on the y-axis to obtain a calibration curve. A linear regression equation, y = 0.0601x + 0.0061 ($R^2$ = 0.9995) was obtained. The method was precise and accurate as the % RSD was less than 2.0 (ICH Guidelines, 2005). The percentage purity was 99.58%, and regular analysis of the Finasteride tablets can be performed using this validated method.

**Keywords:** Finasteride, UV Spectroscopy, Method Development, Validation

**CH-424**

## SYNTHESIS AND EVALUATION OF MUTUAL PRODRUG OF NONSTEROIDAL ANTI-INFLAMMATORY DRUG AND SKELETAL MUSCLE RELAXANT

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In this study, mutual ester prodrug of Ibuprofen with the skeletal muscle relaxant chlorzoxazone was synthesized and characterized using IR, GC-MS, NMR, and chromatographic techniques to achieve synergistic activity of the two drugs, avoiding ibuprofen-mediated gastrointestinal damage, as well as reducing its ulceration tendency. The mutual prodrug showed better physicochemical properties, particularly in solubility and partition coefficient testing. Solubility and partition coefficient investigations revealed an increased lipophilicity, making it better suited for oral administration than the parent drug. *In-vitro* hydrolysis was further investigated at various pH levels, using simulated gastric fluid, simulated intestinal fluid, and plasma. The quantitative examination was carried out using high-performance liquid chromatography. The method involves the chemical attachment of an NSAID to a skeletal muscle relaxant, which is designed so that upon enzymatic hydrolysis (mainly in plasma), the conjugate cleaves, releasing both active parent medicines. This method minimizes undesirable effects, particularly gastrointestinal discomfort, by retaining the medications as a chemically stable prodrug in the stomach (acidic circumstances) while efficiently releasing them into the plasma (neutral conditions). Furthermore, the mutual ester prodrug was evaluated for anti-inflammatory, skeletal muscle relaxation, and ulcerogenic activity and found to be equivalent to the parent drug. Microscopic examination of the stomach tissues demonstrated a considerable reduction in gastric ulcer formation in mice gastric mucosa when compared to the parent carboxylic acid medications. As a result, the newly developed mutual prodrug had fewer gastrointestinal adverse effects while retaining therapeutic efficacy.

**Keywords:** NSAID, Ibuprofen, Skeletal Muscle relaxant, Chlorzoxazone, Ulcerogenicity, HPLC.

**CH-425**

## ANALYSIS OF MINERAL CONTENT IN LEAFY VEGETABLES USING FLAME PHOTOMETRY

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The main objective of current study, is to examine the content of mineral ions sodium (Na+) and potassium (K+) in leafy vegetables by using a calibrated Flame Photometer. The aim of this work is to compare the ion concentration among different leafy vegetables and demonstrate the reliability of flame photometry as an analytical technique for food analysis. Fresh samples of each leafy vegetable were collected from the Panchavati area of Nashik, then washed, prepared, filtered, and analyzed using a calibrated Labtronics-LT65 flame photometer. Among the tested sample, the fenugreek exhibited the highest potassium emission (198/67), succeeding coriander (185/89) and spinach (145/90) while mint recorded the lowest (23/08). Mint had the lowest emission (11/03), making it the most sodium safe, while dill had the highest emission (100/07), followed by spinach (61/03) and fenugreek (44/03). By understanding these variations, the link between agriculture and health becomes clear. These variations demonstrate how plant species, soil type, and environmental conditions influence the way plants absorb minerals. For improvement in health diets we have to regularly observed mineral content form the supplements, which is emphasized in this study.

**Keywords:** Flame Photometry, Sodium (Na+), Potassium(K+), Leafy Vegetables.

**CH-426**

## INHIBITORS OF MULTIDRUG EFFLUX PUMPS OF PSEUDOMONAS AERUGINOSA AND STAPHYLOCOCCUS AUREUS FROM NATURAL SOURCES: AN *IN-SILICO* HIGH-THROUGHPUT VIRTUAL SCREENING AND *IN VITRO* VALIDATION

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Antimicrobial resistance (AMR) in bacterial pathogens, particularly in Multidrug-Resistant (MDR) strains of Pseudomonas aeruginosa and Staphylococcus aureus, poses a severe global public health challenge. One of the key mechanisms driving this resistance is the overexpression of multidrug efflux pumps (MDR-EPs), which actively expel antibiotics from the bacterial cell. This study aimed to identify potential Efflux Pump Inhibitors (EPIs) from natural sources by employing an in-silico high-throughput virtual screening (HTVS) approach, followed by in-vitro validation. The research focused on inhibiting the MexAB-OprM efflux system (PDB IDs: 1lnw and 5daj) of P. aeruginosa and the MepA efflux system (PDB ID: 3ECO) of S. aureus. A library of natural compounds was screened using molecular docking software (MOE), and based on the maximum predicted binding energy, two lead compounds were selected: Hesperidin (a flavonoid glycoside from Citrus aurantium peels) and Carnosic acid (a diterpenoid from Rosmarinus officinalis leaves). The molecular docking results identified Hesperidin as showing the highest binding affinity to the target proteins. Specifically, Hesperidin achieved a binding energy of -12.8832 kcal/mol against the S. aureus MepA efflux pump (3ECO) and a maximum of -17.2939 kcal/mol against the P. aeruginosa MexAB-OprM efflux pump (5daj). These in-silico findings were subsequently validated by *in-vitro* microbiological assays, which confirmed the inhibitory activity of both Hesperidin and Carnosic acid against the tested microorganisms. The study concludes that Hesperidin and Carnosic acid are promising candidates for inhibiting MDR efflux systems and could potentially be used in a combination therapy with conventional antibiotics to counteract MDR infections in P. aeruginosa and S. aureus.

**Keywords:** Antimicrobial resistance, Efflux pump inhibitors, Pseudomonas aeruginosa, Staphylococcus aureus, Natural compounds, Hesperidin, Carnosic acid, Molecular docking, Virtual screening, Phytochemicals

**CH-427**

## DESIGN, SYNTHESIS, ANTICANCER ACTIVITY & NITRIC OXIDE RELEASE OF QUINOLINE-BASED (4-OXO-1,4-DIHYDROQUINOLIN-2-YL) METHYL NITRATE DERIVATIVES

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ISBN: 978-81-980623-8-3

In this study, substituted (4-oxo-1,4-dihydroquinolin-2-yl) methyl nitrate derivatives were synthesized through a multi-step chemical process involving reactions with Boron trichloride, chloroacetyl chloride, and silver nitrate. The synthesized compounds were characterized using analytical methods. Molecular docking studies were performed to assess binding affinities to EGFR tyrosine kinase (PDB ID: 4HJO). Compounds 6h (-4-OH), 6c (-4-Br), and 6e (-4-CH3) as having strong binding affinities to EGFR tyrosine kinase. Nitric oxide release was measured using the Griess method in adherent cells. In NO release assays, 6h showed the highest NO production (49.95 µmol/L). Anticancer activity was evaluated through IC50 assays in Non-small cell lung cancer (A-549) and Pancreatic cancer (PANC-1) cell lines, and selectivity indices were calculated to determine the compounds preference for cancerous cells over normal cells (HEK-29). Anticancer evaluations identified 6e, 6h, and 6m (-3,4-CH3) as the most effective, with IC50 values of 21.46 ± 1.41 µM, 22.22 ± 1.10 µM, and 24.39 ± 2.39 µM, respectively, and high selectivity indices in both A-549 and PANC-1 cell lines. Compounds 6e, 6h, and 6m showed potent anticancer effects and strong binding to EGFR tyrosine kinase, indicating their potential as leads for further cancer therapy development.

**Keywords:** Quinoline nitrate derivatives, Anticancer activity, Nitric oxide release, EGFR tyrosine kinase, Molecular docking.

**CH-428**

## DEVELOPMENT AND VALIDATION OF NEW SPECTROPHOTOMETRIC METHOD FOR THE ASSAY OF MECLIZINE IN PHARMACEUTICAL FORMULATIONS

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A new spectrophotometric method has been developed for the assay of Meclizine HCl in pharmaceutical dosage forms (Tablets). Meclizine HCl is used for the prevention and control nausea, vomiting and dizziness caused by motion sickness and also used for vertigo caused by ear problems. It is chemically, 1-(p-chloro-α-phenyl benzyl)-4-(m-methyl benzyl) piperazine dihydrochloride monohydrate with molecular formula $C_{25}H_{27}ClN_2 \cdot 2HCl \cdot H_2O$ and molecular weight 481.9 grams/mole. Meclizine is a first-generation antihistamine that blocks histamine H1 receptors and has central anticholinergic effects. A SHIMADZU Model No. UV- 1800 double beam spectrophotometer with quartz cells was used for the study. Meclizine HCl has shown absorption maxima (λmax) at 232 nm in phosphate buffer (pH 7.5) and Beer- Lambert's law was obeyed over the concentration range 1-20 µg/ml and the method was validated as per ICH guidelines. The method was found to be precise and accurate and can be applied for the assay of Meclizine HCl successfully for the pharmaceutical formulations.

**Keywords:** Meclizine HCl, Spectrophotometry, Validation, ICH Guidelines.

**CH-429**

## METHOD DEVELOPMENT AND VALIDATION OF NEW SPECTROPHOTOMETRIC METHOD FOR THE ASSAY OF VORICONAZOLE TABLETS

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A new spectrophotometric method has been developed for the assay of Voriconazole in pharmaceutical dosage forms (Tablets) using Phosphate buffer (pH 7.0). Voriconazole is an anti-fungal agent and it is chemically (2R, 3S)-2-(2,4-difluro phenyl)-3-(5-fluoro-4-pyrimidinyl)-1-(1H-1,2,4 triazol1-yl)-2-butanol. It is also used to treat invasive fungal infections that are generally seen in immunocompromised patients which include invasive candidiasis, invasive aspergillosis and emerging fungal infections. Double beam spectrophotometer (SHIMADZU Model No. UV-1800) with quartz cells was used for the present study. Voriconazole has shown λmax at 255.6 nm in Phosphate buffer (pH 7.0) and Beer-Lambert's law was obeyed over the concentration range 5-50 µg/ml and the method was validated as per ICH guidelines. The method was found to be simple, precise and accurate and can be applied successfully for the assay of Voriconazole in tablets.

**Keywords:** Voriconazole, Spectroscopy, Validation, ICH guidelines.

**CH-430**

## DEVELOPMENT AND VALIDATION OF NEW SPECTROPHOTOMETRIC METHOD FOR THE ASSAY OF CELECOXIB IN PHARMACEUTICAL FORMULATIONS

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A new spectrophotometric method has been developed for the assay of Celecoxib in pharmaceutical dosage forms (Tablets) using Acetate buffer (pH 4.0) and Phosphate buffer (pH 7.5). Celecoxib (CAS 169590-42-5) is used to relieve pain, tenderness, swelling and stiffness caused by osteoarthritis, rheumatoid arthritis (arthritis caused by swelling of the lining of the joints), and ankylosing spondylitis (arthritis that mainly affects the spine). It is chemically, 4-[5-(4-methylphenyl)-3-(trifluoro methyl) pyrazol-1-yl] benzene sulfonamide with molecular formula C17H14F3N3O2S and molecular weight 381.373 gm/mole. Celecoxib suppresses the formation of metabolites such as prostaglandin E2, Prostacyclin, Thromboxane A2, prostaglandin D2 and prostaglandin F2 and thereby reduces pain and inflammatory responses. A double beam spectrophotometer (SHIMADZU Model No. UV- 1800) with quartz cells was used for the study. Celecoxib has shown absorption maxima (λmax) at 248 nm in Acetate buffer (pH 4.0) and at 246 nm in Phosphate buffer (pH 7.5). Beer-Lambert's law was obeyed over the concentration range 2.5-20 µg/ml for both the methods. The methods were validated as per ICH guidelines and found to be simple, precise and accurate and can be applied successfully for the assay of Celecoxib for the pharmaceutical formulations.

**Keywords:** Celecoxib, Spectrophotometry, Validation, ICH Guidelines.

**CH-431**

## DRUG REPURPOSING

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Drug repurposing, or repositioning, is a creative approach in pharmaceutical research to find new indications of already marketed drugs. Instead of expensive and time-consuming drug discovery processes often rife with high rates of failure, repurposing capitalizes on the decades of safety, pharmacokinetic and manufacturing data associated with known drugs. This cuts the time and expense needed to get treatments to patients by a huge margin. Indeed several success stories have emerged and emphasized the potential of repurposing including thalidomide for multiple myeloma, sildenafil, initially designed for angina but endorsed later for erectile dysfunction and pulmonary hypertension, metformin, an antidiabetic which is now undergoing testing as a drug to prevent cancer or increase life span. The method is especially useful for treating unmet medical requirements, unusual diseases, and new health emergencies. For example, it was quickly evaluated for antivirals and anti-inflammatory drugs during the COVID-19 pandemic. Drug repurposing has benefits, but it also has drawbacks, including the need for clinical validation for new applications, regulatory complexity, and intellectual property hurdles. However, the discovery of new drug-disease associations is being sped up by developments in bioinformatics, artificial intelligence, and high-throughput screening. All things considered, drug repurposing is a viable and affordable strategy to increase therapeutic alternatives, enhance patient outcomes, and make the best use of currently available pharmaceutical resources.

**Keywords**: drug repurposing, Pharmaceutical research, Clinical validation, Artificial intelligence, Therapeutic alternatives

**CH-432**

## DESIGN SYNTHESIS CHARACTERISATION OF NEW OFLOXACIN-IMINE DRUGS FOR TUBERCULOSIS

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ISBN: 978-81-980623-8-3

This research focuses on developing new drugs to fight tuberculosis, especially the kind that is resistant to multiple existing treatments. The researchers created seven new chemical compounds by modifying a common antibiotic called ofloxacin. They did this by attaching a special chemical group called an imine to it. The new compounds were thoroughly checked to confirm they were made correctly. This involved using several lab techniques to analyze their chemical structure and purity. The researchers tested how well these new compounds worked against the bacteria that causes tuberculosis. They used a specific lab test called the Microplate Alamar Blue Assay (MABA) and compared their results to several well-known anti-tuberculosis drugs. The new compounds showed very strong activity, with a concentration of just 1.6 µg/ml being enough to stop the bacteria from growing. Then we used computer modeling to predict how these new drugs would behave in the body. These "in-silico" studies suggested that the new compounds have better properties than the standard drugs. The computer analysis also predicted that the drugs would be well-absorbed by the body. The study successfully created and tested several new potential drugs that are highly effective against tuberculosis in lab tests and show promise for future use based on computer predictions.

**Keywords:** Ofloxacin-imine synthesis, *In silico* studies, Anti-tubercular activity, Molinspiration, Protox-3

**CH-433**

## METHOD DEVELOPMENT & VALIDATION FOR THE SIMULTANEOUS ESTIMATION OF UMECLIDINIUM & VILANTEROL USING RP- HPLC METHOD

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A new, simple, precise, rapid, selective and stability reversed-phase high performance liquid chromatographic (RP-HPLC) method has been developed and validated for the simultaneous quantification of Vilanterol and Umeclidinium in pure form and its pharmaceutical dosage form. The method is based on Phenomenex Gemini C18 (4.6×250mm) 5µ column. The separation is achieved using isocratic elution by Methanol: TEA Buffer in the ratio of 65:35% v/v, pumped at flow rate 1.0mL/min and UV detection at 265nm. The column is maintained at 40°C throughout the analysis. The total run time is about 6min. The method is validated for specificity, accuracy, precision and linearity, robustness and ruggedness, system suitability, limit of detection and limit of quantitation as per International Conference of Harmonization (ICH) Guidelines. The method is accurate and linear for quantification of Vilanterol, Umeclidinium between 10 - 50µg/mL and 20 - 100µg/mL respectively. Further, satisfactory results are also established in terms of mean percent- age recovery (100.37% for Vilanterol and 100.34% for Umeclidinium, intra-day and inter-day precision (<2%) and robustness. The advantages of this method are good resolution with sharper peaks and sufficient precision. The results indicate that the method is suitable for the routine quality control testing of marketed tablet formulations.

**Keywords:** Vilanterol and Umeclidinium, RP-HPLC, ICH Guidelines, Accuracy, Precision.

**CH-434**

## REVERSE PHASE CHROMATOGRAPHIC METHOD DEVELOPMENT AND VALIDATION FOR ESTIMATION OF BENIDIPINE HCL AND METOPROLOL SUCCINATE FROM COMBINED DOSAGE FORM

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Applicability of Liquid chromatography technique for separation and detection of drugs from complex matrix is well known and widely used. A new and improved economical technique has been developed for combined drug estimation Benidipine HCL (BDH) and Metoprolol succinate (MPS). Chromatographic system RP-HPLC, using RP - C18 column equipped with UV detector was utilised for estimation of both these drugs. The mobile phase [Methanol: water pH 4.7 (pH adjusted with acetic acid HPLC grade)] was pumped at a flow rate of 0.8 ml/min in the ratio of 70: 30 % v/v and the eluents were monitored at 239 nm. The technique was successfully applied for quantitative determination of both analytes from their combined dosage form. The method was validated as per ICH guidelines. To ascertain linearity of both these drugs conc level 2 to 10µg/ml for BDH and 2 to 12µg/ml for MPS was found suitable and within acceptable range. The retention time of BDH and MPS was found 5.457 and 2.318 mins respectively. The validation parameters accuracy, precision, LOD and LOQ, robustness were studied. The assay of formulation was found 99.37% w/w for BDH and 99.31% w/w for MPS in the range stated in the official book. The precision study RSD data were varied from 0.6359 to 0.9359 for BDH and 0.1422 to 0.2872 for MPS which was within given criteria. Efficiency of the column to resolve both analytes was good and parameters were in the specified limits. Both drugs were eluted within 6 mins and no interference of excipients was observed during estimation. The developed Technique can be applied for routine quality control tests for the combined dosage form. The techniques simple, preciseness, accurate and robust characters were made sound.

**Keywords:** Benidipine HCL, Metoprolol succinate, Chromatography, validation, ICH guidelines

**CH-435**

## COMPUTER-AIDED MOLECULAR DESIGNING, OPTIMIZATION, AND DEVELOPMENT OF POLYMERIC CARRIERS FOR TAXANE DRUG DELIVERY

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Taxanes, such as paclitaxel and docetaxel, are potent chemotherapeutic agents widely used in the treatment of various cancers. However, their clinical application is limited by poor solubility, systemic toxicity, and multidrug resistance. Polymeric drug delivery systems offer a promising strategy to overcome these challenges by enhancing solubility, targeting, and controlled release. This study focuses on the computer-aided molecular design and optimization of polymeric carriers specifically tailored for efficient taxane delivery. To design, optimize, and develop biocompatible polymeric carriers for taxane drug delivery using computational modeling and molecular simulations, followed by experimental validation. A computer-aided drug design (CADD) approach was employed to model interactions between taxanes and various polymeric materials, including PEG, PLA, and PLGA. Molecular docking, dynamics simulations, and quantitative structure–activity relationship (QSAR) modeling were used to predict drug loading efficiency, stability, and release profiles. The top-performing polymers were synthesized and characterized using FTIR, DSC, and SEM. *In vitro* drug release studies, cytotoxicity assays, and cellular uptake experiments were conducted to validate the computational predictions. Simulation studies identified PEG-PLGA copolymers with optimized molecular weight and hydrophobicity as the most efficient carriers for taxane encapsulation. These carriers demonstrated high drug loading capacity, sustained release, and enhanced stability. *In vitro* results confirmed improved cytotoxic effects against cancer cells with reduced off-target toxicity compared to free drug formulations.Computer-aided molecular design proved to be an effective tool in the rational development of polymeric drug delivery systems for taxanes. The optimized PEG-PLGA carriers hold significant potential for improving therapeutic outcomes in cancer treatment by enhancing drug solubility, targeting, and reducing adverse effects.

**Keywords:** Computer-Aided Drug Design (CADD), Polymeric Carriers, Taxanes, Paclitaxel, Docetaxel, Molecular Modeling, Drug Delivery, Nanomedicine, PEG-PLGA, Controlled Release.

**CH-436**

## BICYCLIC SULTAMS IN DRUG DISCOVERY: RECENT ADVANCE & EMERGING TRENDS

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Bicyclic sulfonamides (sultams) are emerging as highly versatile scaffolds in modern drug discovery due to their structural rigidity, enhanced target specificity, and favorable pharmacokinetic properties. These compounds exhibit significant potential across diverse therapeutic areas, including antibacterial, antifungal, antiviral, anticancer, and central nervous system (CNS) disorders. The unique bicyclic framework enables precise interactions with enzymes and receptors, enhancing potency and




ISBN: 978-81-980623-8-3

selectivity. Recent advances in synthetic methodologies, such as green chemistry approaches, flow chemistry, microwave-assisted reactions, and multicomponent cascade strategies, have facilitated the efficient generation of diverse sultam derivatives. Moreover, fragment-based drug discovery and artificial intelligence-driven scaffold optimization have expanded the chemical space of bicyclic sulfonamides, enabling the design of molecules with improved ADMET profiles. Sultams have also been incorporated as ligands in targeted protein degradation strategies, such as PROTACs, further broadening their therapeutic applications. Despite these advantages, challenges remain, including synthetic complexity, scalability, potential resistance development in antimicrobial applications, and regulatory and toxicological considerations. Patent activity and a growing number of candidates in preclinical and clinical pipelines highlight the translational and commercial relevance of bicyclic sulfonamides. This review summarizes the structural, chemical, and biological characteristics of sultams, recent developments in drug discovery, emerging trends such as AI-assisted design and sustainable synthesis, and future directions for their application. By integrating innovative design strategies, computational modeling, and eco-friendly synthetic approaches, bicyclic sulfonamides hold substantial promise for addressing unmet medical needs and delivering next-generation therapeutics across multiple disease areas.

**Keywords:** bicyclic sulfonamides, sultams, drug discovery, fragment-based design, PROTACs, antimicrobial, kinase inhibitors.

**CH-437**

## IMPURITY PROFILING AND METHOD VALIDATION OF BREXPIPRAZOLE TABLETS USING HIGH-PERFORMANCE RP-HPLC TECHNIQUES

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The present study reports the development and validation of a stability-indicating Reverse Phase High-Performance Liquid Chromatography (RP-HPLC) method for the quantitative determination of related substances in Brexpiprazole tablets. Brexpiprazole, an atypical antipsychotic, demands stringent impurity profiling to ensure product safety and regulatory compliance. Method optimization was carried out on a C18 column using a gradient elution of buffer–organic solvent system, with detection at 215 nm, enabling effective separation of Brexpiprazole from its known and unknown impurities. The method was validated in accordance with ICH Q2(R1) guidelines for specificity, linearity, accuracy, precision, limit of detection (LOD), limit of quantification (LOQ), and robustness. The results confirmed high resolution, reproducibility, and acceptable system suitability parameters. This validated RP-HPLC method is simple, robust, and suitable for routine quality control, stability testing, and regulatory submission of Brexpiprazole formulations.

**CH-438**

## DEVELOPMENT OF FORCE DEGRADATION PROFILE OF ATENOLOL AND CHLORTHALIDONE IN COMBINE TABLET DOSAGE FORM BY (RP-HPLC)

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A force degradation profile of Atenolol (ATN) & Chlorthalidone (CTN) in combine tablet dosage form on RP-HPLC was developed using Comosil RP-C18 (4.6 x 250mm, 5µm) in an gradient mode with mobile phase comprising of Methanol: Water (pH 3 using OPA) The flow rate was 1 mL/ min and effluent was monitored at 226 nm. The stress conditions selected on the basis of literature review and drug profile. The analysis of the marketed formulation shows the % RSD of 0.37 and 0.99 for ATN & CTN which fully agrees with system suitability. All the system suitability parameters were fully obeyed during generation of force degradation profile.

**Keywords:** ATN, CTN, RP-HPLC, Force, Stress, Degradation.

**CH-439**

## COMPUTATIONAL DESIGN AND STRUCTURE BASED OPTIMIZATION OF NOVEL CARDIOTONICS

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The structure required for the generation of Energy and physicochemical properties were obtained from known Cardiotonics reported in ChEMBL database multiple conformers, but not more than 300, were allowed to be generated rest of parameters was set to default values. Here we used igemdock and chemmaster for searching similar compounds. We have selected Five known Cardiotonic agents which are generated and selected from the ChEMBLE database. The energy and physicochemical properties were obtained from the igemdock and chemmaster were used for the Lead Identification by subjecting the all structures of generated energy and physicochemical properties for virtual screening by using docking method against the PDB ID 1j36. The energy compounds which has highest binding affinity or energy was selected for the Lead optimization All the structures were subjected for the molecular docking studies using Glide, in the active sites of the X-ray crystal structures and induced fit models Cardiotonics. The inhibition activity of the optimized lead molecules were studied. The extent of inhibition activity of the optimized lead molecules was estimated binding energy as energy score or physicochemical properties and no of interactions with Cardiotonic agents among the compounds 1-14 it was observed that the compounds 1, 4, 5, 8, 9, 10, 13 and 14 have potent inhibitory activity with highest energy value. All drugs follow the Lipinski's rule of five.

**Keywords**: 1j36, CHF, igemdock, chemmaster, Lipinski's rule

**CH-440**

## ADVANCING MOLNUPIRAVIR QUANTIFICATION: A VALIDATED RP-HPLC METHOD FOR ANALYSIS

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A simple, reliable, and validated reverse-phase high-performance liquid chromatography (RP-HPLC) method was established for the quantitative determination of Molnupiravir in its active pharmaceutical ingredient (API) form. Separation was achieved on an Inertsil C8 column (150 × 4.6 mm, 5 µm) using an isocratic mobile phase of potassium dihydrogen phosphate buffer (pH 4.1) and methanol in an 80:20 ratio (v/v). The flow rate was set at 1.0 mL/min, with detection at 275 nm. The method exhibited excellent linearity within the 50–150% concentration range, with a correlation coefficient ($r^2$) of 0.999. Accuracy, expressed as recovery, ranged between 98.08% and 100%, while precision was confirmed with a %RSD below 0.2%. The sensitivity of the method was demonstrated by a limit of detection (LOD) of 0.478 µg/mL and a limit of quantification (LOQ) of 1.592 µg/mL. Stability and specificity were proven under forced degradation conditions, including acidic, alkaline, oxidative, photolytic, and thermal stress, confirming its stability-indicating nature. Robustness and ruggedness were verified through deliberate variations in chromatographic parameters and by different analysts across instruments. Developed and validated in line with ICH Q2(R2) guidelines, this method is suitable for routine quality control and regulatory testing of Molnupiravir in bulk drug substances. Considering its vital role in COVID-19 therapy, the method ensures consistent quality of the drug and supports the development of safe and effective pharmaceutical formulations.

**Keywords:** Molnupiravir, RP-HPLC, Method validation

**CH-441**

## ONE-POT SYNTHESIS AND IN-SILICO MOLECULAR DOCKING AND ADMET ANALYSIS OF IMIDAZO[1,2-A] PYRIDINE–THIADIAZOLE DERIVATIVES AS PROSPECTIVE ANTI-TUBERCULAR AND ANTI-PROLIFERATIVE AGENTS.

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Design an efficient One-pot synthesis of 2-Phenyl-N-(5-phenyl-1,3,4-thiadiazol-2-yl) H-imidazo[1,2α] pyridine-3-carboxamide. The synthesized derivatives were characterized using various spectroscopic techniques, including 1H-NMR, 13C-NMR, FT-IR, and Mass spectrometry. Further, our interest is based on the literature review. Imidazo[1,2-α]




ISBN: 978-81-980623-8-3

pyridine is promising in a prospective anti-tubercular and anti-proliferative agent. The in-silico Molecular Docking studies were performed using PyRx 0.8 software with PDB ID 1WYX, and the results were compared with reference drugs cisplatin and camptothecin, revealing favorable binding affinity values. ADMET properties were predicted using the Swiss ADME software, and all synthesized derivatives adhere to Lipinski's Rule of Five.

**Keywords:** Imidazo[1,2-α] pyridine, antitubercular, antiproliferative, Molecular Docking

**CH-442**

## DEVELOPMENT AND VALIDATION OF STABILITY INDICATING METHOD FOR UDENAFIL IN BULK BY HPLC

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The present study focused on developing and validating a reverse phase high-performance liquid chromatography (RP-HPLC) method for the estimation of Udenafil. RP-HPLC was chosen for its high specificity, sensitivity, and reproducibility in separating and quantifying the drug. The chromatographic parameters, including detection wavelength, stationary phase, and mobile phase composition, were optimized to achieve better resolution and peak symmetry. Based on UV spectral analysis (200–400 nm), the detection wavelength was fixed at 291 nm. The optimized mobile phase consisted of Acetonitrile, Methanol, and Sodium dihydrogen orthophosphate dihydrate buffer (pH 6.0), which provided sharp and symmetrical peaks with efficient drug elution. Forced degradation studies were conducted under different stress conditions—acidic, basic, neutral, oxidative, and photolytic—to assess the stability of udenafil. The degradation percentages were 36.9% (acidic), 23.5% (basic), 28.8% (neutral), 25.8% (oxidative), and 26.8% (photolytic) after 24 hours, indicating the method's suitability for stability-indicating analysis. The method showed excellent linearity within the concentration range of 1–20 µg/ml, with a limit of detection (LOD) of 0.7621 µg/ml and a limit of quantification (LOQ) of 2.3095 µg/ml, demonstrating high sensitivity.In conclusion, the developed RP-HPLC method was successfully optimized and validated for the estimation of Udenafil. It proved to be accurate, precise, linear, and robust, meeting all validation criteria. Hence, this method can be effectively applied for routine quality control and stability testing of Udenafil formulation.

**Keywords:** Udenafil, method development, forced degradation studies, Limit of Detection and Limit of Quantification.

**CH-443**

## ANTI-CANCER POTENTIAL OF CARBAZOLE DERIVATIVES: SYNTHESIS AND EVALUATION *FOR IN-SILICO* AND *IN-VITRO* STUDIES

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Carbazole derivatives are used in the treatment of various Cancer Diseases and possess a wide range of pharmacological activities. In the present work we designed, synthesized and perform In-silico and *In-vitro* studies on novel carbazole derivatives containing B-lactam ring for their anti-cancer activity. The designed compounds were predicted by Swiss ADME software for their ADME properties which give information about Lipinski rule of 5 by that we get different parameters of derived ligands. Then we performed Docking studies for the binding affinity of derivatives and protein (PDB-ID: 5J2T) Tubulin-vinblastine complex and compared with standard drug doxorubicin. Synthesis of novel carbazole derivatives were performed to which compounds show lower binding energy. Then the synthesis of selected compound were conducted in 4 steps. The process starts by reacting carbazole with chloroacetyl chloride to form N9-(chloroacetyl)-carbazole. This compound is then treated with hydrazine to obtain N9-(hydrazinoacetyl)-carbazole, which can be further modified by adding aldehyde groups to the ring. Finally, these derivatives undergo cyclization to produce carbazole compounds containing a B-lactam ring. The compounds A1, A2, A3, A4, A5, A6, A7, A8, A9, and A10, were synthesized based on their In-silico study data. The synthesized compounds were characterized and confirmed TLC, FT-IR, IH-NMR and Mass spectrometry. The synthesized compounds were then placed for their In-vitro studies for their anti-cancer activity by using MTT assay method against Hela and Jurkat cell lines. As a result, the Compound A5, and A7 shows potent activity against Hela cell line and the compounds A4 and A3 shows potent activity against Jurkat T cell line by comparing with standard drug doxorubicin.

**Keywords:** Carbazole, Swiss ADME, Docking, Anti-Cancer activity

**CH-444**

## THE INDOLIZINE SCAFFOLD-A PRIVILEGED HETEROCYCLE IN CONTEMPORARY MEDICINAL CHEMISTRY

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The indolizine nucleus, a non-benzenoid, nitrogen-fused bicyclic heterocycle, has recently emerged as a structurally versatile and biologically privileged scaffold in modern drug discovery. As structural isomers and bioisosteres of the ubiquitously pharmacologically active indole core, indolizine derivatives possess an unusual 10-π electron aromatic system that confers desirable physicochemical properties, including planarity and strong fluorescence, useful for both therapeutic agents and biological probes. This review summarises the considerable advances in the synthesis and medicinal uses of the indolizine system over the past decade. To date, the scaffold has exhibited a wide and potent range of biological activities, including key research focusing on its utility as an anti-cancer agents, often acting as tubulin polymerization inhibitors or EGFR disruptors, as antitubercular agents targeting essential enzymes such as InhA in Mycobacterium tuberculosis, as anti-inflammatory drugs through selective COX-2 inhibition, and as anti-microbial compounds against various bacterial and fungal strains. Moreover, the reduced indolizidine system is found in a number of highly active natural products, most notably the Vinca alkaloids. Recent efforts exploit state-of-the-art synthetic methodology to construct highly functionalised indolizines coupled with advanced ADMET computational profiling, positioning this heterocycle as a pivotal platform for the generation of next-generation therapeutic leads with enhanced potency and favourable pharmacokinetic profiles.

**Keywords:** Indolizine; Heterocyclic scaffolds; Anticancer agents; Antitubercular agents; Tubulin polymerisation inhibitors; EGFR inhibitors; InhA inhibitors; COX-2 inhibition.

**CH-445**

## *IN-SILICO* AND *IN-VITRO* STUDIES ON SUBSTITUTED 2-PHENYLINDOLE DERIVATIVES AS POSSIBLE ANTIBACTERIAL AGENTS

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Considering the 2024 statistical data, 28% of the global burden of disease is due to infections and half of that 14% of the global burden is due to bacterial infections. The research was conducted to develop more safe and effective antibacterial agent. The 2-phenylindole derivatives were synthesized as novel antibacterial compound. To perform in-silico and *in-vitro* studies on 2-Phenylindole substituted derivatives as possible antibacterial agents. Compound A2(2-(2,4-dinitrophenyl)-1h-indol-6-ol) on reaction with substituted anilines,anhydrous potassium carbonate,heating at 190 oC, reflux for 3hrs to give derivatives Ab1/Ab2/Ab3/Ab4/Ab5/Ab6/Ab7. Compound A3((E)-4-(2-92-dinitrophenyl)-6-hydroxy-1H-indol-3-yl)diazenyl)benzoic acid) on reaction with substituted alcohols,conc.sulphuric acid,sodium carbonate,reflux for 3hrs gives derivatives Aa1/Aa2/Aa3. Among all the designed compounds, Aa3 showed highest binding affinity with E.coli with MolDock score of -120.501 and compound Ab2 showed the highest binding affinity with S.aureus. with MolDock score of -133.294. Among all the compounds Ab4 was found to be most potent with zone of inhibition 23mm against E.coli and Ab1 was found to be most potent with zone of inhibition of 15mm against S.aureus. Most of the newly




ISBN: 978-81-980623-8-3

synthesized compounds showed activity against E.coli but not S.aureus indicating that they could be narrow spectrum.

**Keywords:** 2-phenylindole, antibacterial, molecular docking, zone of inhibition, ADMET profile.

**CH-446**

**NAPHTHOXY AND PHENOXY AMIDES AS NOVEL PARP-1 INHIBITORS: DESIGN, DOCKING, AND *IN VITRO* EVALUATION**

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Poly (ADP-ribose) polymerase-1 (PARP1) is a critical enzyme in DNA damage repair, making it a valuable therapeutic target for cancers with deficient DNA repair mechanisms. While PARP1 inhibitors like Olaparib have shown clinical efficacy, there is a need for novel inhibitors with improved therapeutic profiles. In this study, we designed, synthesized, and evaluated a series of naphthoxy and phenoxy amide derivatives (A1–A9 and B1–B9) as potential PARP1 inhibitors using computational and *in-vitro* methods. Molecular docking was performed with the PARP1 structure (PDB ID: 4ZZZ) to predict binding affinities, followed by ADMET analysis for pharmacokinetic evaluation. The most promising compounds were further assessed through MM-GBSA binding energy calculations and 50 ns molecular dynamics (MD) simulations. The selected compounds were tested for *in-vitro* cytotoxicity against MCF-7 breast cancer cells. Among the derivatives, compounds B2 and B3 exhibited strong binding affinities comparable to Olaparib, along with favourable ADMET profiles. Notably, compound B2 demonstrated high structural stability in MD simulations and potent cytotoxicity against MCF-7 cells, highlighting its potential as an effective PARP1 inhibitor. The combined computational and experimental results suggest that compound B2 is a promising lead with robust PARP1 inhibition, excellent structural stability, and significant anticancer activity. This study provides a basis for the development of novel, effective PARP1 inhibitors in cancer therapy.

**Keywords:** PARP1 inhibitors; Molecular docking; MM-GBSA; Molecular dynamics simulation; ADMET.

**CH-447**

**MOLECULAR MODELING, SYNTHESIS, ENZYME ASSAY AND BIOLOGICAL EVALUATION OF FERULIC ACID DERIVATIVES AS A NOVEL CLASS OF DIHYDROFOLATE REDUCTASE INHIBITORS**

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DHFR (Dihydrofolate reductase) crucial for cell growth and cell division in almost all eukaryotic and prokaryotic cells, hence it is a prime target for combating various diseases. Novel ferulic acid derivatives were designed, synthesized and evaluated for their *in vitro* DHFR inhibitory activity, alongside antimicrobial and anticancer properties. Rb1 and Ra3 were two of the synthesized compounds that showed outstanding antimicrobial activity. When compound Rb1 was docked against antibiotic-resistant strains of S. aureus DHFR (PDB ID: 2W9S), it showed exceptional docking scores and binding energy. With MIC values of 5, 3, and 3 µM, respectively, Rb1 demonstrated significant antibacterial activity against priority pathogens, such as S. aureus, E. coli, and P. aeruginosa. Molecular docking analysis revealed that this derivative formed hydrogen bonds with important amino acid residues such as Ser49, Asn18, Ile5, and Thr121 within the DHFR binding site. Compound Rb2 with an IC50 of 2.98 µM showed promising anticancer effects against breast cancer cells. Moreover, all synthesized compounds displayed noteworthy DHFR inhibition but compound Rb2 was found to be the most potent inhibitor with an IC50 value of 0.053 ± 0.001 µM. This study establishes the groundwork for a novel class of DHFR inhibitors that hold great promise for the treatment of cancer and bacterial infections resistant to antibiotics.

**Keywords**: Ferulic acid; DHFR; Anticancer; Antimicrobial; *In silico* designing; Molecular docking

**CH-448**

**ALIPHATIC ACID–ACTIVATED TRIBOMILLING AS A GREEN STRATEGY FOR FUNCTIONAL RE-DESIGN OF MILLET STARCH**

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This study investigates a sustainable mechanochemical approach for modifying millet starch through tribomilling in the presence of food-grade aliphatic organic acids. Millet starch was blended with citric, tartaric, and oxalic acids at a 10:3 (w/w) ratio and subjected to controlled tribomilling using a rotary dry mill operated in 5-minute milling / 5-minute resting cycles, maintaining the milling temperature below 60°C to avoid thermal gelatinization. The modification process produced a measurable shift in starch structure and functionality. XRD analysis showed a 35–60% reduction in crystallinity, indicating significant amorphization. FT-IR spectra revealed the appearance of ester-linked carbonyl peaks near 1720 $cm^{-1}$, confirming acid-starch interactions. SEM images demonstrated clear granule fragmentation, with particle size reduced by 40–70% depending on the acid used. Thermal analysis via DSC showed a decrease in gelatinization onset temperature from 64.5°C (control) to 52.1–57.3°C in modified samples, accompanied by a 25–45% reduction in enthalpy. Functionally, solubility increased by 18–32%, swelling power improved by 15–28%, and paste clarity increased by up to 40% compared to native starch. Among all treatments, citric-acid-activated tribomilling produced the strongest modification effects, followed by tartaric and oxalic acids. These results demonstrate that aliphatic-acid-assisted tribomilling is a green, solvent-free, and efficient strategy for tailoring starch properties, offering practical potential in food formulation, biodegradable packaging, and pharmaceutical excipient development.

**Keywords:** Mechanochemical modification, Tribomilling, Millet starch, Organic acids, Starch functionality

**CH-449**

**DEVELOPMENT AND VALIDATION OF NEW SPECTROPHOTOMETRIC METHOD FOR THE ESTIMATION OF EFAVIRENZ IN PHARMACEUTICAL FORMULATIONS**

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Efavirenz (CAS 154598-52-4) is used for the treatment of human immunodeficiency virus infection. It is a non-nucleoside reverse transcriptase inhibitor. Efavirenz is chemically, 4S)-6-chloro-4-(2-cyclo propyl ethynyl)-4-(trifluoromethyl)-1H-3,1-benzoxazin-2-one with molecular formula $C_{14}H_9ClF_3NO_2$ and molecular weight 315.675 grams/mole. It acts by binding to a non-catalytic site on the HIV-1 reverse transcriptase enzyme and prevents the enzyme from functioning properly which indirectly inhibits and also halts the conversion of HIV's RNA into DNA which is necessary for producing new virus particles. A new spectrophotometric method has been developed for the estimation of Efavirenz in pharmaceutical dosage forms (Tablets). Double beam spectrophotometer (SHIMADZU Model No. UV- 1800) with quartz cells was used for the present study (200-400 nm). Efavirenz has shown absorption maxima (λmax) at 247 nm in phosphate buffer (pH 2.1) and Beer-Lambert's law was obeyed over the concentration range 2.5-40 µg/ml with linear regression equation, y = 0.0522x + 0.0501 ($R^2$ = 0.9987). The method was validated as per ICH guidelines and found to be simple, precise and accurate and can be applied successfully for the assay of Efavirenz for the pharmaceutical formulations.

**Keywords:** Efavirenz, spectrophotometry, ICH Guidelines.

**CH-450**

***IN-SILICO* INVESTIGATION OF ARGYREIA NERVOSA PHYTOCHEMICALS AGAINST PROSTATE CANCER**

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ISBN: 978-81-980623-8-3

Prostate cancer ranks among the most prevalent cancers in men, particularly in those over the age of 50. The majority of prostate cancers develop at a slow pace and can stay localized within the gland for many years without leading to any adverse effects. Argyreia nervosa is a perennial plant which contains glycosides, alkaloids, amino acids, flavonoids, and tannins. In this present study, we made an attempt to investigate the potential of phytochemicals from Argyreia nervosa (Burm.f.) Bojer using a systems biology approach. The phytochemicals were sourced from Dr. Duke's Phytochemical, Ethnobotanical database and IMPPAT databases. SwissADME, ProTox 3.0, and CardioTOXCSM webservers were utilized to assess the physicochemical, pharmacokinetic, and toxicological profiles of the phytochemicals. The OSIRIS Property Explorer was employed to evaluate the drug score, and the findings indicated the compounds potential for drug development. To illustrate the anticancer mechanism of the developed compounds, an analysis of Gene Ontology (GO) and Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway enrichment was conducted utilizing the intersecting genes that exhibited differential expression. The biological efficacy of the compounds against the chosen molecular targets (STAT 3, BCL 2, TP 53, RAC-alpha serine/threonine-protein kinase, HIF1A, ESR1 and ESR 2) was assessed through molecular docking studies. Owing to the various *in silico* studies, the compounds Emodin, Kaempferol, Lysergamide and Lysergic acid were identified as a significant compound with good binding energies and interaction profiles. Thus, these compounds exhibit potent anti-prostate cancer activity. However, further *in vitro* and *in vivo* are warranted.

**Keywords:** Prostate cancer, Argyreia nervosa (Burm.f.) Bojer, *In silico*, Systems biology, Molecular docking.

**CH-451**

## ANTIDIABETIC POTENTIAL OF CARISSA OPACA FRUIT: ROLE OF CHLOROGENIC ACID IDENTIFIED BY UPLC ANALYSIS

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Carissa opaca is an endemic plant of Himalayan region of India which is traditionally used as for curing diabetes. The present study focuses on the phytochemical analysis and antidiabetic activity of the hydro-methanolic extract of Carissa opaca fruit. The extract was subjected to Ultra-Performance Liquid Chromatography (UPLC) for the identification and quantification of major bioactive compounds. The UPLC profile revealed the presence of several polyphenolic constituents, among which chlorogenic acid was identified as the predominant compound. Chlorogenic acid is a well-known bioactive molecule with significant antioxidant and glucose-modulating properties, which may contribute to the antidiabetic potential of the extract. The *in-vitro* assays such as alpha-amylase and alpha-glucosidase showed significant activity when compared to the acarbose at 200 µg/ml concentration. The findings suggest that the hydromethanolic extract of Carissa opaca fruit possesses promising antidiabetic properties, largely attributed to its high chlorogenic acid content and associated phytochemicals.

**Keywords:** Carissa opaca; Hydro-methanolic extract; Anti-diabetic; Chlorogenic acid.

**CH-452**

## STRUCTURE BASED DOCKING AND DRUG REPURPOSING ANALYSIS OF SULFONYL UREA-1(SUR 1) WITH CLINICALLY APPROVED DRUGS USING PYRX

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This study investigates the binding affinity and interaction profiles of Sulfonyl urea receptor 1(SUR 1) with Glibenclamide (as a reference ligand), and four widely used repurposed drugs—Ramipril, Mefloquine, Isoniazid, and Clozapine—through molecular docking using PyRx. The crystal structure of SUR 1 (PDB ID: 6PZA) was used as the receptor model. Ligand structures were energy-minimized and docked using AutoDock Vina integrated within PyRx. Binding affinities were calculated, and interaction patterns were visualized and analyzed using Discovery Studio and PyMOL. Glibenclamide exhibited the stronger binding affinity (-9.2 kcal/mol), forming key hydrogen bonds. Ramipril showed moderate binding (–7.6 kcal/mol), while Isoniazid had weak but specific interactions (–5.3 kcal/mol). Mefloquine showed strongest binding affinity (–9.4 kcal/mol) and Clozapine (–7.2 kcal/mol) showed minimal affinity for the receptor. These findings suggest that certain non-antidiabetic drugs may exert unintended metabolic effects through partial engagement with SUR 1. The study provides computational evidence that supports the potential interaction of select repurposed drugs with SUR 1. Further *in vitro* and *in vivo* validation could clarify their metabolic implications and guide drug repurposing or polypharmacy management in diabetic patients.

**Keywords**: SUR 1, Molecular docking, Glibenclamide, Drug repurposing and binding affinity.

**CH-453**

## COMPUTATIONAL CHARACTERIZATION OF COUMARIN DERIVATIVES TARGETING GLMS ENZYME: INSIGHTS FROM DOCKING, DFT, AND MOLECULAR DYNAMICS SIMULATIONS

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Bacterial infections remain a major global health concern due to the rapid emergence of antibiotic resistance. GlmS, a key enzyme in the bacterial cell wall biosynthesis pathway, catalyzes the conversion of fructose-6-phosphate and glutamine to glucosamine-6-phosphate, making it an attractive target for the development of novel antibacterial agents. In this study we aimed to investigate the designed coumarin derivatives and assess their potential as GlmS inhibitors by an *in silico* approach. Physicochemical properties and Absorption, Distribution, Metabolism, Excretion were evaluated by QIKPROP module. Docking studies were performed using Schrodinger software, with the protein target being GlmS (PDB ID: 1JXA). Additionally, MD simulation studies were conducted, and the key interactions in the protein-ligand complexes were identified. The results demonstrate the favourable binding affinities with Glide g scores ranging from -10.78 kcal/mol -6.15 kcal/mol and exhibit significant activity against GlmS and compared with the co-crystal (-9.06 kcal/mol). The density functional calculations were also performed to determine the geometrical properties, thermal parameters, chemical reactivity descriptors and molecular electrostatic potential of the compounds using the B3LYP functional and 6-31G++ basis sets. The energy difference between the highest occupied molecular orbitals and lowest unoccupied molecular orbitals for all the investigated compounds in the range of 3.2-3.7eV which allows for easy transfer of electrons and reactivity. Further research and development of these designed compounds could contribute to the advancement of effective bacterial infections.

**Keywords:** GlmS enzyme, coumarin derivatives, antibacterial agents, *In-silico* design

**CH-454**

## ANALYTICAL QBD BASED SIMULTANEOUS QUANTIFICATION OF PACLITAXEL AND IMATINIB MESYLATE IN FORMULATION BY HPLC

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This research focused on the development and validation of a simple, accurate, and robust HPLC method for the simultaneous estimation of Paclitaxel (PAC) and Imatinib mesylate (IMI) in bulk and finished formulations. The robustness of the method was optimized using a Box–Behnken statistical design, evaluating the influence of mobile phase composition, flow rate, and wavelength on key chromatographic parameters such as retention time (RT), area under the curve (AUC), resolution, theoretical plates (TP), and asymmetry. Chromatographic separation was achieved on a C18 column using Methanol :10 mM phosphate buffer (50:50 v/v) as the mobile phase at a flow rate of 0.8 mL/min for 12 minutes. Detection was carried out at 234 nm and 25°C. IMI and PAC showed distinct retention times of 6.8 and 8.7 minutes,


ISBN: 978-81-980623-8-3

respectively, confirming excellent resolution. The method exhibited linearity in the 10–50 ppm range, with correlation coefficients ($R^2$) of 0.9998 for PAC and 0.9995 for IMI. Accuracy results showed %SD values ranging from 0.09–0.9 for PAC and 0.05–0.19 for IMI, while precision studies reported low %RSD values of 0.53 and 0.07, respectively. The limits of detection were 0.0315 µg/mL for PAC and 0.06 µg/mL for IMI, with quantification limits of 0.0955 µg/mL and 0.175 µg/mL. Ruggedness and robustness results confirmed method reliability. Overall, the validated method demonstrated high accuracy, precision, and reproducibility, making it suitable for routine quality control and combined drug analysis in pharmaceutical research.

**Keywords:** Paclitaxel, Imatinib mesylate, analytical method, validation, Box Behnken design.

**CH-455**

**SYNTHESIS AND CHARACTERISATION OF SILVER NANOPARTICLES**

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Metal nanoparticles are gaining importance nowadays in nanoscience. The nanoparticles had better physical and chemical properties compared with solid particles due to their large surface area. Nano size particles are a core material which carries out as a whole unit in terms of property and transportation. Novel applications of nanoparticles and nanomaterials are emerging rapidly on various properties of metal nanoparticles are different from those of bulk materials made from the same atoms. AgsNPs were prepared by using tri sodium citrate as reducing agent shows a colour change and the mixture changes from transparent to pale yellow, golden yellow, brownish yellow and light brown colors indicating the formation of AgsNPs. AgsNPs were characterized by a particle size analyzer (PSA) to determine the particle of the AgsNPs. In this AgsNPs suspension of 2mM concentration was characterized. The result of characterization in the particle size analyzer (PSA) test showed that the 2mM AgsNPs size was 179nm. The stirring time was maintained at 4 min.

**Keywords:** Silver nanoparticles, stirring time, scanning electron microscopy, laser treatment.

**CH-456**

**DESIGN AND OPTIMIZATION OF BIFUNCTIONAL DEGRADERS FOR PARP: INTEGRATING MOLECULAR MODELING WITH *IN VITRO* VALIDATION IN RESISTANT BREAST CANCER MODELS**

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The conceptual framework of the research aims at creating and testing the PROTAC-based degraders of PARP and E3 ligase CRBN as a form of combating medication resistance in BRCA-mutated and triple-negative breast cancer (TNBC). The goal relies on the resistance forces of extensive PARP inhibitor therapy and has the effect of initiating specific protein degradation instead of inhibition of enzyme activity. The aim is to develop and evaluate PROTAC-based PARP degraders as a therapy option to overcome medication resistance in BRCA-mutation and triple-negative breast cancer (TNBC).There are five sequential steps: bioinformatics profiling that recognizes resistant biomarkers and druggable networks; rational selection of bifunctional PROTAC molecules joining PARP and CRBN ligands will be identified; chemical synthesis and structural characterization of potential PROTACs; and Degradation efficiency, cytotoxicity, and reversal of resistance in TNBC models by in vitro cellular assays will be analysed. Based on docking analysis, the binding affinity is -7.30 kcal/mol which is a stable interaction of the designed PROTAC molecule in the active site of PARP-CRBN complex and also MM-GBSA binding scores (ΔG_bind = -130.53 kcal/mol) verified a high thermodynamic stability and a positive non-covalent interaction that was stabilizing the ternary complex. Conclusion: The study focuses on challenges in drug discovery via performing multidisciplinary approaches in developing next-generation therapeutic PROTACs with specificity and efficacy to overcome resistant subtypes of breast cancer.

**Keywords**: PARP, E3 Ligase (CRBN), PROTAC, Breast Cancer.

**CH-457**

**INVESTIGATION OF SOME NOVEL AMINO-PYRIMIDINES AS PROSPECTIVE INHIBITORS OF S. AUREUS: *IN-SILICO* INSIGHTS, SYNTHESIS AND BIOLOGICAL EVALUATION**

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Pyrimidine derivatives are significant scaffolds in the field of medicinal chemistry as they exhibit versatile pharmacological activities. Twenty novel amino-pyrimidine analogues were designed and subjected to virtual in-silico screening to identify potential inhibitors of S.aureus. Molecular docking was implemented to detect selectivity of the analogues to bind with some essential enzymes of S.aureus; Dihydrofolate reductase, Pyruvate Kinase, DNA gyrase, Dihyropteroate synthetase. In-silico ADME investigations indicate that all the designed ligands exhibit drug like properties, satisfy the Lipinski rule of 5 and have low toxicity profile. Molecular docking studies divulge that five compounds display good binding affinity and has formed stable interactions with the essential enzymes of S.aureus. The promising 'hits' of in-silico investigations were synthesized, characterized by spectroscopic methods and subjected to *in-vitro* anti-microbial screening. Compound 2c (4-hydroxy derivative) showed significant activity against the selected strain of S.aureus. The mechanism of action could be the inhibition of dihydrofolate reductase as the ligand exhibited good binding interactions with the enzyme and the docked complex was stable at its' active site. The significant activity of the compounds may be due to the involvement of the hydroxyl groups of the derivatives interacting via H-bonding at the active site of the enzyme. The study provides valuable insights into the potential of novel amino-pyrimidines as DHFR inhitbitors of S.aureus. It highlights the potential of amino-pyrimidines as a favorable stratagem for antimicrobial drug discovery, specifically in the design of novel and effective inhibitors of S.aureus.

**Keywords:** Antimicrobial; Pyrimidines; Molecular docking; S.aureus; *In-silico*, ADMET

**CH-458**

**SYNTHESIS, IDENTIFICATION OF NOVEL BENZIMIDAZOLE DERIVATIVES & EVALUATION OF THEIR MOLECULAR DOCKING, ANTI-HISTAMINE & ANTI-ULCER ACTIVITIES**

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Benzimidazole is an important heterocyclic scaffold known to exhibit diverse pharmacological activities, including antiviral, anticancer, anthelmintic, anti-inflammatory, analgesic, antihistaminic, antiparasitic, anticonvulsant, antiulcer, antihypertensive, and antifungal effects. The present study aimed to design, synthesize, and evaluate a series of novel benzimidazole derivatives as potential antihistamine and antiulcer agents. A set of newly designed derivatives (3H.Y, 4CL.Y, JN. Y, ZN. Y, S.Y, 4H.Y, P.Y, 4F.Y, and 2CL.Y) were synthesized using various aromatic benzaldehydes and assessed through molecular docking to predict their binding affinity. Based on the *Insilico* study, the antiulcer activity was evaluated against ethanol-induced gastric ulcers in rats for novel derivatives 2N.Y. (200 mg/kg and 400 mg/kg) and 3H.Y. (200 mg/kg and 400 mg/kg). Based on the antiulcer activity of the novel derivatives, it is observed that 2N. Y showed moderate activity, whereas 3H. Y showed better activity compared to the standard drug Omeprazole. Based on the *Insilico* study, the antihistamine activity was evaluated using isolated rat ileum for novel derivatives (2CL. Y and 4CLY). Based on the antihistamine activity of novel derivatives, it is observed that 2CL. Y showed moderate activity, whereas 4CL. Y showed better activity compared to the standard drug, Mizolastine. Our findings demonstrate the improved antiulcer and antihistamine activity of the recently developed benzimidazole derivatives. Therefore, these could serve as a starting point for the creation of more effective and targeted antiulcer and antihistamine medications. The results indicate that the newly synthesized benzimidazole derivatives possess enhanced antiulcer and antihistamine




ISBN: 978-81-980623-8-3

potential. These compounds may serve as promising lead molecules for the development of more effective, targeted therapeutic agents.

**Keywords:** Benzimidazole, Benzaldehyde, Molecular docking, Anti-ulcer, Anti-histamine.

**CH-459**

**GREEN SYNTHESIS OF NANOPARTICLES FROM CAMARA LANATA LINN EXTRACT AND THEIR EVALUATION FOR ANTI-INFLAMMATORY ACTIVITY**

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The present study investigates the anti-inflammatory activity of Camara lanata Linn extract through the synthesis of Nanoparticles using a green synthesis method. The plant extract was used to reduce metal salts, resulting in nanoparticles with potential therapeutic properties. The egg albumin protein denaturation assay was employed to assess the anti-inflammatory activity, showing an inhibition of 85%, indicating significant potential. To further characterize the synthesized nanoparticles, Scanning Electron Microscopy (SEM) was used for morphological analysis, and particle size analysis was performed to determine the size distribution and stability of the nanoparticles. The results highlight the effectiveness of plant-based green synthesis in the preparation of nanoparticles with anti-inflammatory properties.

**Keywords:** Camara lanata Linn, nanoparticles, green synthesis, anti-inflammatory activity, egg albumin protein assay, SEM analysis, particle size, protein denaturation, therapeutic potential.

**CH-460**

**INTEGRATIVE NETWORK AND COMPUTATIONAL MODELING OF ANNONA RETICULATA L. PHYTOCHEMICALS AGAINST PROSTATE CANCER**

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Prostate cancer ranks among the most prevalent cancers affecting men, particularly in older peoples. The majority of prostate cancers develop at a slow phase and typically do not result in significant harm. Annona reticulata L.is a medicinal plant, used in the treatment of cardiac problem, dysentery, epilepsy, parasite and worm infestations, constipation and haemorrhage. It contains a phytoconstituents of Annonaretin A, kaurenoic acid, Liriodenine, Reticuline, Adriamycin and (-)-kau-16en-19-oic acid. In this study, we investigated the potential of phytochemicals from Annona reticulata L. using a network pharmacology approach. Dr. Duke's Phytochemical and Ethnobotanical database, The Natural Products Atlas, Medicinal Plants database, IMPPAT, and KNApSAcK Core system databases were consulted for the phytochemicals. The SwissADME, ProTox 3.0, and CardioTOXCSM webservers were used to forecast the physicochemical, pharmacokinetic, and toxicity profile of the phytochemicals that were retrieved. The compounds were suitable for drug development, and the OSIRIS Property Explorer was utilized to predict the drug score. Network pharmacology and enrichment analyses have shown that the phytochemicals are likely to be very effective in combating prostate cancer (STAT 3, JUN, BCL 2, HIF1A, SRC AND ESR1). Subsequently, molecular docking was conducted against the chosen targets utilizing Autodock tools, and the results were compared with the co-crystallized ligand and the standard. Owing to the various *in silico* studies, the compounds like 1,2-disehydronococlaurine, Anonaine, Coclaurine, Corydine, Michelalbine, Mitoflaxone, Norushinsunine and N-Trans-feruloyltyramine are identified as hit compounds against the tested targets with better binding energies and interaction profiles. These substances can thus be employed to fight against prostate cancer. Nevertheless, additional *in vitro* and *in vivo* studies are required.

**Keywords:** Prostate cancer, Annona reticulata L., *In silico* studies, Network pharmacology, Molecular docking.

**CH-461**

**NETWORK PHARMACOLOGY AND MOLECULAR DOCKING STUDY OF KARANJIN REVEALS MULTI-TARGET THERAPEUTIC POTENTIAL AGAINST ALZHEIMER'S DISEASE**

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Alzheimer's disease (AD) is a complex neurodegenerative disorder marked by cognitive decline and characteristic pathological features such as amyloid-beta plaques and neurofibrillary tangles. This study employed integrated network pharmacology and molecular docking approaches to elucidate the therapeutic potential and underlying mechanisms of karanjin, a furanoflavonoid derived from Pongamia pinnata, against AD. Targets of karanjin were identified through predictive databases and cross-referenced with AD-related genes to construct a comprehensive drug-target network. Key protein targets implicated include β-secretase (BACE1), acetylcholinesterase (AChE), glycogen synthase kinase-3β (GSK-3β), and TNF-α, which are crucial in AD pathogenesis. Pathway enrichment analyses revealed significant involvement in neuroinflammation, oxidative stress regulation, apoptotic signaling, and amyloid-beta metabolism. Molecular docking simulations demonstrated strong binding affinities of karanjin with these key targets, supporting its multi-target inhibitory potential. These findings highlight karanjin's promise as a neuroprotective agent modulating multiple pathogenic pathways in AD. Further experimental validation is needed to confirm its clinical applicability.

**Keywords:** Alzheimer's disease, Karanjin, Network pharmacology, Molecular docking, β-secretase.

**CH-462**

**A PIONEER REVIEW ON LACTOFERRIN AS VERSATILE MACROMOLECULAR LIGAND FOR TARGETING CANCER: RECENT ADVANCES**

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This review critically evaluates the emerging role of lactoferrin, an iron-chelating glycoprotein, as a macromolecular ligand in precision cancer therapy. Lactoferrin exhibits potent anti-tumour, anti-inflammatory, and immunomodulatory properties and targets cancer cells via high-affinity binding to transferrin and LDLreceptor-related proteins, enhancing selectivity and minimizing off-target toxicity. It modulates key oncogenic pathways such as PI3K/Akt and MAPK to suppress tumour growth and metastasis. Nanoformulations—like liposomes and polymeric nanoparticles—improve pharmacokinetics, enable targeted drug delivery, and enhance therapeutic efficacy. Lactoferrin's ability to cross biological barriers, including the blood-brain barrier via receptor-mediated transcytosis, offers promise for treating difficult cancers such as glioblastoma. Additionally, it enhances anti-tumour immunity by activating NK cells and polarizing macrophages to the M1 phenotype. Importantly, lactoferrin helps overcome multidrug resistance by modulating efflux pumps like P-glycoprotein. Integrating molecular insights with preclinical and clinical evidence, this review underscores lactoferrin's transformative potential in precision oncology through advanced nanoformulations and synergistic immunomodulatory mechanisms.

**Keywords**: Lactoferrin; cancer therapeutics; targeted drug delivery; immunotherapy; nano-oncology; drug resistance

**CH-463**

**DESIGN, SYNTHESIS, CHARACTERIZATION AND BIOLOGICAL EVALUATION OF β-AMINO ACID DERIVED ANTICANCER PEPTIDOMIMETICS**


ISBN: 978-81-980623-8-3

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Peptide-based therapeutics hold significant potential in cancer treatment; however, their aar use is often constrained by poor stability and rapid proteolytic degradation. To overcome these limitations, the present study focuses on the design and synthesis of β-amino acid-containing peptidomimetics as novel anticancer agents. Incorporating β-amino acids into peptide sequences is a promising strategy to improve structural stability, enhance resistance to proteolytic enzymes, and enhance biological efficacy. This study involved the synthesis of five novel cationic peptidomimetics (P1–P5) using solid-phase peptide synthesis employing Fmoc/Boc chemistry protocols. Comprehensive characterization of these compounds was performed through reversed-phase high-performance liquid chromatography (RP-HPLC), mass spectrometry, and one- and two-dimensional nuclear magnetic resonance (1D/2D NMR) spectroscopy. Proteolytic stability was evaluated via degradation assays using the enzymes trypsin and chymotrypsin. The biological activities of the synthesized peptidomimetics were assessed *in vitro* using MCF-7 breast cancer cells. Key assays included cell viability measurements, caspase-3/7 activation assays to detect apoptosis, and Annexin V-FITC/PI staining to differentiate between apoptosis and necrosis. Among the synthesized peptidomimetics, P2 and P3 demonstrated potent, dose-dependent cytotoxic effects against MCF-7 cells, with P3 showing a marked capacity to induce apoptotic cell death. P1 primarily triggered necrotic pathways, whereas P4 and P5 exhibited moderate anticancer activity. Proteolytic stability assays confirmed that the incorporation of β-amino acids significantly enhanced resistance to enzymatic degradation compared to typical peptide counterparts. Collectively, these results highlight β-amino acid-modified peptidomimetics as stable, selective, and mechanistically diverse anticancer agents. These findings justify further preclinical investigations aimed at their development as potential therapeutic agents in cancer treatment.

**CH-464**

## A NEW STABILITY INDICATING RP-HPLC METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS ESTIMATION OF SOFOSBUVIR AND DACLATASVIR

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A simple, precise, accurate, and rapid stability-indicating RP-HPLC method was developed and validated for the simultaneous estimation of Sofosbuvir and Daclatasvir in bulk and tablet dosage forms. Chromatographic separation was achieved using an Inertsil C18 ODS-3V (4.6 × 250 mm, 5 µm) column with a mobile phase consisting of acetonitrile and 1% isopropyl alcohol (65:35 v/v) at a flow rate of 0.7 mL/min. Detection was performed at 288 nm, and the retention times obtained ensured good resolution between both analytes. The method was validated according to ICH Q2(R1) guidelines, and results demonstrated excellent linearity, precision, accuracy, robustness, and acceptable limits for LOD and LOQ for both drugs. Forced degradation studies including acid, base, oxidative, and hydrolytic conditions confirmed that the method is capable of distinguishing analytes from their degradation products, proving its stability-indicating nature. Overall, the developed RP-HPLC method is suitable for routine quality control

**Keywords:** ICH Q2(R1), Stability-Indicating Method, Forced Degradation, analysis of Sofosbuvir and Daclatasvir in pharmaceutical formulations.

**CH-465**

## COMPUTATIONAL AND NETWORK ANALYSIS OF BIOACTIVE COMPOUNDS FROM MOLLUGO PENTAPHYLLA L. AGAINST PROSTATE CANCER

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Prostate cancer is the second most common cancer affecting men worldwide. It accounts for approximately 14.2% of newly diagnosed cancer cases in the male population, with an age-adjusted incidence rate of 29.4 per 100,000 individuals. Mollugo pentaphylla L.is a medicinal plant that contains carotene, traces of vitamins C, a saponin and potassium nitrate, steroids and flavones. In this study, we aimed to explore the potential of phytochemicals derived from through a systems biology approach. The phytochemicals were sourced from Dr. Duke's Phytochemical and Ethnobotanical database and IMPPAT. To estimate the physicochemical, pharmacokinetic, and toxicological profiles of the phytochemicals, we utilized the SwissADME, ProTox 3.0, and CardioTOXCSM webservers. The OSIRIS Property Explorer was employed to assess the drug score, revealing the druggable nature of the compounds. Network modeling and enrichment analysis identified the specific targets of the phytochemicals, suggesting their significant activity against prostate cancer. Subsequently, molecular docking studies against the targets (SRC, AKT1, ESR 1, PPARG and BCL 2) were conducted using Autodock tools, comparing the results with the co-crystallized ligand and standard. Through various *in silico* studies, the compounds Eriodictyol, Arzoxifene and Bosutinib were recognized as hit compounds. Notably, Kieclorin exhibited high activity against SRC, demonstrating favorable binding energies and interaction profiles. Therefore, these compounds hold potential for use against prostate cancer; however, additional *in vitro* and *in vivo* studies are necessary.

**Keywords:** Prostate cancer, Mollugo pentaphylla L, Systems biology, Network modelling, Molecular docking

**CH-466**

## ISOLATION AND CHARACTERIZATION OF IMPURITIES IN AN ACTIVEPEPTIDE (EPTIFIBATIDE INJECTION)

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This investigation aimed to elucidate the structure of a novel impurity detected in HPLC chromatograms of eptifibatide synthesized via an optimized manufacturing process and formulated into a finished pharmaceutical product. Eptifibatide, a cyclic heptapeptide comprising six amino acids and one mercaptopropionyl (des-amino cysteinyl) residue, contains a characteristic interchain disulfide linkage between the cysteine amide and mercaptopropionyl moieties. Comprehensive impurity profiling was required to understand the mechanistic pathway underlying the formation of the newly observed entity.Analytical characterization was performed using RP-HPLC coupled with high-resolution mass spectrometry. Chromatographic separation was optimized on a Hypersil C18 column (250 × 4.6 mm, 3 µm) employing a mobile phase system of 0.1% formic acid in water and acetonitrile at a flow rate of 0.7 mL/min, with UV detection at 280 nm. Asp-clipped eptifibatide eluted at 10.495 minutes, whereas the unknown impurity exhibited a markedly delayed retention at 40.125 minutes. The use of advanced reversed-phase silica significantly enhanced selectivity, resolution, recovery, and peptide loading capacity. Method validation demonstrated excellent linearity ($r^2$ = 0.9984), mean recovery of 97.5%, and complete absence of interference from excipients or solvent artifacts, meeting all ICH requirements.High-resolution MS analysis revealed a protonated ion at m/z 811.9619 corresponding to $C_{33}H_{42}N_{11}O_3S_2$. Structural interpretation confirmed the impurity as a dehydration product of asp-clipped eptifibatide formed under stability stress conditions.

**Keywords:** Eptifibatide, peptide impurity profiling, RP-HPLC, high-resolution mass spectrometry, degradation mechanism, stability-indicating analysis, ICH validation.

**CH-467**

## SIMULTANEOUS ESTIMATION OF BENEDIPINE HCL AND NEBIVOLOL HCL IN BULK AND TABLET DOSAGE FORMS BY STABILITY INDICATING USING RP-HPLC

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ISBN: 978-81-980623-8-3

This study presents the development, optimization, and ICH-compliant validation of robust RP-HPLC methods for the quantitative estimation of Benidipine HCl and Nebivolol HCl, along with the structural identification of a newly observed impurity in eptifibatide. Chromatographic separation of both drugs was achieved on a Thermo C18 column using a methanol–$KH_2PO_4$ buffer mobile phase (30:70, pH 4.0) with detection at 219 nm. The method demonstrated excellent linearity over 4–12 µg/mL for Benidipine HCl and 5–15 µg/mL for Nebivolol HCl. Validation confirmed high accuracy (≈99–100%), precision (RSD <0.30%), and significant sensitivity (LOD 0.068 µg/mL). Forced-degradation studies showed complete separation of degradation products, establishing the method as a reliable stability-indicating tool for routine quality control.The second part of the investigation focused on the characterization of an unknown impurity detected in eptifibatide produced via a modified synthetic process. RP-HPLC coupled with high-resolution mass spectrometry enabled baseline separation of the impurity from asp-clipped eptifibatide. LC-MS analysis revealed a protonated ion at m/z 811.9619, corresponding to the molecular formula $C_{33}H_{42}N_{11}O_3S_2$. Structural analysis indicated that the impurity resulted from dehydration of asp-clipped eptifibatide under stability stress conditions. Overall, the method demonstrated excellent selectivity, resolution, and full compliance with ICH requirements, confirming its suitability for peptide impurity profiling.

**Keywords:** RP-HPLC, Benidipine HCl, Nebivolol HCl, eptifibatide impurity, high-resolution mass spectrometry, stability-indicating method, ICH validation.

**CH-468**

## COMPARISON OF PHYTOCHEMICAL PROFILE IN ETHANOL EXTRACT AND CHLOROFORM FRACTION OF PAPAYA (CARICA PAPAYA L.) LEAF BY UV AND HPTLC METHODS

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Carica papaya has high nutritional and medicinal values in both traditional and modern health management. Among them, the most famous application is the role of papaya leaf extract for improving platelet level in dengue infected patients. Though alcoholic extract of papaya leaves has been studied widely for it therapeutic benefits, there are limited reports on its non-polar fractions. The objective of the present study was to prepare chloroform fraction from ethanol extract of papaya leaves and compare phytochemical profile by UV spectroscopic and HPTLC methods. UV spectroscopic analysis was carried out for determining total alkaloid content (TAC), total flavonoid content (TFC) and total phenolic content (TPC) equivalent to atropine, rutin and gallic acid standards respectively. CAMAG HPTLC system equipped with Linomat 5 applicator, CAMAG TLC scanner and Win CATS software was used for analysis of both ethanol extract and chloroform fraction of papaya leaves. Chloroform and methanol (7:3) were used as mobile phase on precoated TLC plate. The developed TLC plate was scanned at 366 nm followed by treatment with Dragendorff's reagent to detect alkaloid. Phytochemical analysis by UV spectroscopy showed that TAC (2.38 ± 0.34 mg/g), TFC (4.75 ± 0.05 mg/g) and TPC (2.63 ± 0.36 mg/g) was significantly higher in ethanol extract than those in chloroform fraction (TAC: 1.68 ± 0.43 mg/g, TFC: 1.15 ± 0.18 mg/g and TPC: 1.82 ± 0.14 mg/g). The HPTLC profile indicated variation in the number of spots detected for ethanol extract (three spots at Rf value of 0.02, 0.87 and 0.91) and chloroform fraction (four spots at Rf value of 0.04, 0.12, 0.86 and 0.90) of papaya leaves. The presence of additional peak at Rf = 0.12 could be due to the enrichment of alkaloid in chloroform fraction of papaya leaves.

**Keywords**: Carica papaya, ethanol extract, chloroform fraction, UV spectroscopy, HPTLC, alkaloid, flavonoid, phenolic content

**CH-469**

## NETWORK PHARMACOLOGY AND MOLECULAR MODELING-BASED INVESTIGATION OF BIOACTIVE COMPOUNDS FROM CALOPHYLLUM INOPHYLLUM AGAINST NON-SMALL CELL LUNG CANCER

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Calophyllum inophyllum is a tropical evergreen tree rich in bioactive compounds like coumarins and xanthones, which show significant anticancer potential by inducing apoptosis, inhibiting cell proliferation, and suppressing tumour growth in various cancer models. However, its mechanisms of action are unclear. In this study, we systematically explored the effects and mechanism of action of Calophyllum inophyllum using network pharmacology, molecular docking, and molecular dynamics simulation studies. Active compounds and targets of Calophyllum inophyllum were obtained from Swiss target prediction. Non-small cell lung cancer-related targets were retrieved from GeneCards and OMIM databases. A protein-protein interaction (PPI) network was built to screen the core targets. DAVID was used for GO and KEGG pathway enrichment analyses. The tissue and organ distribution of targets was evaluated. Interactions between potential targets and active compounds were assessed by molecular docking. A molecular dynamics simulation was conducted for the optimal core protein–compound complexes obtained by molecular docking. In total, 53 active compounds and their relative targets, along with non-small cell lung cancer-related targets, were identified. The number of common targets between Calophyllum inophyllum and NSCLC was 290. A topological analysis of the PPI network revealed the core targets. The GO enrichment analysis showed that the target genes were predominantly involved in metabolic and inflammatory biological processes, localised mainly in the mitochondria and cytoskeleton, and exhibited molecular functions related to kinase and oxidoreductase activities-suggesting a multifaceted mechanism potentially relevant to cancer regulation. Molecular docking and molecular dynamics simulations revealed a good binding ability between the active compounds and the screened targets.

**Keywords:** Calophyllum inophyllum, Anticancer, Network pharmacology, Docking

**CH-470**

## EVALUATION OF ANTI-EGFR POTENTIAL OF NATURAL TERPENOIDS USING MOLECULAR DOCKING: AN *IN-SILICO* APPROACH

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Breast cancer is characterized by the uncontrolled growth of cells in the milk ducts or lobules. Breast cancer is the second most common cancer worldwide with new cases (11.7%) and mortality rate (6.9%) on 2020. Among the different reported receptors, Human Epidermal Growth Factor Receptor (EGFR) is one of the potential targets for the breast cancer. Although number of small molecules reported as EGFR inhibitor. However, these are associated with diverse number of limitations (resistance, severe to moderate side effects). Therefore, there is a serious quest for searching the natural compounds as potential EGFR inhibitors. In this in-silico study, we have explored the terpenoids using pharmacoinformatic approach for the identification of active compounds against the EGFR. We have explored the Terokit data base and scrutinized the four molecules (C1, C2, C3, C4) after evaluating ADMET, pharmacokinetic, docking and pocket binding analysis. Crystal three dimensional structures of EGFR tyrosine kinase domain (PDB ID:1M17) was downloaded from RCSB PDB database and Molprobity Ramachandran analysis showed the favoured region (89.2%) and allowed region (97.8%) of EGFR. Finally, we observed that the compound C3 (-9.87) shows highest binding energy among the four compounds and compared with the commercially available antitumour drug 4-Hydroxytamoxifen (-8.36). The lead compound and 1M17 complex structural stability and dynamic behaviour were monitored with the help of molecular dynamic simulation using Gromacs. Results from our simulation revealed that our compound is more stable against the standard molecule for EGFR inhibition.

**Keywords:** *In-silico* study, Breast Cancer, Human EGFR, Stability Study, Molecular Dynamic Simulation


ISBN: 978-81-980623-8-3

**CH-471**

## GREEN SYNTHESIS OF SILVER NANOPARTICLES USING PLANT EXTRACTS: RECENT ADVANCES, MECHANISMS AND ANTIOXIDANT POTENTIAL

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The synthesis of metal nanoparticles using plant extracts has emerged as a simple, economical, and environmentally sustainable method that avoids the use of toxic chemical reductants and stabilizers. Among various metal nanomaterials, silver nanoparticles (AgNPs) have gained significant attention due to their diverse applications in medicine, agriculture, and industry. In recent years, numerous ecofriendly and rapid synthesis approaches have been reported using aqueous extracts obtained from different plant parts, including leaves, roots, stems, bark, and fruits. These phytochemical-rich extracts act as natural reducing and capping agents, facilitating efficient nanoparticle formation under mild conditions. This review comprehensively highlights recent findings on the green synthesis of AgNPs, emphasizing the role of plant-derived biomolecules, optimization strategies, characterization techniques, and mechanisms of nanoparticle formation. Furthermore, the potential applications and antioxidant properties of plant-mediated AgNPs are discussed, showcasing their relevance in biomedical and therapeutic fields. Overall, green synthesis represents a promising, sustainable alternative to conventional methods for the production of silver nanoparticles.

**Keywords:** Silver nanoparticles, Plant extracts, Green synthesis, Antioxidant activity, Phytochemicals, Applications.

**CH-472**

## BIOANALYTICAL METHOD RELIABILITY: STRATEGIES FOR ROBUST VALIDATION AND REGULATORY SUCCESS

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The quantity of drugs and their metabolic constituents in plasmatic matrices is routinely determined in this article utilizing bioanalytical methods. Both clinical and non-clinical research should use these strategies. Bioanalytical procedures, which are used to quantitatively describe medicinal drugs and their constituents in a biological environment, are heavily relied on for the interpretation and evaluation of bioequivalence, pharmacokinetics, and toxicokinetic in conjunction. Bioanalysis' key tasks include technology development, validation, and sample evaluation. Determining the amount to which the material, environment, or operational variables can influence the analyte's estimate in the material from implementation to analysis necessitates a detailed evaluation of each stage of the process. The drug compounds present in the body can be identified using procedures such as liquid chromatography at high pressure (HPLC) or liquid chromatography at double mass spectrometry (LCMS MS). Every tool has advantages and disadvantages of its own. The bioanalysis of large molecules has primarily used gaseous chromatography, HPLC, and the LC/MS/MS method. Precision, reproducibility, accuracy, linearity, sensitivity, stability, and selectivity are some of the most commonly utilized metrics. In this review paper, we will cover information regarding the development and validation parameters of bioanalytical methods. This information in this article aids in quality assurance by determining the concentration of a medicine and its metabolite in a biological source.

**Keywords**: Analyte, Clinical and Non-Clinical Study, Method Development, Validation of Bioanalysis Techniques, Validation Parameters.

**CH-473**

## NETWORK PHARMACOLOGY AND MOLECULAR DOCKING STUDIES OF PHYTOCONSTITUENTS OF PIPER BETLE ON TYPE 2 DIABETES MELLITUS

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Type 2 Diabetes Mellitus is a multifactorial metabolic disorder characterized by insulin resistance, oxidative stress, and chronic inflammation. Piper betle is a medicinal plant employed here for network pharmacology and molecular docking approach to elucidate the multi-targeted therapeutic potential of Piper betle against Type 2 diabetes mellitus. Phytoconstituents of Piper betle were collected from IMPPAT data base and screened for drug-likeness and ADME properties through Swiss ADME. Potential targets were predicted using Swiss target prediction database and cross-referenced with Type 2 diabetes mellitus-associated genes through GENE Cards and OMIM database. Compound–target and protein–protein interaction (PPI) networks were constructed using STRING and Cytoscape. Gene Ontology (GO) and Reactome pathway enrichment analyses were performed to identify relevant biological processes and pathways. Molecular docking was conducted using Schrodinger suite 2025-2 to validate the interactions of key compounds with Type 2 diabetes Mellitus-related proteins. Cytoscape analysis of network among targets of phytoconstituents and genes of Type 2 diabetes mellitus identified 1-Triacontanol, 2-Undecanone, Arecoline, Beta-Caryophyllene, Piperitone, Safrole, Vitamin-E, Beta-sitosterol, Camphor, Cedrol, Chavibetol, Clionasterol, P-Methane-1,3-diol, Stearic acid, Decanal, Diosgenin, Eugenol, Iso-eugenol, Piperbetol, Retinol, Stigmasterol as major active compounds. Docking studies confirmed stable binding affinities of Piper betle phytoconstituents with AKT1, ESR1, STAT3 supporting their role in improving insulin sensitivity and reducing oxidative stress.The integrative evidence from network pharmacology and molecular docking highlights phytoconstituents of Piper betle as a promising candidate for the management of Type 2 diabetes mellitus

**Keywords:** Network pharmacology, Molecular docking, Piper betle, Type 2 diabetes mellitus.

**CH-474**

## MOLECULAR DOCKING AND ADMET ANALYSIS OF THE MUNTINGIA CALABURA PLANT CONSTITUENT WITH MULTIPLE PHARMACOLOGICAL ACTIVITIES

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The identification of novel lead compounds from natural sources is paramount in modern drug discovery. This study employed a dual computational strategy that is *in silico* molecular docking followed by ADMET analysis to systemically evaluate the therapeutic potential of major phytochemicals isolated from Muntingia calabura L. Compounds including key triterpenoids and phenolic acids were screened against 14 established proteins that have been critical targets for seven major therapeutic activities: anti-thrombolytic, anti-oxidant, anti-inflammatory, anti-diabetic, hepatoprotective, COPD, and anti-cancer activities. Binding free energy was used to measure affinity, while drug-likeness rules and predictive toxicity models were used to assess pharmacokinetic property and safety. The docking phase identifies exceptional affinities, notably stigmasterol, b-sitosterol, kaempferol, oleanolic acid, etc., and shows high affinities for respective targets. Critically, the ADMET analysis revealed that the top-performing phytochemicals satisfy the majority of accepted drug-likeness filters and exhibit low-moderate probability for hERG inhibition and AMES mutagenicity. These findings conclude that the traditional use of Muntingia calabura positions its potent, druggable constituents as highly promising multi-target lead compounds for pharmacological development

**Keywords:** Muntingia calabura L., molecular docking, phytochemicals, ADMET analysis, anti-diabetic, anti-thrombolytic, anti-inflammatory, COPD, anti-cancer, anti-oxidant, hepatoprotective.

**CH-475**

## REDUCING ENVIRONMENTAL IMPACT THROUGH GREENER ANALYTICAL METHODS

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Green Analytical Chemistry (GAC) is quickly changing how environmental analysis is done by helping labs have less of an impact on the environment as a whole. GAC encourages the use of safer solvents, smaller methods, and tools that use less power instead of chemical-heavy and energy-intensive methods. New methods like solid-phase microextraction (SPME), microfluidic systems, ionic-liquid extractions, and different types of spectroscopy have made it possible to use fewer reagents and make less waste. Scientists can now take accurate measurements on-site without having to move or handle samples a lot thanks to the development of portable sensors and field-based analytical tools. Greener chromatographic methods, especially those that use water-rich solvents or supercritical $CO_2$, help sustainability efforts even more. In general, GAC not only keeps up its high analytical performance, but it also helps the world reach its goals for protecting the environment, saving resources, and making labs safer. Environmental monitoring is getting cleaner, smarter, and more sustainable as more researchers use these methods.Looking ahead, the future of GAC will focus on fully automated, AI-driven analytical platforms that further cut down solvent use and energy demand. The integration of biodegradable materials in sample preparation and sensor fabrication is expected to make analytical workflows even more eco-friendly. As sustainability becomes a global priority, GAC will continue to evolve into a standard requirement rather than an optional practice in modern laboratories.

**Keywords:** Green Analytical Chemistry (GAC), solid-phase microextraction (SPME), ionic-liquid extractions, microfluidic systems, greener chrometographic methods.

## CH-476

## DESIGN AND SYNTHESIS OF THIAZOLO[5,4-B] PYRIDINE DERIVATIVES AS NOVEL DPP-4 INHIBITORS FOR TYPE 2 DIABETES MELLITUS

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Type 2 diabetes mellitus (T2D) is a chronic and progressive metabolic disorder marked by impaired glucose regulation and insulin resistance, often necessitating therapeutic intervention through the modulation of incretin hormones via dipeptidyl peptidase-4 (DPP-4) inhibition. This study focused on the rational design, multi-step synthesis, and comprehensive *in vitro* evaluation of a novel series of thiazolo[5,4-b] pyridine derivatives as prospective DPP-4 inhibitors. The structural conformation of the synthesized compounds was confirmed utilizing standard spectroscopic techniques, including thin-layer chromatography (TLC), nuclear magnetic resonance 1H and 13C NMR) spectroscopy, and mass spectrometry. Molecular docking and dynamics simulations, conducted using the Schrodinger Maestro suite, revealed favorable binding affinities and stable interactions of several derivatives within the DPP-4 active site. Importantly, the *in vitro* fluorescence-based DPP-4 inhibition assay revealed that several newly synthesized derivatives displayed moderate to strong inhibitory potential, achieving up to 94.2% enzyme inhibition closely matching the 92.1% inhibition observed for the clinical standard, sitagliptin. Notably, three derivatives emerged as lead candidates, displaying superior docking scores and enzyme inhibition profiles. These findings underscore the pharmacological promise of thiazolo[5,4-b] pyridine scaffolds as potent DPP-4 inhibitors, further exploration through *in vivo* efficacy and pharmacokinetic studies. Collectively, this study establishes a foundation for the development of structurally optimized thiazolo[5,4-b] derivatives as next-generation antidiabetic therapeutics targeting DPP-4-mediated glucose regulation.

**Keywords:** Diabetes mellitus, synthesis, molecular docking, dynamics, DPP-4

## CH-477

## RAPID STABILITY-INDICATING RP-HPLC METHOD FOR SILODOSIN AND IMPURITY ANALYSIS

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A rapid and robust reverse-phase high-performance liquid chromatography (RP-HPLC) method was developed and validated for the quantitative analysis of Silodosin and its related impurities in pharmaceutical dosage forms. Silodosin, an α1-adrenoceptor antagonist highly selective for the prostate, is used for the symptomatic treatment of benign prostatic hyperplasia (BPH). The chromatographic separation was achieved using a Waters HPLC system equipped with a UV detector, employing a mobile phase of acetonitrile and water (50:50 v/v) with a flow rate of 0.8 mL/min. The method was validated in accordance with ICH guidelines for key analytical parameters, including specificity, linearity, precision, accuracy, limit of detection (LOD), limit of quantification (LOQ), robustness, and degradation studies. The retention time of Silodosin was 2.252 min, enabling rapid determination. The method showed excellent linearity for Silodosin and its impurity over the concentration range of 1–6 µg/mL with correlation coefficients close to 0.999. LOD and LOQ values were found to be 0.03 µg/mL and 0.09 µg/mL, respectively, indicating high sensitivity. Forced degradation studies, including acid, base, oxidative, thermal, photolytic, and aqueous conditions, confirmed the stability-indicating nature of the method, with all degradation products well-resolved from the main peak. The assay of Silodosin in marketed formulations showed an average recovery of 100.85%, demonstrating the accuracy and reliability of the method. This validated RP-HPLC method is precise, rapid, cost-effective, and suitable for routine quality control, stability testing, and impurity profiling of Silodosin in bulk and finished pharmaceutical products.

**Keywords:** Silodosin, RP-HPLC, Method validation, Stability-indicating method, Impurity profiling, ICH guidelines.

## CH-478

## DESIGN, SYNTHESIS, *IN-SILICO* STUDY, AND *IN-VITRO* STUDY OF ANTITUBERCULAR ACTIVITY OF (2E)-N-(1,3-BENZOTHIAZOL-2-YL)-3-PHENYLPROP-2-ENAMIDE DERIVATIVES

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Many first-line and second-line medications have been proven to be ineffective in treating multi-drug-resistant tuberculosis (MDR-TB). Using Dimethylaminopyridine aminopyridine (DMAP) as a base and Di cyclohexyl carbodiimide (DCC) as coupling agents, 2-amino benzothiazoles was reacted with with various (2E)-3-phenylprop-2-enoic acids to synthesize (2E)-N-(1,3-benzothiazol-2-yl)-3-phenylprop-2-enamide. These compounds were evaluated for their anti-tubercular activity against the Mycobacterium tuberculosis H37Rv strain by the Microplate Alamar Blue assay (MABA) method. (2E)-N-(1,3-benzothiazol-2-yl)-3-phenylprop-2-enamide derivatives with 4-bromo (CH-03), 4-nitro (CH 06), 4-hydroxy (CH 09), 3-chloro (CH 10), 2,4,6-trimethoxy (CH-15), and 4-methyl (CH 12) substituted cinnamic acids exhibited good anti-tubercular activity. CH-12 and CH-15 (MIC 1.6 µg/ml), CH-10 (MIC 3.12 µg/ml), and CH-09, CH-06, and CH-03 (MIC 6.25 µg/ml). All synthesized compounds complied with the Lipinski rule of five and, from the QikProp analysis, showed drug-likeness properties. Through this study, it was proved that synthesized analogues could serve as leads for further development as antitubercular agents.

**Keywords**: Mycobacterium tuberculosis H37Rv strain, antituberculosis activity, (2E)-N-(1,3-benzothiazol-2-yl)-3-phenylprop-2-enamide.

## CH-479

## EMERGING ROLE OF AMINO ACID CONJUGATION IN MULTI-TARGET DRUG DESIGN FOR ALZHEIMER'S DISEASE

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ISBN: 978-81-980623-8-3

Alzheimer's disease (AD) is a progressive neurodegenerative disorder affecting over 50 million individuals worldwide, characterized by amyloid-β (Aβ) aggregation, tau hyperphosphorylation, cholinergic deficits, oxidative stress, mitochondrial dysfunction, and neuroinflammation. Current therapies, including acetylcholinesterase (AChE) inhibitors (e.g., donepezil) and NMDA receptor antagonists (e.g., memantine), provide only symptomatic relief, limited by poor blood-brain barrier (BBB) permeability, short half-life, and systemic toxicities such as gastrointestinal irritation. To address these challenges, amino acid and dipeptide conjugation has emerged as a promising and innovative strategy in drug design. These conjugates enhance solubility, metabolic stability and BBB penetration via endogenous transporters (e.g., LAT1, PEPT1/2), as well as multi-target-directed ligand (MTDL) properties, while imparting synergistic neuroprotective or antioxidant effects from amino acids such as tryptophan, tyrosine, or cysteine. This review focuses on recent advancements in drug conjugates, particularly those based on ibuprofen, donepezil, curcumin, and resveratrol, which function as multi-target drugs with enhanced absorption and efficacy. We discuss these drugs, including their design, their impact on the body, their application in treating Alzheimer's, and the contribution of computer modeling in their development. We also cover challenges like stability and moving from lab research to clinical use, as well as future directions such as using artificial intelligence, eco-friendly chemistry, and nanotechnology. By combining new delivery methods with multi-target strategies, amino acid and dipeptide conjugates could change how Alzheimer's is treated in the future.

**Keywords**: Alzheimer's disease, amino acid conjugation, dipeptide conjugates, multi-target-directed ligands, blood-brain barrier, prodrugs, molecular docking, drug delivery.

**CH-480**

## SYNTHESIS CHARACTERIZATION AND PRE-CLINICAL EVALUATION OF TRANSFERRIN CONJUGATED PH SENSITIVE EPIRUBICIN FOR BREAST CANCER TREATMENT

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The development of targeted and stimuli-responsive drug delivery systems remains a pivotal strategy to enhance therapeutic efficacy and mitigate systemic toxicity in breast cancer management. This study reports the synthesis and comprehensive characterization of a novel transferrin-conjugated, pH-sensitive epirubicin nanoparticle formulation engineered for precision targeting of breast cancer cells. Conjugation with transferrin leverages the high affinity and elevated expression of transferrin receptors on malignant breast tumors, facilitating receptor-mediated endocytosis and selective intracellular delivery. The pH-sensitive design ensures preferential epirubicin release within the acidic tumor microenvironment, substantially improving drug bioavailability at the target site while minimizing off-target effects. Physicochemical characterization revealed optimal particle size, surface charge, and stability, confirming nanoparticle suitability for systemic administration. *In vitro* evaluations demonstrated enhanced cellular uptake, superior cytotoxicity against breast cancer cell lines, and minimal toxicity to normal cells versus free epirubicin. *In vivo* preclinical studies in breast cancer xenograft models exhibited pronounced tumor growth inhibition, improved pharmacokinetic profile, and reduced cardiotoxicity, underscoring the translational potential of this nanomedicine. This work exemplifies how biomolecule-guided, environment-responsive drug delivery can revolutionize breast cancer therapy by improving the therapeutic index and patient outcomes. The integration of receptor targeting with microenvironment-triggered release offers a promising platform for the next generation of oncologic nanomedicines.

**Keywords:** Breast Cancer, Drug Targeting, Transferrin Conjugation, stimuli-responsive drug delivery systems

**CH-481**

## DESIGN AND SYNTHESIS OF 1,3,4-OXADIZOLE-2-THIONE ANALOGUES AS ANTICANCER AGENTS

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Cancer is characterized by uncontrolled cell proliferation, apoptosis evasion, angiogenesis, and metastasis, and it is known to be a leading cause of death. As a result, there is an urgent need for the development of new and efficient chemotherapeutic drugs. In this regard, the wide range of biological properties of 1,3,4-oxadizole-2-thione, a heterocyclic scaffold, has gained interest in medicinal chemistry. The present study used a rational drug design approach to create and develop several 1,3,4-oxadiazole-2-thione analogues as possible anticancer drugs. The design approach is based on improving lipophilicity and binding affinity by structural modification. The objective of this study is to synthesize a series of 1,3,4-oxadiazole-2-thione analogues and to explore the anticancer activity and selectivity. Several compounds showed potent antiproliferative activity as compared to the standard drug when their *in-vitro* cytotoxic potential was assessed against different human cell lines. This research contributes to the development of potent and targeted 1,3,4-Oxadizole-based anticancer drugs by establishing a correlation between chemical structure and anticancer activity. It was discovered that adding thione (-C=S) to oxadiazole enhanced biological activity and target interaction. According to these findings, 1,3,4-oxadiazole-2-thione derivatives have shown great potential as a scaffold for future research into effective anticancer drugs.

**Keywords:** 1,3,4-oxadizole-2-thione, Anticancer drugs, SAR, In-silico studies.

**CH-482**

## DOCKING DRIVEN DRUG REPURPOSING FOR ALZHEIMER'S DISEASE

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According to the Alzheimer's Association, more than 4 million people suffer from dementia in India. Alzheimer's disease (AD) is the predominant type of dementia (~75% cases). While a cure for AD remains elusive, the U.S. Food and Drug Administration (USFDA) has approved drugs that reduce symptoms progression. Many drugs that have been evaluated for the AD, failed in clinical trials owing to a lack of efficacy or toxicity issues. To explore novel treatments for AD, a repurposing approach was considered. Based on the most reported targets for AD in the literature, 5 targets were selected with PDB IDs 4EY7 (AChE), 2MZ7 (Tau), 8GRX (ApoE4), 5I2K (NMDA), and 7D8X (gamma-Secretase). The ligand dataset (2118 drugs) was taken from the e-Drug3D dataset of USFDA-approved. The ligand dataset was docked against 4EY7.pdb because acetylcholinesterase is the most explored target for AD, which led to the selection of 47 better drugs (-13.5 kCal/mol to -11.7 kCal/mol) than the standard drug donepezil (-11.7 kCal/mol). Molecular docking of the selected drugs against the remaining four targets led to selection of three model drugs with binding affinity values in kCal/mol as Drug-A (4EY7: -13.2, 2MZ7: -6.6, 8GRX: -7.5, 5I2K: -8.9, and 7D8X: -12.0), Drug-B (4EY7: -12.7, 2MZ7: -7.0, 8GRX: -8.3, 5I2K: -10.0, and 7D8X: -12.0), and Drug-C (4EY7: -12.4, 2MZ7: -6.9, 8GRX: -7.3, 5I2K: -9.6, and 7D8X: -10.0) which were better than their respective standard drugs. Further research would be undertaken to reduce the rejection of the API in clinical trials, the physicochemical properties of the selected drugs will be modified.

**Keywords:** AD, Molecular Docking, Donepezil,

**CH-483**

## NETWORK PHARMACOLOGY AND COMPUTATIONAL STUDIES OF ANNONA GLABRA L. PHYTOCHEMICALS TARGETING PROSTATE CANCER

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Prostate cancer is the most frequently diagnosed cancer globally and ranks as the sixth leading cause of cancer-related mortality among men. Annona glabra L is a medicinal plant, which is widely used in ayurvedic and siddha medicines for the treatment of various ailments. It contains N-Methylactinodaphnine, reticuline, anonine, anolobine, asimilobine,




ISBN: 978-81-980623-8-3

atherospermidine, isoboldine, liriodenine, (-) N-nornuciferine and norushinsunine. In this study, we examined the effectiveness of the metabolites derived from this plant against prostate cancer, utilizing a network pharmacology approach. The phytochemicals were obtained from various sources including IMPPAT, Dr. Duke's Phytochemical and Ethnobotanical database. The physicochemical, pharmacokinetic, and toxicity profiles of the retrieved phytochemicals were forecasted using the SwissADME, ProTox 3.0, and CardioTOXCSM web servers. The OSIRIS property explorer was utilized to predict the drug likeness and drug score of the compounds. To illustrate the anticancer mechanism of the developed compounds, an analysis of Gene Ontology (GO) and Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway enrichment was conducted utilizing the intersecting genes that exhibited differential expression. The suitable targets of the phytochemicals were predicted through network modelling, which indicated that they are likely to exhibit significant activity against prostate cancer, specifically STAT3, ESR1, MAPK1 and HIF1A. The biological efficacy of the compounds against the chosen molecular targets was assessed through molecular docking studies, Discovery Studio visualizer and the prankweb webserver were utilized. From the diverse computational analysis and drug evaluations, the results indicated that the compounds Abietal, (+)-norisodomesticine, (7,7-dimethyl-1,4-dioxo-2,3,4,5,6,7-hexahydro-1H-inden-2-yl) acetic acid, and Methyleugenol exhibited significant activity with better binding energies and interaction characteristics against the evaluated targets. From this, we conclude that these compounds are effectively utilized in the management of prostate cancer. However, further in vitro and in vivo studies are warranted.

**Keywords:** Prostate cancer, Annona glabra L., Computational analyses, Network Pharmacology, Molecular docking.

**CH-484**

## MECHANISTIC EXPLORATION OF POLYHERBAL DECOCTION IN ENDOMETRIOSIS VIA COMPUTATIONAL NETWORK PHARMACOLOGY AND DOCKING STUDIES

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Endometriosis is a multifactorial, estrogen-dependent gynecological disorder characterized by chronic inflammation, oxidative stress, aberrant angiogenesis, and hormonal dysregulation, which collectively contribute to pelvic pain and infertility. Conventional therapeutic options remain limited by partial efficacy and undesirable adverse effects, underscoring the need for safer, multi-target strategies. The present study investigated the mechanistic basis of a polyherbal decoction composed of Curcuma longa (turmeric), Withania somnifera (ashwagandha), Mentha piperita (peppermint), Zingiber officinale (ginger), Camellia sinensis (green tea), Arachis hypogaea (peanuts), Glycine max (soybeans), Allium sativum (garlic), Vitis vinifera (grapes), and Salvia hispanica (chia seeds) using an integrative computational approach. Phytoconstituents were retrieved from IMPPAT databases, subjected to drug-likeness and ADMET screening, and their potential targets predicted via SwissTargetPrediction. Disease-associated genes were collated from GeneCards and DisGeNET, followed by construction of a protein–protein interaction network in STRING and topological analysis in Cytoscape to identify hub targets. Functional enrichment revealed significant modulation of estrogen signaling, NF-κB, TNF, IL-17, VEGF, and PI3K-Akt pathways, which are central to endometriosis pathophysiology. Key bioactive compounds, including curcumin, withaferin-A, epigallocatechin gallate, resveratrol, genistein, allicin, and quercetin, demonstrated strong binding affinities with pivotal proteins such as ESR1, TNF, IL6, VEGFA, and AKT1 in molecular docking analyses by using Autodock 4.0. Collectively, these findings suggest that the polyherbal decoction exerts its therapeutic potential through synergistic, multi-target modulation of interconnected biological networks, thereby offering a promising systems-level intervention for endometriosis. Further *in-vitro* and in-vivo investigations are warranted to substantiate these computational predictions and establish translational relevance.

**Keywords:** Endometriosis, Polyherbal decoction, Network pharmacology, Molecular docking, Multi-target therapy

**CH-485**

## DISCOVERY OF A NOVEL PRODIGIOSIN-PRODUCING SERRATIA MARCESCENS JSSCPM1: ISOLATION, CHARACTERIZATION, AND ANTIBACTERIAL INSIGHTS

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Prodigiosin, a red bioactive pigment with remarkable medicinal potential, was isolated from a newly identified bacterial strain, Serratia marcescens JSSCPM1. The compound was purified and characterized using UV–visible spectroscopy, high-performance liquid chromatography (HPLC), liquid chromatography–mass spectrometry (LC–MS), and nuclear magnetic resonance (NMR) spectroscopy. Structural elucidation confirmed the identity of the isolated compound as prodigiosin, consistent with previously reported data.The antibacterial activity of prodigiosin was assessed against Gram-positive and Gram-negative bacteria. The compound exhibited stronger inhibition against Gram-negative strains, with a minimum inhibitory concentration (MIC) of 15.9 ± 0.31 µg/mL recorded against Escherichia coli NCIM 2065. *In silico* molecular docking studies were performed to explore interactions between prodigiosin and OmpF porin proteins (PDB IDs: 4GCS, 4GCP, and 4GCQ), which serve as key antibiotic targets. The docking results indicated that prodigiosin has strong binding affinity toward these proteins, supporting its antibacterial potential.

**Keywords:** Serratia marcescens; JSSCPM1 strain; prodigiosin; OmpF porin protein; antibacterial agent; *in silico* molecular docking

**CH-486**

## LIGAND BASED DESIGN OF THIAZOLIDINEDIONE FUSED WITH QUINOLINE AS PROMISING HYPOGLYCEMIC AGENTS

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Diabetes mellitus (DM) is a group of chronic metabolic disorders characterized by high blood sugar levels due to insufficient insulin production or cellular resistance to insulin.There is a growing need for safer and more effective drug candidates that target underlying disease mechanisms. Thiazolidinediones (TZDs), known PPARγ agonists, show antidiabetic, anti-inflammatory, antimicrobial, and anticancer activities, with pioglitazone and rosiglitazone as approved drugs. Quinoline, an important aromatic heterocycle, exhibits diverse activities including antimalarial, anti-inflammatory, antioxidant, and antidiabetic effects, making it a valuable scaffold in drug design. To design, synthesize, and evaluate thiazolidinedione derivatives fused with quinoline as potential hypoglycemic agents. Ligand-based design of structural analogs of thiazolidinedione fused with quinolines.Synthesis of planned derivatives using conventional and microwave methods. Characterization of synthesized compounds using IR spectral studies. *In vitro* hypoglycemic activity screening using α-amylase activity inhibition. The designed analogs were evaluated using structural similarity analysis, PASSOnline activity prediction, and molecular docking against pancreatic α-amylase. Quinoline intermediates and thiazolidinedione were synthesized using Vilsmeier–Haack and reflux methods, respectively, followed by microwave-assisted condensation to obtain the final compounds. Product formation was confirmed through TLC and IR spectroscopy. Novelty screening confirmed all four designed analogs (IVa–IVd) as new structures, with PASSOnline predicting notable antidiabetic potential (Pa = 0.650–0.709). Molecular docking showed good binding to pancreatic α-amylase, with IVc displaying the best affinity (–9.1 kcal/mol). The synthesis yielded quinoline intermediates (71%), thiazolidinedione (89%), and final products IVa and IVb (87%). IR spectroscopy confirmed the expected functional groups in the synthesized. These findings highlight the potential of the synthesized compounds, particularly IVb, as effective antidiabetic agents. Further studies, including *in vivo* evaluations and clinical trials, are recommended to fully establish their




ISBN: 978-81-980623-8-3

therapeutic efficacy and safety. Additionally, the use of both conventional and microwave synthesis methods underscores the versatility and efficiency of the synthetic approaches employed.

**Keywords:** Thiazolidinedione, Quinoline, Hypoglycemic Agents, α-Amylase Inhibition, CADD, AutoDock

**CH-487**

## *IN-SILICO* AND *IN-VITRO* STUDIES ON SUBSTITUTED 2-METHYL BENZIMIDAZOLE DERIVATIVE AS POSSIBLE ANTI-FUNGAL AGENTS

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The current research work deals with the computational evaluation of antifungal activity of the designed heterocyclic aromatic compounds containing 2-methyl benzimidazole nucleus using Molegro Virtual Docker (MVD) software and by conducting ADME studies. The most potent compounds are synthesised. All the synthesised compounds were characterised by chemical tests and by using IR, NMR and mass spectroscopic data. Molecular docking studies of the title compounds were carried out using molegro virtual docker softwareAll the synthesised compounds were found to be more potent than the standard, benzimidazole (-65.925) and clotrimazole (-108.819). Compound 1-((2-(2,4 dinitrophenyl)hydrazono)(4-nitrophenyl)methyl)-2-methyl-1H-benzo[d]imidazole (IIIb3) with MolDock score of -168.853 showed highest binding affinity and was found to be the most potent amongst all the synthesised compounds and showed better results than the active ligand 18H_202[A](-145.783). All the synthesised compounds also showed good ADME profile.*In vitro* antifungal activity was performed on the synthesised compounds against candida albicans using clotrimazole as the standard drug. Amongst all the synthesized compounds, (Z)-1-((2-(2,4-dinitrophenyl)hydrazono)(4-nitrophenyl)methyl)-2-methyl-1H-benzo[d]imidazole (IIIb3) was found to be the most potent as it showed zone of inhibition 38mm in comparison to clotrimazole which showed 10mm.

**Keywords:** 2-Methyl benzimidazole, Clotrimazole, Spectroscopic analysis, Molecular docking studies, Antifungal activity.

**CH-488**

## QUANTUM CHEMISTRY METHODS FOR ESTIMATING NUCLEOPHILICITY AND ELECTROPHILICITY OF TLR-4 MODULATORS IN THE TREATMENT OF DIABETIC WOUNDS: A COVALENT DOCKING APPROACH

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Diabetic wounds are slow healing wounds characterized by disordered healing processes, which has characteristics of an abnormal and unresolved inflammatory response, which is primarily brought on by abnormal macrophage innate immune signaling activation. The overwhelmed infiltration of pro-inflammatory macrophages leads to elevated pro-inflammatory cytokines and further mediates pathological events of impaired diabetic wound healing. Toll-like receptor 4 (TLR4) plays a pivotal role in the inflammatory signaling cascade, making it an attractive therapeutic target.The current study aims to identify potent modulators of Toll Like Receptor-4 (TLR-4) employing covalent docking method and ADMET studies to streamline drug discovery.β methyl umbelliferone derivatives have a prominent effect in anti-inflammatory activity as it downregulates the TLR-4 activity by which the expression of pro-inflammatory cytokines such as IL-6, TNF-α and IL-1β will reduce. We have designed some β methyl umbelliferone to check their binding affinity against TLR-4 (PDB: 3FXI) by Covalent docking studies using Schrodinger suite 2021-22. EsNuEl for estimating nucleophilicity and electrophilicity. DFT study used for analysis of the stability of the designed compounds.Covalent docking studies revealed a strong ligand binding affinities at residues Cys133 with significant Cdock score and MMGBSA dG Bind scores when compared to the standard drugs. DFT results supported the molecules stability and reactivity profiling.The identified covalent antagonists show potential as TLR-4 antagonist, providing a foundation for further validation and contributing to advancement for the effective treatment of Diabetic Wounds through computational drug discovery approaches.

**Keywords:** Diabetic wounds, Toll like receptor-4, Cdock, EsNuEl

**CH-489**

## *IN SILICO* INVESTIGATION OF SULPHONAMIDE-CHALCONE DERIVATIVES FOR ANTICANCER ACTIVITY

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Sulphonamide–chalcone hybrids have gained attention as potential anticancer molecules due to their capacity to interact with multiple molecular pathways implicated in tumor growth. In the present work, in-silico evaluation of newly designed sulphonamide–chalcone derivatives aimed at targeting major oncogenic proteins involved in breast and colorectal cancers. Molecular docking studies performed against HER2, EGFR, and CDK4/6 revealed that several compounds demonstrated notable binding affinities ranging from –7.8 to –9.1 kcal/mol, surpassing the reference drug 5-fluoro uracil (–8.3 kcal/mol). These derivatives formed stable hydrogen bonds and hydrophobic interactions within the receptor active sites, suggesting strong inhibitory potential. Complementary ADMET analyses predicted good absorption, distribution, metabolic stability, and minimal toxicity, indicating favorable drug-likeness. The synergistic presence of sulphonamide and chalcone pharmacophores appears to enhance biological performance while providing structural flexibility for further optimization. This study highlights the effectiveness of integrating molecular docking with computational pharmacokinetic profiling to support early-stage lead discovery. Overall, the findings suggest that sulphonamide–chalcone hybrids represent promising multi-target anticancer candidates that merit further experimental validation. The research offers useful guidance for the rational development of safer and more effective therapeutic agents for breast and colorectal cancer management.

**Keywords:** Sulphonamide-chalcone, Molecular docking, Anticancer, HER2, ADMET

**CH-490**

## DESIGN, SYNTHESIS AND BIOLOGICAL EVALUATION OF OXIME DERIVATIVES WITH ANTIMICROBIAL, ANTI-INFLAMMATORY, ANTICONVULSANT AND ANTICANCER ACTIVITIES

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Oxime derivates are the versatile class of compounds known to have wide spectrum of Pharmacological activities including Antimicrobial, Anti-inflammatory, Anticonvulsant and Anticancer activities. Our present research study aims to derive the derivatives of oxime which are synthesised from isatin, anthraquinone and quinoxaline scaffolds through a systemic synthetic routes. The chemical structure of the synthesised compounds were confirmed by the physicochemical characterization and spectral analysis including IR, NMR and MS. Once after the confirmation the compounds were subjected for a biological evaluation. Acute oral toxicity studies has confirmed the safety of the derivatives at the tested doses. Several compounds has exhibited significant anti-inflammatory and anticonvulsant activities in in-vivo. Moreover, two compounds exhibited a strong promising anticancer potential against MCF–7 Breast cancer cell line in MTT Assay and antibacterial activity against both Gram Positive and Gram-Negative bacteria and two of the other compounds also demonstrated a notable antifungal activity. Overall, our entire research study concludes that oxime derivatives may serve as a promising lead molecule for drug discovery with various therapeutic applications.

**Keywords:** Oxime Derivatives, Synthesis, Antimicrobial, Anti-inflammatory, Anticonvulsant and Anticancer activities.

**CH-491**

## DESIGN, SYNTHESIS, CHARACTERIZATION, *IN-SILICO* MODELLING, AND BIOLOGICAL EVALUATION OF COUMARIN-BENZIMIDAZOLE DERIVATIVES FOR THEIR POTENTIAL ANTICANCER, ANTIOXIDANT, AND ANTI-INFLAMMATORY PROPERTIES

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ISBN: 978-81-980623-8-3

The present research focuses on the design, synthesis, characterization, in-silico modelling, and biological evaluation of a novel series of compounds, 3-(1H-benzo[d]imidazol-2-yl)-7-(substituted alkoxy)-4-methyl-2H-chromen-2-one [IV (1–10)], for their potential anticancer, antioxidant, and anti-inflammatory properties. The synthetic route involves preparation of substituted 7-Hydroxy-4-methyl-2H-chromen-2-one from resorcinol and ethyl acetoacetate, which is further reacted with different alkyl halides to yield 7-(substituted alkoxy)-4-methyl-2H-chromen-2-one [II (1-10)]. Subsequent formulation was carried out using POCl3 and anhydrous N, N-DMF to obtain 7-(substituted alkoxy)-4-methyl-2-oxo-2H-chromene-3-carbaldehyde [III (1-10)], which then further undergo final cyclization with o-phenylenediamine in solvent free condition to obtain the target compounds 3-(1H-Benzo[d]imidazol-2-yl)-7-(substituted alkoxy)-4-methyl-2H- chromen-2-one [IV (1-10)]. Out of seventeen designed molecules, 10 were selected for synthesis based on favourable MolDock scores obtained from molecular docking studies. Structural confirmation of the synthesized compounds was achieved through IR, 1H-NMR, 13C-NMR, and mass spectrometry. Docking studies against the AKT receptor domain (PDB ID: 3QKK) for anticancer activity revealed that all selected compounds established significant hydrogen bonding and polar interactions within the active site. ADMET predictions confirmed that all synthesized compounds adhered to Lipinski's Rule of Five, indicating good drug-like properties with acceptable ranges for molecular weight, hydrogen bond donors and acceptors, lipophilicity, and solubility. Toxicity assessment classified all compounds in Class IV based on $LD_{50}$ values ranging between 300–2000 mg/kg, suggesting moderate toxicity. To conclude, the synthesized coumarin-benzimidazole derivatives exhibited promising anticancer, anti-inflammatory, and antioxidant potential, supported by both computational and experimental data, making them suitable candidates for further development in therapeutic research.

**Keywords:** Coumarin-Benzimidazole, Anticancer, Anti-inflammatory, Antioxidant, Molecular docking studies.

**CH-492**

## IDENTIFICATION OF NATURAL ORIGIN RHO KINASE INHIBITORS TARGETING TRIPLE-NEGATIVE BREAST CANCER METASTASIS VIA VIRTUAL SCREENING, ADMET PROFILING, MM-GBSA, DFT, AND MOLECULAR DYNAMICS SIMULATIONS

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Triple-negative breast cancer (TNBC) is a very aggressive subtype of breast cancer, associated with reduced survival rates and over 90% of mortality resulting from metastasis. Rho-associated coiled-coil kinase (ROCK) is pivotal in the development of TNBC through its regulation of cellular motility and invasion. This research aims to identify novel natural ROCK inhibitors that may prevent metastasis in TNBC, utilizing an in-silico drug development methodology. The Coconut database, including 123,971 phytochemicals, was employed for virtual screening. Additional pharmacokinetic and pharmacodynamic characteristics were predicted using the SMARTCyp web server and the Schrödinger suite QikProp module. The highest-ranking hits were next analyzed by MM-GBSA binding free energy calculations, DFT assessment for electronic property evaluation, and MD simulations to evaluate the structural stability and dynamic behavior of the docked complexes. Natural compound (CNP0115371) was projected to demonstrate significant ROCK binding affinity, ADMET characteristics, and stable interaction patterns. DFT studies indicated significant chemical reactivity and electron distribution conducive to biological interaction. MD simulations validated persistent P-L interactions during the MD trajectory, corroborating the compounds' potential as ROCK inhibitors. The research found naturally derived chemicals as possible ROCK inhibitors with anti-metastatic significance for TNBC therapy. These discoveries require more experimental validation to verify their therapeutic effectiveness and to create new anti-TNBC medicines derived from natural sources.

**Keywords:** TNBC, Rho kinase, Density functional theory, molecular dynamics

**CH-493**

## METHOD DEVELOPMENT AND VALIDATION FOR THE SIMULTANEOUS ESTIMATION OF PAROXETINE AND CLONAZEPAM IN PHARMACEUTICAL FORMULATIONS BY THERMOSIL RP C18

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Chromatographic parameters were optimized to develop HPLC methods for individual drugs and for simultaneous estimation of combined dosage forms of Paroxetine and Clonazepam in pharmaceutical formulations with short analysis time with acceptable resolution. In the present study a simple, rapid, accurate and robust HPLC method was developed for the estimation of Paroxetine and Clonazepam in their pharmaceutical formulations. The optimum detection wavelength for Paroxetine and Clonazepam combination was 255nm. The mobile phase optimized for Paroxetine alone and Paroxetine and Clonazepam combination consists of Methanol and disodium hydrogen phosphate buffer of pH 3.5 in the ratio of 45:55. The mobile phase optimized for Clonazepam alone was ammonium formate buffer of pH 3 and acetonitrile in the ratio of 67:33 v/v. Columns finalized for individual drugs are Paroxetine and Clonazepam Thermosil RP C18 (4.6*150mm) 5µm were used as stationary phases. The solutions were chromatographed at a constant flow rate of for Paroxetine alone and Paroxetine+ Clonazepam combination the flow rate was found to be ideal at 0.7ml/min and for Clonazepam alone the flow rate selected was 0.8ml/min. Linearity was set up over the focus scope of 10ppm to 50ppm for Paroxetine, 15ppm to 75ppm for Clonazepam and Correlation coefficient was seen as 0.999. The mean % Recovery for Paroxetine bulk drug it was found to be 99.07%, 99.87% and 100.22% respectively and for Clonazepam it was found to be 99.41%, 100.02% and 99.67% respectively are within the limits. The mean percentage recovery for Paroxetine and Clonazepam combination at 50%, 100% and 150% levels were found to be 99.64%, 100.04% and 99.89% respectively for Paroxetine and 99.57%, 99.78% and 99.83% respectively for Clonazepam and are within the limits. The LOD value obtained for Paroxetine and Clonazepam combination is 2.951 for Paroxetine and 2.878 for Clonazepam and the LOQ result obtained is 9.902 for Paroxetine and 9.731 for Clonazepam.The percentage purity of Paroxetine and Clonazepam combination was found to be 98.62% for Paroxetine and that of Clonazepam was found to be 99.60%

**Keywords:** Paroxetine, Clonazepam Assay, RP-HPLC, Validation

**CH-494**

## DESIGN, SYNTHESIS AND CHARACTERISATION OF NOVEL SUBSTITUTED BENZIMIDAZOLE DERIVATIVES AS PROMISING ANTI BACTERIAL AGENTS

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The current research work deals with the synthesis of various heterocyclic aromatic compounds containing benzimidazole nucleus and characterisation by IR, NMR and mass spectroscopic data and computational evaluation of their antifungal activity using molegro virtual docker (MVD) software. The sequence of reactions involves condensation of phenylenediamine with 4-amino benzoic acid to give 4-(1H-benzo(d)imidazole-2-yl)-N-benzylideneaniline(I) in the presence of O-phosphoric acid, which further on reaction with substituted aldehyde along with methanol and glacial acetic acid forms substituted schiffs base to give IIa/IIb/IIc/IId/IIe as the formed derivatives All the synthesised compounds were characterised by TLC and by using IR, NMR and mass spectroscopic data. Molecular docking studies of the title compounds were carried out using Molegro Virtual Docker software. All the synthesised compound exhibited well conserved hydrogen bonding with one or more amino acid residues in the active pocket of DNA gyrase domain and active ligand with PDP ID 1KZN.The compound 4-(4-1-H-benzo(d)imidazole-2yl)phenyl)imino)methyl)-2-methoxyphenol (Ic) is found to be more potent with MolDock score of -135.817 in comparison to standard drug penicillin having MolDock score of -132.006 and is comparable to active ligand having MolDock score of - 151.102. Antibacterial activity was performed by determining the zone of




ISBN: 978-81-980623-8-3

inhibition of all the synthesized compounds. The compounds were evaluated against gram positive bacteria viz, S.aureus and Gram-negative bacteria viz, Escherichia coli. Out of the six synthesized compound one compound showed excellent result against both gram positive and negative bacteria which was comparable to the standard penicillin.

**Keywords:** Benzimidazole, Antibacterial, Spectroscopic analysis, Molecular docking studies, Penicillin

**CH-495**

## DESIGN OF COLCHICINE-BASED TUBULIN INHIBITORS AS ANTICANCER AGENTS BY *IN SILICO* ANALYSIS OF COLCHICINE-BASED TUBULIN INHIBITORS: 3D-QSAR, MOLECULAR DOCKING, AND MOLECULAR DYNAMICS SIMULATIONS FOR ANTICANCER DRUG DEVELOPMENT

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This study explores colchicine analogues as potential anticancer agents by analyzing their interactions with the tubulin–colchicine complex. A robust three-dimensional quantitative structure–activity relationship (3D-QSAR) model (r2 = 0.9438, q2 = 0.8915) identified key substituent regions influencing biological activity. Among 720 evaluated colchicine derivatives, 25 compounds exhibited superior binding affinities compared to colchicine. Compounds S3, S22, and a reference (Colchicine) were selected for molecular dynamics (MD) simulations, which confirmed stable binding interactions over 100 ns. Root mean square deviation and RMSF analyses highlighted key residues contributing to ligand stability within the protein–ligand complexes. Atom based QSAR and molecular docking were used to design new chemical entities (NCEs) with drug-like properties. Absorption, distribution, metabolism, excretion, and toxicity (ADMET) screening ensured favorable pharmacokinetic and pharmacodynamic profiles, including optimal molecular weight, hydrogen bonding, and blood–brain barrier permeability. Compounds S3 and S22 demonstrated the most promising results, with strong stability, binding characteristics, and drug-likeness. This computational approach indicates colchicine derivatives as viable candidates for anticancer drug development by disrupting tubulin dynamics and inducing cell cycle arrest. The findings support the potential of these derivatives to serve as the foundation for future anticancer therapies, highlighting their stability, binding efficiency, and favorable pharmacological profiles. Colchicine derivatives show potential as anticancer drugs by disrupting tubulin dynamics.

**Keywords:** 3D-QSAR, ADMET, MD simulation, molecular docking

**CH-496**

## HYBRID PHARMACOPHORES IN MULTITARGET DRUG DESIGN: ADVANCING THERAPEUTIC STRATEGIES FOR ALZHEIMER'S

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Alzheimer's disease (AD) is a leading cause of dementia that increasingly challenges healthcare systems and society. Traditional single-target therapies have failed due to the complex and multifactorial nature of AD, which requires the simultaneous targeting of various disease mechanisms for clinical success. Since the disease involves multiple pathologies, targeting them simultaneously could provide a synergistic therapeutic effect. The identification of new targets beyond the classical hallmarks of AD provides a fertile ground for the design of new Multi-Target Drugs (MTDs), and the building on the existing compounds has the potential to yield successful disease-modifying therapies. Earlier studies had identified bioactive heterocycles, and so, the design of new thiazole-sulfonamide hybrids as potential AChE and BChE inhibitors for the discovery of lead candidates was performed. Therefore, following a multitarget approach, rivastigmine–heterocyclehybrids (indole), Tacrine-heterocycle (phenylbenzthiazole) hybrids, Sulphanilamide-heterocycle hybrids (Thiazole) and others were designed, synthesized and evaluated for their multiple biological properties and free radical scavenging activity, as potential multitarget anti-AD drugs deserving further investigation. This review discusses the evolving landscape of multi-target drugs, focusing on their potential as AD therapeutics. Analysis of past and current trials of compounds with multitarget activity underscores the capacity of MTDs to offer synergistic therapeutic effects, and the flourishing genetic understanding of AD will inform and inspire the development of MTD-based AD therapies.

**Keywords**: Alzheimer, MTDs, AChE, BChE, Synergism, Thiazole-Sulphonamide hybrid, Rivastigmine-indole hybrid, Tacrine-hybrid, phenybenzthiazole.

**CH-497**

## TARGETING TGF-B–INDUCED EMT IN TRIPLE-NEGATIVE BREAST CANCER THROUGH INTEGRATED TRANSCRIPTOMICS AND COMPUTATIONAL DRUG REPURPOSING

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The study investigates the role of Transforming Growth Factor-Beta (TGF-β) pathway in driving epithelial-mesenchymal transition (EMT) and promoting metastasis in Triple-Negative Breast Cancer. TNBC lacks oestrogen, progesterone, and HER2 receptors, making drug selection and treatment challenging and highlighting the need for novel therapeutic strategies targeting alternative pathways. To identify the molecular mechanism underlying EMT progression, publicly available bulk gene expression data from the GEO NCBI dataset were retrieved, integrated, processed, and analysed to identify the EMT gene signature. 567 TNBC and 129 Non-TNBC patient samples were used. Top genes highlight their potential as biomarkers for tumour plasticity and metastasis progression. Functional enrichment analysis revealed significant activation of TGF-β, Wnt, and other cancer-associated signalling pathways in TNBC compared to non-TNBC. Key genes, such as TGFβR1, TGFβR2, SMAD3, and CDH2, showed marked differential expression. Kaplan-Meier survival analysis in the TCGA-BRCA cohort demonstrated that high TGFBR1 expression correlated with worse overall survival (). Expression of TGFBR1 was markedly elevated in metastatic and primary tumour samples compared to normal controls, confirmed by the Kruskal-Wallis test (). For therapeutic exploration, TGF-β receptor-1 (TGF-βR-1) was selected for *in silico* drug repurposing. A library of 2,118 FDA-approved drugs was screened using dy namic simulations (Schrodinger Suite), narrowing down candidates based on affinity and protein-ligand interaction stability. MM\GBSA binding energy calculations further validated promising leads for experimental approaches. The overall integrative approach combining transcriptomics and computational drug discovery provides new insight into EMT-driven metastasis and identifies repurposable small molecule inhibitors to target TGF-β signalling.

**CH-498**

## HPLC QUANTIFICATION OF APREPITANT IN BULK AND CAPSULES

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A simple, accurate, and precise Reverse Phase High-Performance Liquid Chromatography (RP-HPLC) method has been developed and validated for the quantitative determination of Aprepitant in bulk and pharmaceutical dosage form(capsules).The chromatographic separation was carried out using a C18 column (250 mm × 4.6 mm, 5 µm) with a mobile phase consisting of Acetonitrile and Phosphate Buffer (pH 3.0 adjusted with 1% orthophosphoric acid) in the ratio of 85:15 v/v. The flow rate was maintained at 1.0 mL/min, and detection was carried out at a wavelength of 264 nm. The retention time of Aprepitant was found to be approximately 3.097 minutes. The method showed good resolution with symmetrical peaks, a tailing factor less than 2, and theoretical plates greater than 2000, indicating high efficiency of the column. Linearity was observed in the concentration range of 200-1000µg/mL, with a correlation coefficient ($r^2$) greater than 0.997, confirming the method's linearity. The Limit of Detection (LOD) and Limit of Quantification (LOQ) were found to be 39.63µg/mL and 120.09µg/mL, respectively. The accuracy of the method was confirmed by recovery studies at 80%, 100%, and 120% levels, with results ranging from 100.4%




ISBN: 978-81-980623-8-3

to 103.22%, indicating excellent recovery. The % assay of Aprepitant in tablet formulation was found to be 99-101.36% w/w, demonstrating that the method is suitable for routine analysis. The developed method was validated in accordance with ICH guidelines (Q2(R1)) and found to be specific, accurate, precise, robust, and suitable for the routine quality control of Aprepitant in both bulk and pharmaceutical dosage form(capsules).

**Keywords:** Aprepitant, RP-HPLC, ICH (Q2(R1)).

**CH-499**

## SYNTHESIS, CHARACTERIZATION AND MOLECULAR DOCKING STUDIES OF 2- [BIS (2-CHLOROETHYL) AMINO]-5-(SUBSTITUTED PHENYL -1,3,4-THIADIAZOL-2-YL)-ACETAMIDE DERIVATIVES AS A POSSIBLE ALKYLATING AGENT

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Targeted research as shifted tremendously towards synthetic area in the past few years due to the drastic Increase of life-threatening disease worldwide such as cancer. Nitrogen Mustard are widely used for the clinical treatment of cancer. DNA is a major target of the drug interaction because of the potential for affecting gene expression because there are few differences between normal DNA and Abnormal DNA, cytotoxic agent affects both type N-N [Bis -2-Chloroethyl] amine pharmacophore is believed to produce the antitumoral activity through intestine cross-linking in DNA. To synthesize the title compound various aromatic carboxylic acid was refluxed with thiosemicarbazide in presence of phosphorus to get substituted 1,3,4-thiadiazole which was condensed with chloroacetyl chloride to get chloroacetamide 5-Phenyl Substituted -1,3,4-Thiadiazole and treated with diethanolamine to get Bis-2 hydroxyethyl amino acetamide derivatives, which thionyl chloride was added to get the title compounds. Which was confirmed by spectral analysis and subjected to molecular docking studies using PyRx software against Casein Kinase-2 protein. Insilico modelling was effectively utilised & explored for drug designing to find out the binding affinity, H-bond, and residual interaction of synthesized compounds. The cytotoxicity potential of 2- [Bis(2-chloroethyl) amino]-5-(Chloro Phenyl-1,3,4-Thiadiazol-2yl)-acetamide evaluated on JeKo-1 cell line by adding MTT reagent at 37°C and incubated for 2hrs. the percentage growth inhibition was calculated &IC50 Value was generated from the dose response curve.

**Keywords:** Synthesis of thiadiazole derivative, *In silico* docking study, *In-vitro* cytotoxicity study.

**CH-500**

## INNOVATIVE DRUG REPURPOSING STRATEGIES FOR MULTIPLE SCLEROSIS THERAPY

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Multiple sclerosis, or MS, is a chronic autoimmune-inflammatory disease of the central nervous system that affects approximately 2.9 million people worldwide. Successful management of MS requires comprehensive therapeutic intervention that is appropriately tailored. Selecting appropriate treatments for MS remains problematic because of the large clinical and subclinical variation in disease course among patients. Over the past few years, drug repurposing, the use of established medications for new therapeutic applications has been increasingly recognized as a precious strategy in MS research. It provides a faster and less costly alternative compared with classic drug development. Numerous medications that were created for other ailments but have specific immunomodulatory, anti-inflammatory, or neuroprotective properties are being actively studied for their potential to treat multiple sclerosis. Agents such as S1P receptor modulators, kinase inhibitors, and metabolic regulators have exhibited promise in increasing neuroprotection, controlling immune activation, and enhancing remyelination both at the laboratory level and in clinical trial settings. In parallel, drug discovery and personalized medicine in MS have been further transformed by artificial intelligence. Advanced machine learning and deep learning systems interpret large-scale biological data sets, forecast drug-target relationships, and accelerate strategies for repurposing drugs. AI-driven approaches further allow uncovering novel therapeutic targets through integration of multi-omics information with neuroimaging and more accurate patient stratification toward personalized treatments. This review underlines advances in drug repurposing and emphasizes the significant role of AI in accelerating drug development toward better treatments for MS.

**Keywords:** Multiple sclerosis, Drug repurposing, AI-driven approaches, personalized treatments

**CH-501**

## SMART FLOOR-CLEANING COMPOSITION WITH VISUAL CLEANLINESS INDICATOR

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The invention discloses a cleaning composition and method that provide a visible, real-time indication of floor cleanliness via a triggered color change, enabling users to confirm effective soil removal and endpoint sanitation without auxiliary devices. The formulation integrates surfactant systems with pH-responsive or redox-responsive dyes, optionally immobilized on or microencapsulated with carriers, to transition between distinct colors as the surface condition shifts from soiled to clean and near-neutral, or as active antimicrobial strength decays or reaches target efficacy. The indicator phase may employ sulfonephthalein, phthalein, azo, or anthocyanin dyes tuned to change within predefined pH windows correlated to cleaning endpoints, or redox-coupled systems that respond to oxygenation or residue depletion, ensuring clear visual contrast under typical floor-care conditions. The composition can be delivered as a concentrate, ready-to-use liquid, foam, or wipe, and is compatible with common substrates including tile, stone, vinyl, and sealed wood. In some embodiments, the dye is bound to a solid or polymeric substrate to stabilize response, avoid staining, and provide at-a-glance verification of in-use concentration and antimicrobial activity thresholds. This approach reduces chemical overuse, minimizes rework, and standardizes cleaning quality across domestic, institutional, and industrial settings by coupling chemical functionality with robust visual feedback. Environmentally preferable embodiments incorporate biodegradable surfactants and low-toxicity indicators, maintaining optical clarity and stability over typical storage intervals while delivering a reliable, reversible or irreversible color signal matched to the desired cleaning performance criteria.

**CH-502**

## DESIGN, SYNTHESIS AND PHARMACOLOGICAL EVALUATION OF ISOXAZOLE CONTAINING 1,2,4-TRIAZINE AND ITS DERIVATIVES

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This research centers on the design, synthesis, and pharmacological assessment of derivatives of 1,2,4-triazine that contain isoxazole. The field of pharmaceutical chemistry combines essential concepts from medicinal chemistry, chemical synthesis, and computational drug design to create biologically active compounds with enhanced therapeutic capabilities. As a significant category of six-membered heterocyclic compounds with three nitrogen atoms, 1,2,4-triazines showcase a variety of biological activities, such as anticancer, antioxidant, and anti-inflammatory effects. Their capacity to modulate kinases, inhibit lipid and protein kinases, and interact with critical molecular targets underscores their importance in the development of anticancer drugs. In this investigation, a collection of N-[5-(substituted phenyl)-1,2-oxazole-3-yl]-5,6-diphenyl-1,2,4-triazine-3-amine derivatives were devised using computational methods and assessed through SwissADME and molecular docking analyses. In-silico findings revealed that all designed compounds were adhered to Lipinski's rule of five, while docking studies against anticancer and antioxidant targets indicated strong binding affinities, particularly for proteins 8HUO and 3HBS. The synthesized derivatives underwent further characterization through physicochemical and spectroscopic techniques. Their antioxidant effectiveness was evaluated using nitric oxide scavenging and DPPH assays, where all derivatives demonstrated considerable free-radical scavenging capabilities compared to ascorbic acid. The anticancer




ISBN: 978-81-980623-8-3

potential of selected compounds (N-[5-(4-Methoxylphenyl)-1,2-oxazole-3-yl]-5,6-diphenyl-1,2,4-triazine-3-amine and 2-{3-[(5,6-Diphenyl-1,2,4-triazin-3-yl)amino]-1,2-oxazole-5-yl}phenol) was investigated against the MDA-MB-231 breast cancer cell line using the MTT assay, indicating significant cytotoxic effects. In summary, the results validate that the synthetic approach taken is effective for developing isoxazole-linked 1,2,4-triazine derivatives with encouraging anticancer and antioxidant properties, emphasizing their potential as lead candidates for future drug development.

**Keywords:** Isoxazole derivatives, 1,2,4-Triazine, Heterocyclic compounds, Molecular docking, SwissADME, Anticancer activity.

**CH-503**

## *IN SILICO* DOCKING OF LECITHIN FOR ANTI-ALZHEIMER'S ACTIVITY

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Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by memory loss, cognitive decline, and neuronal degeneration, primarily associated with the aggregation of β-amyloid (Aβ) peptides and hyperphosphorylation of tau proteins. The search for safe and effective therapeutics has led to increasing interest in natural compounds with neuroprotective potential. Lecithin, a phospholipid-rich compound found in soybeans and eggs, is known for its role in enhancing cholinergic transmission and improving cognitive function.In the present study, in silico molecular docking techniques will be employed to evaluate the interaction of lecithin with key Alzheimer's disease targets, including acetylcholinesterase (AChE), butyrylcholinesterase (BChE), β-secretase (BACE1), and amyloid beta (Aβ) peptide. The docking studies were performed using AutoDock Vina and visualized using Discovery Studio to predict binding affinities and interaction patterns. Lecithin demonstrated significant binding affinity toward AChE and BACE1, suggesting its potential to inhibit cholinesterase activity and amyloid plaque formation. Hydrogen bonding and hydrophobic interactions were found to stabilize the lecithin–enzyme complexes, indicating possible neuroprotective effects.The computational findings suggest that lecithin could serve as a promising lead compound for the development of novel therapeutics against Alzheimer's disease. Further *in vitro* and *in vivo* studies are warranted to validate its efficacy and safety profiles.

**Keywords:** Lecithin, Alzheimer's disease, *in silico* docking, acetylcholinesterase, BACE1, neuroprotection.

**CH-504**

## A NOVEL LEAN SIX SIGMA APPROACH AND SUSTAINABLE HPLC METHOD FOR SIMULTANEOUS ESTIMATION OF SELECTED ANALGESIC COMBINATION DRUGS IN PHARMACEUTICAL FORMULATIONS

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In the present study, Lean Six Sigma (LSS) principles and Green Analytical Chemistry (GAC) metrics were used to develop and validate a statistically optimized and environmentally sustainable Reverse Phase High-Performance Liquid Chromatography (RP-HPLC) method for the simultaneous determination of paracetamol, caffeine, diphenhydramine hydrochloride, and phenylephrine hydrochloride in pharmaceutical formulations. The Box–Behnken Design (BBD) of the Response Surface Methodology (RSM) framework optimized wavelength, flow rate, and column temperature. An eco-friendly mobile phase of ethanol and 0.1% formic acid (50:50, v/v) replaced harmful solvents. The approach was tested for validation parameters as per ICH Q2(R1). MoGAPI, CaFRI, RAPI, RGB Fast, CACI, and Spider Chart Analysis assessed technique sustainability and greenness. Method performance was statistically assessed using Six Sigma process capacity indicators (Cpk). Optimal separation occurs at 1.5 mL/min flow rate, 41.9 °C column temperature, 218 nm detection wavelength, with a composite desirability of 0.874. The method revealed high linearity (2-150 µg/ mL, $r^2 > 0.999$), accuracy (%RSD < 2%), and recovery (98-101%). Compared to established methodologies, the greenness evaluation showed enhanced eco-efficiency (MoGAPI = 91, CaFRI = 89), reducing solvent usage, waste, and carbon footprint. Six Sigma analysis showed good process capacity and method robustness for all analytes with Cpk > 1.33. Lean Six Sigma and Green Analytical Chemistry were used to create a proven, cost-effective, and environmentally friendly RP-HPLC method for regular pharmaceutical quality monitoring. Through sustainability, quality, and analytical performance in a forward-thinking paradigm, the plan sets a standard for future chromatographic technique development.

**Keywords:** Lean Six Sigma, Green Analytical Chemistry, Box–Behnken Design, Sustainable HPLC, Process Capability, Eco-Efficiency

**CH-505**

## INTEGRATION OF ANALYTICAL GREENNESS AND AQBD FOR DEVELOPING AN ECO-COMPATIBLE RP-HPLC METHOD FOR EMTRICITABINE, TENOFOVIR AND EFAVIRENZ

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Emtricitabine, Tenofovir, and Efavirenz are widely used together in fixed-dose antiretroviral therapy. Because Efavirenz has a narrow therapeutic window, accurate quantification of all three drugs is essential to maintain patient safety, therapeutic efficacy, and consistent product performance. To date, no reported analytical method has integrated the principles of Green Analytical Chemistry or employed an Analytical Quality by Design (AQbD) strategy for this particular combination. In this study, we developed and validated a novel, environmentally conscious RP-HPLC method capable of simultaneously estimating all three drugs. Chromatographic separation was achieved on a Cosmosil C18 column (250 mm × 4.6 mm, 5 µm) using water and methanol as the mobile phase components. Methanol was ultimately selected for its superior performance, and to enhance the sustainability of the method, complete solvent recovery and recycling were implemented to minimise ecological burden. The method was validated in accordance with ICH guidelines and demonstrated excellent linearity, with correlation coefficients of Emtricitabine 0.9995, Tenofovir 0.9998, and Efavirenz 0.9992. The greenness of the method was further evaluated using NEMI, GAPI, and the AGREE metric, all of which confirmed its environmentally friendly attributes. This investigation is distinguished by its successful integration of sustainability considerations with the systematic, risk-based approach of AQbD. To the best of our knowledge, this is the first analytical method for this antiretroviral combination that incorporates both frameworks. The proposed method has strong potential for routine quality control and regulatory use, offering reliable quantification while aligning with global environmental sustainability initiatives.

**Keywords:** Emtricitabine, Tenofovir, and Efavirenz, AQbD and Green analytical chemistry

**CH-506**

## MOLECULAR DOCKING AND TOXICITY ASSESSMENT OF COUMARIN DERIVATIVES AS POTENTIAL EBOLA VIRUS INHIBITORS

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Ebola virus remains a critical global health challenge due to its high fatality rate and limited treatment options. Coumarin derivatives are known to exhibit diverse biological activities including antiviral potential, making them attractive scaffolds for drug discovery. Computational approaches provide rapid and cost-effective tools for exploring new antiviral candidates. In this study, molecular docking was employed to assess the interaction of coumarin derivatives with a key ebola viral protein. This study aims to evaluate a series of ten coumarin derivatives for their inhibitory activity against the Ebola virus protein (PDB ID: 6YU8) using molecular docking and computational toxicity profiling. The goal was to identify the most potent and safe derivative suitable for further drug development. Molecular docking studies were carried out using PyRx software to predict binding affinities of coumarin derivatives with the Ebola viral target (6YU8). Toxicity parameters, including organ-specific and carcinogenic risks, were evaluated using ProTox-3.0, while




ISBN: 978-81-980623-8-3

Swiss ADME was used to assess pharmacokinetic features such as Lipinski's rule of five, blood-brain barrier permeability by boiled egg model and Synthetic accessibility scores (1-10 scale) were analyzed to estimate the ease of chemical synthesis. All coumarin derivatives displayed notable binding affinities ranging from –6.0 to –8.4 kcal/mol, with the highest docking score of –8.4 indicating strong interaction with the Ebola target protein. The toxicity class ranged from 4–5, showing low toxicity for most compounds. However, compound 8 exhibited moderate organ specific toxicities. All derivatives satisfied Lipinski's rule of five and were predicted to cross the blood-brain barrier, supporting favorable drug-likeness.Synthetic accessibilty scores between 2 and 4 confirmed that all derivatives are easily synthesizable using standard laboratory methods. The results indicate that coumarin derivatives possess promising antiviral potential against the Ebola virus, with generally acceptable safety and pharmacokinetic properties. The lead compound (–8.4 kcal/mol) is a strong candidate for further biological evaluation, whereas compound 8 requires optimization to reduce toxicity risks.

**Keywords:** Ebola virus, Molecular docking, ProTox-3.0, SwissADME, Lipinski's rule, Blood-brain barrier, Toxicity prediction, Computational drug design

**CH-507**

## DESIGN AND DEVELOPMENT OF 4,5-DISUBSITUTED PYRIMIDINE DERIVATIVES AS EGFR INHIBITORS TARGETING NON-SMALL CELL LUNG CANCER (NSCLC)

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Non-small cell lung cancer (NSCLC) driven by mutations in the epidermal growth factor receptor (EGFR) remains a major therapeutic challenge, particularly due to the emergence of drug resistance. In this study, a new series of 2,4-disubstituted pyrimidine derivatives (Ri–Rxii) was designed, synthesized, and evaluated as potential EGFR inhibitors. Among these, compound Riv demonstrated the most potent antiproliferative activity against both wild-type and mutant EGFR-driven NSCLC cell lines, including EGFRL858R/T790M and the drug-resistant EGFRL858R/T790M/C797S variants, exhibiting low IC50 values and minimal cytotoxicity toward normal cells. Mechanistic studies revealed that Riv induced cell cycle arrest at the S and G2/M phases and promoted apoptosis in a dose-dependent manner. Western blot analysis confirmed significant suppression of the EGFR/Akt signaling pathway, with Riv markedly reducing the phosphorylation levels of EGFR and Akt. In addition, Riv exhibited strong antioxidant activity, surpassing ascorbic acid in both DPPH and ABTS assays, thereby indicating its potential to mitigate oxidative stress. Molecular docking and molecular dynamics simulations revealed stable binding interactions with key active-site residues of EGFR, while DFT analysis indicated favorable electronic properties supporting its reactivity profile. Furthermore, in-silico ADMET predictions suggested good pharmacokinetic behavior and low toxicity risk. Collectively, these findings identify Riv as a promising, safe, and effective EGFR inhibitor capable of overcoming drug resistance in the treatment of NSCLC.

**Keywords**: Lung cancer, EGFR, pyrimidine, docking, ADMET


ISBN: 978-81-980623-8-3

**PC-01**

## DEVELOPMENT OF A CONTROLLED-RELEASE NANOGEL PLATFORM FOR INTRA-ARTICULAR CORTICOSTEROID DELIVERY IN RHEUMATOID ARTHRITIS

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Rheumatoid arthritis (RA) is a debilitating autoimmune disorder that causes chronic inflammation of the synovial tissues and subsequent deterioration of the joints. Corticosteroids are effective at dampening inflammation; however, administration via systemic routes leads to concerns about rapid systemic clearance, dose-frequent delivery, and potential adverse effects. To minimize these potential problems, we undertook to prepare a sustained intra-articular delivery system by encapsulating corticosteroids in lipid-based nanoparticles made by emulsification–solvent evaporation. Our final optimized formulation produced nanoparticles that were 110–210 nm in size, had a high drug-loading content, and sustained the controlled release of the corticosteroid for up to 12 hours. Although we reported our initial formulation period of sustained drug availability for only 12 hours, we incorporated these nanoparticles into an in-situ gelling matrix with sustained drug delivery for up to 7 days. The final formulation is favorable in a range of physiochemical parameters: pH, viscosity, texture, gelling ability, and spreadability. In summary, the nanogel system is suitable to deliver a corticosteroid for a targeted and long-acting purpose in the case of RA. Further, the potential to reduce systemic exposure should improve therapeutic outcomes.

**Keywords:** Rheumatoid arthritis, Corticosteroids, Lipid nanoparticles, In situ gel, Sustained drug delivery.

**PC-02**

## PREPARATION AND EVALUATION OF HERBAL METALLIC NANOCOMPOSITES USING GREEN SYNTHESIS FOR THERAPEUTICS APPLICATIONS

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This study reports the green synthesis of magnesium oxide (MgO) and titanium dioxide ($TiO_2$) nanoparticles using Syzygium aromaticum (clove) extract as a natural reducing and stabilizing agent. The phytochemical constituents of clove, including flavonoids, alkaloids, tannins, saponins, and phenolics, facilitated nanoparticle formation under mild conditions. Successful synthesis was confirmed by UV-Visible spectroscopy, which exhibited a characteristic absorption band at 281.2 nm, and FTIR analysis, which identified functional groups such as O-H, C=O, and metal-oxygen bonds. Particle size analysis revealed an average size of 202 nm, while zeta potential values confirmed good stability. X-ray diffraction (XRD) displayed sharp peaks within the 20°-40° range, confirming crystallinity and phase purity. Scanning electron microscopy showed predominantly spherical to irregular porous structures, indicating high surface area favorable for biomedical applications. Incorporation of 1-2.5% Clove-MgO nanoparticles into glass ionomer cement (GIC) significantly enhanced compressive strength and surface hardness. The nanoparticles demonstrated high entrapment efficiency (92.58%) and drug content (84.65%). This study demonstrate that green-synthesized MgO nanoparticles are biocompatible, sustainable, and effective reinforcements for dental restorative materials. Their ability to improve mechanical performance enhances their potential in minimizing secondary caries and improving long-term clinical outcomes in restorative dentistry.

**Keywords:** Magnesium oxide NPs, Titanium dioxide Nps, Biocompatible, Entrapment efficiency.

**PC-03**

## IMPROVING ORAL BIOAVAILABILITY OF LULICONAZOLE WITH SOLID SELF-EMULSIFYING DRUG DELIVERY SYSTEM (S-SEDDS) USING HOT MELT EXTRUSION (HME) TECHNOLOGY

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The treatment of systemic fungal infection is one of the challenges in the public health domain. Recently published reviews and clinical reports have addressed the issue of fungi becoming resistant to the commonly used antifungal drugs. However, these documents have reported a better activity of Luliconazole against resistant strains. Based on this evidence, the current research work was conducted to formulate, optimize and evaluate Solid Self-Emulsifying Drug Delivery Systems (SEDDS) of Luliconazole. Liquid SEDDS are known for enhancing the solubility of BCS class II drugs like Luliconazole. Quality by Design (QbD) approach was used to optimize these liquid SEDDS by applying KCV design in Design Expert software. To enhance stability of these liquid formulations, they were solidified using Hot Melt Extrusion technology. This research work was focused on the comparative study of in vitro and in vivo activities of Solid SEDDS versus Liquid SEDDS. In vitro antifungal study showed higher zones of inhibition for Solid SEDDS compared to the Liquid SEDDS. In vivo pharmacokinetic and pharmacodynamic evaluation of Solid SEDDS demonstrated improvement in oral bioavailability and enhanced antifungal activity against Candida albicans respectively.

**Keywords:** Solid SEDDS, Liquid SEDDS, Hot Melt Extrusion, Luliconazole.

**PC-04**

## IN-SILICO AND IN-VITRO ANALYSIS OF NOVEL SILYMARIN METAL COMPLEXES AS A POTENTIAL CANDIDATE FOR THE TREATMENT AGAINST MYCOBACTERIUM TUBERCULOSIS AS ANTI-TUBERCULAR AGENTS

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The clinical use of metal complexes is well-established and have significant potential for developing novel Metallo pharmaceutical agents. The present study aimed to investigate silymarin-based metal complexes as potential inhibitors of Enoyl acyl carrier protein reductase (ENR), a validated drug target in Mycobacterium tuberculosis (H37Rv). Molecular docking revealed that the silymarin complexes with metals $Cu^{2+}$, $Co^{2+}$, $Zn^{2+}$, $Ca^{2+}$ and $Hg^{2+}$ exhibited good binding score to ENR which are then synthesized and characterization was done by FT-IR, NMR, Mass, and powder XRD which confirmed coordination through the carbonyl group (C-22) and hydroxyl group (C-15). In-vitro anti-tuberculosis activity was assessed using the Microplate Alamar Blue Assay (MABA) and the results indicates that copper (MIC = 12.5 µg/ml) and zinc (MIC = 12.5 µg/ml) complexes demonstrated notable inhibitory activity against M. tuberculosis. Using GROMACS, molecular dynamic simulation was run and the results indicate that the complex with copper, the protein RMSD stabilized between 1.5–2.0 Å and the ligand RMSD gradually increased to ~2.4–2.7 Å with protein RMSF values remained low (<1.0 Å) in structured regions but showed higher fluctuations (~2.5–3.6 Å) in flexible loops and termini and with zinc, the protein reached equilibrium early, with RMSD values stabilizing between 1.5–1.8 Å and the ligand RMSD ranging from 1.0 Å to 6.0 Å with protein RMSF remained below 1.0 Å in stable regions but showed peaks (~2.6 Å) at flexible loops and termini. In-silico toxicity study was performed using Protox 3.0 web server and the result show minimum toxicity for all the metal complexes. In conclusion, silymarin–metal complexes represent promising candidates for the development of novel anti-tubercular agents. The integration of In-silico and In-vitro approaches highlights their potential for further preclinical evaluation.

**Keywords:** Silymarin, Metal complexes, Mycobacterium tuberculosis, Enoyl ACP reductase, Molecular docking, Anti-tubercular agents.

**PC-05**


ISBN: 978-81-980623-8-3

**DESIGN, DEVELOPMENT, AND EVALUATION OF 5-FLUOROURACIL MATRIX TABLETS USING NATURAL POLYMERS AS A SUSTAINED RELEASE DRUG DELIVERY SYSTEM**

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This Current research focuses on designing and evaluating sustained release matrix tablets of 5-Fluorouracil (5-FU) utilizing natural polymers, specifically Fenugreek gum and Tamarind gum. Matrix tablets were developed using these gums singly and in combination, with in-vitro dissolution studies performed in simulated gastric fluid and phosphate buffer. Polymer blends provided improved control of drug release, reaching up to 94% over 10 hours, attributable to potential in-situ interpolymeric interactions. Physicochemical and stability assessments confirmed excellent formulation reliability, while FTIR and XRD analyses demonstrated absence of significant drug–polymer interactions and retention of 5-FU crystallinity. The results highlight natural gums as promising excipients for sustained release oral delivery of 5-FU, potentially enhancing cancer therapy and patient compliance.

**Keywords:** 5-Fluorouracil, sustained release, Fenugreek gum, Tamarind gum, natural polymers, matrix tablets, cancer therapy

**PC-06**

**FORMULATION AND EVALUATION OF VORICONAZOLE NANOSUSPENSION FOR EFFECTIVE TREATMENT OF FUNGAL KERATITIS**

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Fungal keratitis, also known as keratomycosis, is an infection that affects the cornea, primarily targeting the corneal epithelium and stroma, and in severe cases leading to vision loss. Voriconazole, a modern triazole antifungal drug with a broad spectrum of activity, faces challenges such as poor water solubility and limited eye absorption when delivered through conventional formulations. To overcome these barriers, voriconazole nanosuspensions were developed using Eudragit RL 100 as a polymer carrier and Tween 80 as a stabilizer by solvent-injection technique. These nanosuspensions were thoroughly characterized for particle size, zeta potential, pH, drug excipients compatibility studies, HET-CAM Irritation and drug release behavior. The result shows that formulations had Particle size ranged from 155 to 285 nm with a positive surface charge (16.7 ± 0.2 mV), promoting strong corneal adhesion. The formulations exhibited suitable ocular pH (5.8–6.7) and viscosity (9.13 ± 1.2 cP), supporting prolonged retention on the eye surface. In vitro drug release studies showed sustained and controlled release from VCZ-NS3 (75.89% at 8 hours) compared to rapid release from traditional suspension (97.39% at 6 hours), implicating the polymer coating in modulation of drug release. Release kinetics followed the Higuchi model with a non-Fickian anomalous transport (n=0.685–0.776), indicating coupled erosion-diffusion mechanisms. These findings suggest that VCZ-NS enhances voriconazole penetration, improves bioavailability, and prolongs therapeutic action, representing a promising approach for effective fungal keratitis treatment.

**Keywords:** Voriconazole, Nanosuspension, Fungal Keratitis, Corneal Penetration, Drug Bioavailability, Controlled Release.

**PC-07**

**DEVELOPMENT OF LYOPHILISED FORMULATION OF TIGECYCLINE FOR ENHANCEMENT OF STABILITY**

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Drug Tigecycline in liquid Injection was found to be unstable. Therefore, it was planned to develop the lyophilized formulation for better stability and also to be line with RLD. The lyophilized cycle was optimized with direct four step freezing at -30°C and changing vacuum with post heat up to 40°C. From the compatibility studies results obtained, it was concluded that Drug Tigecycline for Injection 50mg was compatible with o 5mL clear glass USP Type I vial. o Bromobutyl rubber closure. o Nitrogen sparging Drug Tigecycline for Injection 50mg/vial Single Use Vials should be kept in carton to protect from light. The developed formulation was able to withstand three freeze thaw cycles without getting affected product quality. The formulation was stable for 3 Months when subjected to accelerated stability studies. In conclusion a stable formulation for drug Tigecycline was developed which was comparable to Reference Listed Drug Product (RLD), or Innovator. Tigecycline, a glycylcycline, acts by inhibiting protein synthesis at the level of the bacterial ribosome by blocking the binding of amino-acyl tRNA to the A site of the ribosome. Tigecycline has in vivo and in vitro antibacterial activity against a broad spectrum of pathogens. Tigecycline is active against bacterial strains that carry classical tetracycline resistant genes encoding either ribosomal protection or a tetracycline efflux pump.

**Keywords:** LYOPHILISED, TIGECYCLINE, RLD, Enhancement of Stability, compatibility

**PC-08**

**DESIGN, DEVELOPMENT AND EVALUATION OF ANTI DIABETIC EMPAGLIFLOZIN DRUG LOADED NOVEL SNEDDS FORMULATION USING CENTRAL COMPOSITE DESIGN**

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Empagliflozin is a model of drug belonging to BCS class-III, which has poor solubility in aqueous media. This work mainly focused on improving permeability of empagliflozin by developing them on LBDDS & SNEDDS. The solubility studies of various excipients like groundnut oil, coconut oil, sesame oil, Tween 80,60, Span 80 as Surfactant, PEG 4000,6000,8000 as co-surfactant were performed by U.V visible spectroscopy analysis. Groundnut oil: tween 80: peg 4000 were selected as snedds ingredients. Pseudo ternary plot diagrams were performed to optimize the effective combination of oil, surfactant, co-surfactant by preparing blank SNEDDS. From the pseudo ternary phase diagram, the best combinations that were in the nanoscale were selected for DOE. Using design expert software for design of experiments –central composite design (CCD) is used to optimize the effective combination of oil and Smix to formulate SNEDDS. From 15 runs and response (% Entrapment efficiency, % Transmission, Drug loading) performed with CCD. According to DOE, the runs were found to have highest drug content and good % Entrapment efficiency, % Transmission was selected for further optimization. (F1,F5,F10) Using the optimized self-emulsifying mixture, drug loaded liquid SNEDDS were evaluated in terms on phase separation, thermodynamic stability, drug release studies, etc. were characterized. In vitro drug release studies showed more than 95 % drug release in 30 minutes for all formulations. Droplet size analyzer, Poly dispersibility index, Zeta potential, SEM analysis was formed to (F10) formulation. Ex-vivo studies were conducted to detect the permeability through Non –everted gut sac method on goat kidney. L-SNEDDS exhibited good anti –diabetic activity. Empagliflozin L-SNEDDS is a promising approach to enhance drug permeability and improve patient compliance.

**Keywords:** SNEDDS, nanoscale, Empagliflozin, self-emulsifying time and anti – diabetic activity

**PC-09**

**FORMULATION AND CHARACTERIZATION OF MFX-GOLD NANOPARTICLES LOADED IN-SITU GEL FOR THE TREATMENT OF BACTERIAL KERATITIS**

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Background and Aims: The aim of the present investigation is to prepare and evaluate Mfx-GNPs loaded in-situ gel-for ophthalmic drug delivery system for the management of bacterial keratitis. Materials and Method: The study is proposed to evaluate the anti-bacterial and anti-biofilm efficacies of Mfx-GNPs loaded in-situ gel. This article describes a systematic approach for the design, optimization, and characterization of Mfx-GNPs loaded in-situ gel. Optimization was performed using a 32 response surface approach, the effect of Concentration of Gellan gum (X1), Concentration of Chitosan (X2) and Concentration of Carbopol 940p (X3) content was optimized as independent variables, Viscosity at non physiological condition (Y1) and Viscosity at physiological condition (Y2)




ISBN: 978-81-980623-8-3

served as variables. The optimized formulation is characterized by EE, particle size, Fourier transform infrared spectroscopy (FTIR), Xray diffraction (XRD), differential scanning calorimetry (DSC), scanning electron microscopy (SEM), in vitro drug release study, antibacterial efficacy and antibiofilm activity. Results: The percentage of EE is 89%, the size is 56.25 nm, and the in vitro drug release is 92%. Mfx-GNPs loaded in-situ gel are fully prepared and can effectively release drugs in a sustained mode. Conclusion: The developed Mfx-GNPs loaded in-situ gel demonstrated sustained drug release, strong antibacterial and antibiofilm activity, and optimal physicochemical characteristics. This optimized formulation holds promising potential for effective ophthalmic delivery in treating resistant bacterial keratitis.

**Keywords:** Gold Nanoparticles (GNPs), Moxifloxacin (Mfx), Anti-biofilm, In-Situ Gel.

**PC-10**

**BIOACTIVE DUAL-DRUG HYDROGEL: NITROFURAZONE AND ALOIN SYNERGY FOR ACCELERATED BURN WOUND HEALING**

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Burn injuries are among the most challenging clinical problems, generally leads to infection if not treated properly, delayed healing, and compromised patient recovery. To address these multifaceted issues, we developed a smart dual-drug hydrogel that integrates Nitrofurazone, a potent antimicrobial agent, and Aloin, a phytoconstituent well known for its regenerative and anti-inflammatory properties. The hydrogel was formulated using a PVA–Chitosan semi-interpenetrating polymer network (IPN) which was selected for its biocompatibility, mechanical strength, and moisture-retention capacity. Optimization of the formulation ensured sustained drug release, ideal rheological properties, and structural integrity. Physicochemical characterization confirmed optimal thickness, folding endurance, swelling index, and smooth surface morphology (SEM). In vitro studies showed sustained dual-drug release and remarkable antibacterial activity against Staphylococcus aureus and Escherichia coli. In vivo experiments in a rat burn model revealed significantly faster wound closure, reduced infection, and enhanced tissue regeneration compared to conventional treatment. This innovative hydrogel dressing combines antimicrobial defence with skin-healing potential, offering a next-generation solution for burn care. Its synergistic design not only accelerates healing but also improves patient outcomes by reducing complications and recovery time.

**Keywords:** Burn wound therapy, Dual-drug hydrogel, Nitrofurazone, Aloin, PVA–Chitosan, Accelerated healing.

**PC-11**

**MICROPLASTIC POLLUTION: A GROWING GLOBAL ENVIRONMENTAL AND PUBLIC HEALTH CHALLENGE**

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Microplastic pollution impacts terrestrial, marine, and atmospheric systems and is becoming a major global environmental and public health concern. These particles, which come from primary and secondary sources, are common and could endanger ecological stability and human health. The sources, distribution, environmental destiny, and regulatory issues related to microplastics are examined in this paper. In order to comprehend exposure pathways and long-term effects, it highlights the necessity of multidisciplinary research, integrated waste management techniques, and public education. Effective policies that reduce plastic usage, improve recycling systems, and lessen environmental pollution must be implemented through coordination at the local, national, and international levels. Protecting ecosystems and guaranteeing a better future for people depend on addressing this unseen threat.

**Keywords:** Microplastics, global pollution, ecosystem impact, waste management, environmental policy, public health.

**PC-12**

**FORMULATION OF NAIL POLISH AND IN-VITRO ANTI-FUNGAL ACTIVITY BY USING CLITORIA TERNATEA**

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The current study looks at creating a herbal nail polish that uses anthocyanin extracts from Clitoria ternatea (butterfly pea) flowers. It also evaluates its antifungal activity in the lab. Nail polish is a common cosmetic product, but it can also serve as a possible treatment when combined with natural ingredients. Clitoria ternatea has a long history in Ayurvedic medicine for its various health benefits, mainly due to its flavonoid and anthocyanin content. These compounds have strong antioxidant, antimicrobial, and antifungal properties. In this research, we extracted anthocyanins from dried Clitoria ternatea petals using ethanol and Soxhlet extraction. We then performed a phytochemical screening, which confirmed the presence of alkaloids, flavonoids, tannins, saponins, phenols, and terpenoids. We mixed the extract into a nail polish base made of methyl cellulose, castor oil, silica, and stabilizers to ensure it remained stable, uniform, and visually appealing. We tested the finished nail polish for texture, adhesion, drying time, and stability. It showed no phase separation and kept its color. We assessed the antifungal activity of the anthocyanin extract using Candida glabrata cultures on potato dextrose agar plates with the well diffusion method. The results showed significant zones of inhibition at higher concentrations, confirming the antifungal potential of the formulation. This study shows that Clitoria ternatea anthocyanin extract can be effectively used in cosmetic products, providing both beauty and antifungal benefits. Further research on long-term stability and clinical effectiveness could help develop it into a practical commercial antifungal cosmetic product.

**Keywords:** Clitoris Ternatea, Anti fungal, Nail Polish, Herbal, Anthocyanins.

**PC-13**

**FABRICATION AND CHARACTERIZATION OF MICROSPHERES OF AN ANTIDIABETIC DRUG THROUGH STATISTICAL OPTIMIZATION FOR ENHANCED BIOAVAILABILITY USING MULTIVARIATE POLYMERS: A COMPARATIVE ANALYSIS**

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Bioavailability enhancement of Metformin hydrochloride (MFH) was performed through development of a Controlled Drug Delivery System (CDDS) by microspheres fabrication and characterization through implementing Box Behnken design (BBD) as the statistical tool. The multivariate polymeric inculcation comprised of natural, semi-synthetic and synthetic polymers for comparative analysis. Incorporation of natural and semi-synthetic polymers for MFH loaded microspheres were fabricated by ion- gelation technique, emulsion-solvent evaporation technique was used for natural and synthetic polymers and modified solvent evaporation method was employed for combination of semi-synthetic and synthetic polymers. Prepared microspheres were characterized for particle size, entrapment efficiency of drug and in-vitro study. Fourier transform infrared spectroscopy (FTIR), x-ray diffraction (XRD) detection, HPLC and H1 Nuclear magnetic resonance (NMR) quantification for optimized formulation. It was observed that application of response surface method software for BBD yielded most stable and spherical microspheres with mean particle size 268 µm and entrapment efficiency of drug 88.46% for the optimized formulation F6. We can conclude that coupling of MFH with semi-synthetic and synthetic polymers yielded most stable, cost-effective microspheres with enhanced bioavailability and controlled release effect. Thus, it can be concluded that the present developed polymeric combination resulted in improved bioavailability of MFH with controlled release effect and better therapeutic utilization of drug.

**Keywords:** Box-Behnken Design, Metformin hydrochloride, Microspheres, Nuclear magnetic resonance.

**PC-14**

**SURFACE-FUNCTIONALIZED COPPER NANOPARTICLES WITH CURCUMIN AND FERULIC/GALLIC ACID FOR FERROPTOSIS-INDUCED**




ISBN: 978-81-980623-8-3

**THERAPY IN CERVICAL CANCER: A DEEP-LEARNING GUIDED PHARMACEUTICAL APPROACH**

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Cervical cancer is a major health concern for women worldwide. Copper nanoparticles (CuNPs) exhibit cytotoxic and ROS-mediated anticancer effects. Natural compounds like curcumin, ferulic acid, and gallic acid have antioxidant, anti-inflammatory, and anticancer properties but limited bioavailability. Combining these compounds with CuNPs enhances stability, cellular uptake, and synergistic anticancer activity, offering a promising approach for cervical cancer therapy. Aim & Objectives: To synthesize and characterize CuNPs stabilized with curcumin and ferulic/gallic acid. To evaluate their cytotoxic and apoptotic effects on cervical cancer cells.To study the role of oxidative stress and ROS in anticancer activity.To compare the synergistic efficacy of the combined system with individual agents. Methodology:Synthesis & Characterization: Prepare copper nanoparticles using curcumin and ferulic/gallic acid as reducing/stabilizing agents.Characterize by UV–Vis, DLS, TEM, FTIR, and XRD for size, stability, and binding. Cell Culture: Use cervical cancer cell lines (HeLa/SiHa) and normal cells as control. In-vitro Evaluation: Assess cytotoxicity (MTT/Resazurin assay) and calculate $IC_{50}$.Study ROS generation, apoptosis (Annexin V/PI), and cell cycle arrest.Check expression of apoptotic markers (Bax, Bcl-2, Caspase-3). Data Analysis: Compare activity of CuNPs, curcumin, ferulic/gallic acid, and their combinations.Use statistical analysis (ANOVA, $p<0.05$). Results & Conclusion: CuNPs with curcumin and ferulic/gallic acid were stable and nanosized.Showed higher cytotoxicity, ROS generation, and apoptosis in cervical cancer cells than individual agents. The combination of CuNPs with curcumin and ferulic/gallic acid enhances anticancer activity through oxidative stress and apoptosis, making it a promising approach for cervical cancer therapy.

**Keywords:** Copper nanoparticles, Curcumin, Ferulic/Gallic acid, Cervical cancer, Apoptosis

**PC-15**

**SURFACE-FUNCTIONALIZED COPPER NANOPARTICLES WITH CURCUMIN AND GALLIC ACID FOR FERROPTOSIS-INDUCED THERAPY IN TRIPLE-NEGATIVE BREAST CANCER: A DEEP-LEARNING GUIDED PHARMACEUTICAL APPROACH**

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Triple-negative breast cancer (TNBC) is a highly aggressive subtype of breast cancer lacking hormone receptors and HER2 expression, making it unresponsive to conventional targeted therapies. Ferroptosis, a regulated form of cell death characterized by iron/copper-dependent lipid peroxidation, has emerged as a promising therapeutic approach. Copper nanoparticles (CuNPs), owing to their intrinsic redox activity, can trigger ferroptosis via Fenton-like reactions. Functionalization with phytochemicals such as curcumin and gallic/ferulic acid enhances nanoparticle stability, provides synergistic antioxidant–prooxidant activity, and promotes tumor-specific targeting. This project aims to develop and evaluate surface-functionalized CuNPs with curcumin and gallic/ferulic acid for ferroptosis-mediated TNBC therapy. Objectives include: (i) synthesis and characterization of CuNP–phytochemical conjugates via green chemistry, (ii) AI-based modeling to predict nanoparticle–protein interactions and optimize pharmacokinetic properties, and (iii) in vitro and in vivo evaluation of ferroptosis induction, efficacy, and safety. CuNPs will be synthesized using a green chemistry approach employing phytochemical extracts as reducing and stabilizing agents. Structural and morphological characterization will be performed using UV–Vis, FTIR, XRD, SEM/TEM, and DLS techniques. Deep-learning algorithms will model nanoparticle–protein interactions and predict ADMET profiles. In vitro studies on TNBC cell lines will evaluate lipid ROS accumulation, glutathione depletion, GPX4 inhibition, and ferroptotic markers. In vivo efficacy and biosafety will be assessed in TNBC xenograft mouse models. CuNP–phytochemical nanoconjugates are anticipated to demonstrate enhanced stability, selective tumor targeting, and robust ferroptotic activity, leading to significant tumor regression with reduced systemic toxicity. This study highlights a green nanotechnology and AI-integrated pharmaceutical strategy for TNBC therapy.

**Keywords:** Copper nanoparticles; Curcumin; Gallic acid; Ferroptosis; Triple-negative breast cancer.

**PC-16**

**ANTIMICROBIAL STUDIES OF SECRETED PROTEASE OR PROTEIN OF LACTIC ACID BACTERIA ISOLATED FROM INDUSTRIAL WASTE WATER**

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The first study on lactic acid bacteria was published in 1905 by P. A. Levane on "Proteose Cleavage Products". Lactic acid bacteria (LAB) are gram-positive bacteria that produce lactic acid. Novel enzymes and antibacterial chemicals were always investigated from LABs of various origins, including fermented foods, dairy products, and so on, due to their non-pathogenic nature, presence in the gastrointestinal tract (GIT), and antimicrobial effects. LAB are also Generally Recognized As Safe (GRAS) and used as probiotics in humans. Isolation and antimicrobial efficacy of LAB from industrial waste water has not been done extensively. The present work focuses on the antimicrobial effects of secreted proteins on coli and S. aureus. Co-culture of CFS at pH 5.5 with bacteria showed killing of bacteria. Primary LC-MS analysis reveals that the secreted protein contains AraC peptidproteases isolated from industrial waste water. Isolation of LAB was done on Demann Rogosa sharp (MRS) agar at pH 5.5-7.0 and characterized by a catalase test, acid production test, and antibiotic susceptibility profile. The isolated LAB was at pH 5.5 and was found to be resistant to Nalidixic acid, colistin, cefepime, mecillinam, and cefepime. Cell free supernatant (CFS) showed a zone of inhibition on skim milk agar, providing evidence for secreted protease from LAB. Secreted protease profiles were identified on SDS PAGE with bands of 116-200 KDa. Cell free supernatant showed antibacterial activity in a dose-dependent manner. This data supports the hypothesis that LAB isolated from industrial waste water can have an antimicrobial effect with future applications.

**PC-17**

**ATTENUATION OF ORANGE YELLOW S- INDUCED ANXIETY IN MICE BY VERNONIA CINEREA: A REDOX MODULATORY APPROACH.**

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In current research, orange yellow S is a synthetic azo dye widely used in the food and pharmaceutical industries, has been associated with neurobehavioral disturbances upon prolonged exposure. The objective of this research to evaluate the anxiolytic and antioxidant potential of vernonia cinerea in a murine model of anxiety induced by orange yellow S. An experimental anxiety model was established in mice by orally administering orange yellow S at 20mg/kg for 30 consecutive days. To assess the protective effects, the ethanol extract of vernonia cinerea (EEVC) was administered at 400mg/kg orally, one hour after dye exposure. Diazepam (1mg/kg) served as the standard anxiolytic control. Behavioral assessments were performed to evaluate anxiogenic responses. Treatment with vernonia cinerea significantly improved anxiety like behavior in dye exposed mice, with effects comparable to those observed in the diazepam group. Biochemical analysis revealed a significant increase in brain antioxidant enzymes, including Catalyze (CAT) & Superoxide Dismutase (SOD), as well as elevated Gamma- amino butyric acid (GABA) levels. Histopathological examination of the hippocampal CA3 region showed that EEVC reduced structural abnormalities such as perivascular edema, hemorrhage & neuronal degeneration. Therefore vernonia cinerea extract effectively attenuates orange yellow S – induced anxiogenic behavior in mice by restoring oxidative balance and modulating neurotransmitter levels.

**Keywords:** Hippocampal CA3, Orange yellow S, anxiety behavior.

**PC-18**

**RX FOR A CLEANER PLANET: SMART STRATEGIES FOR WASTE MANAGEMENT**




ISBN: 978-81-980623-8-3

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Pharmaceutical waste presents serious risks to the environment and public health, necessitating effective management strategies. Improper disposal can lead to contamination of water bodies, soil, and the emergence of antibiotic-resistant bacteria, which complicates treatment options. To combat these issues, adherence to regulatory guidelines from agencies like the EPA and DEA is essential for minimizing environmental impacts. Public education is critical for ensuring proper medication disposal, helping to raise awareness of disposal methods and their importance. A multifaceted approach that includes comprehensive waste management plans, legal compliance, and public education can significantly mitigate the risks associated with pharmaceutical waste. By implementing these strategies, we can protect public health and the environment from the harms of improper pharmaceutical disposal.

**Keywords:** Syringes, Pharmaceuticals, Metabolites, Drugs, WHO, Waste

**PC-19**

## FORMULATION AND EVALUATION OF CURCUMIN NANOEMULGEL FOR BURN WOUND HEALING: A RAT MODEL APPROACH

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Burn wounds present a significant clinical challenge due to delayed healing, risk of infection, and excessive inflammation. Curcumin, a polyphenolic compound derived from Curcuma longa, exhibits potent anti-inflammatory, antioxidant, and antimicrobial properties but suffers from poor aqueous solubility and bioavailability. This study investigates the therapeutic efficacy of a topically applied curcumin-loaded nanoemulgel formulation in accelerating burn wound healing in Wistar rats. A standardized second-degree burn model was induced on the dorsal surface of rats, followed by daily topical application of curcumin nanoemulgel (1% w/w) for 21 days. The formulation was characterized for droplet size, zeta potential, rheological behaviour, and drug release kinetics. Wound contraction rate, epithelialization period, histopathological analysis, and biochemical markers (hydroxyproline content, catalase, superoxide dismutase, and malondialdehyde levels) were assessed to evaluate healing progression. Results demonstrated significantly enhanced wound contraction, reduced epithelialization time, and improved collagen deposition in the curcumin nanoemulgel-treated group compared to control and placebo groups. Histological examination revealed accelerated granulation tissue formation, neovascularization, and re-epithelialization. Biochemical assays confirmed modulation of oxidative stress and inflammatory mediators, supporting the mechanistic role of curcumin in tissue regeneration. In conclusion, the curcumin nanoemulgel exhibited superior burn wound healing activity, attributed to its enhanced dermal penetration, sustained release, and synergistic pharmacological effects. This nanoformulation holds promise as a translational therapeutic strategy for topical management of burn injuries.

**Keywords:** – Epithelialization Period, nanoemulgel, neovascularization.

**PC-20**

## FORMULATION AND EVALUATION OF RAPIDLY DISINTEGRATING TABLETS OF DILTIAZEM HCl

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Rapidly disintegrating tablets, also known as orally disintegrating tablets (ODTs) are solid unit dosage forms, which disintegrate or dissolve rapidly in the mouth without chewing and water. The orally disintegrating tablets provide an advantage particularly for pediatric and geriatric populations who have difficulty in swallowing conventional tablets and capsules. Diltiazem HCl is an anti-hypertensive drug. The ODTs of Diltiazem HCl can achieve fast onset of action for treating Hypertension. The present study focuses on the formulation and evaluation of Diltiazem HCl rapidly disintegrating tablets using both natural and synthetic superdisintegrants, including Sodium Starch Glycolate, Croscarmellose Sodium, Guar Gum, and ground banana flour. Tablets were prepared via dry granulation, and other excipients such as Lactose, Magnesium Stearate, and Talc were incorporated. Eight formulations (F1–F8) were developed and subjected to pre-compression (bulk density, tapped density, angle of repose, Hausner's ratio) and post-compression (hardness, friability, drug content, water absorption ratio, wetting time, dissolution, and disintegration time) evaluations. All parameters met the acceptable limits prescribed by the Indian Pharmacopoeia (IP). Among all formulations, F2 exhibited the shortest disintegration time of 28 seconds and the highest drug release of 98% within 30 minutes. Drug release kinetics indicated that F2 followed first-order kinetics.The Differential Scanning Calorimetry (DSC) was used to evaluate the drug – excipient interaction. The DSC studies revealed the absence of drug-excipient interaction in the F2 formulation.The results demonstrate that natural superdisintegrant like ground banana flour can be effectively used in combination with synthetic agents to formulate efficient ODTs of Diltiazem HCl.

**Keywords:** Diltiazem HCl, Disintegration, Dissolution, Superdisintegrants.

**PC-21**

## FORMULATION AND EVALUATION OF POLYVINYL ALCOHOL BASED ORAL THIN FILM OF APIXABAN

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The current research work aimed to prepare an optimized and evaluate fast-dissolving oral thin film of Apixaban using polyvinyl alcohol as a film former. The oral thin film of Apixaban enhances the solubility, bioavailability, and therapeutic efficacy in thrombus, pulmonary embolism, and venous thromboembolism. The chemical compatibility and thermal analysis were investigated with the help of FTIR, and DSC. The optimization was performed with the Box-Behnken design. The concentrations of film former (PVA: X1), plasticizer (PEG 200: X2), and super disintegrant (cross povidone: X3) were considered as independent factors and the critical quality attributes for the oral films are disintegration time, dissolution, and folding endurance. The ANOVA comprised of Quadratic model which predicted p-values of 0.0039, 0.0105, and 0.0020 significant. The scanning electron microscopy assessed the texture of the film. An optimized batch P6 disintegrated within 19 seconds, released the drug (99.07 %) within 10 min and had a folding endurance of 116. The results conclude that optimized batch P6 of oral thin film of Apixaban significantly minimizes the deep vein thrombosis, pulmonary embolism, and venous thromboembolism due to fastest onset of action and improved solubility. Thus, the complications associated with the clotting of blood is sharply reduces.

**Keywords:** Oral thin film; Apixaban; Polyvinyl alcohol; Deep vein thrombosis; Box-Behnken design.

**PC-22**

## ECO-FRIENDLY FABRICATION OF SILVER NANOPARTICLES EMPLOYING ALPINIA GALANGA EXTRACTS: STRUCTURAL CHARACTERIZATION AND ANTIBACTERIAL ACTIVITY

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Introduction: The development of eco-friendly nanomaterials offers a sustainable alternative to conventional antimicrobial agents. Alpinia galanga (greater galangal) contains phytochemicals such as flavonoids, phenolics, and terpenoids that can act as reducing and stabilizing agents for nanoparticle synthesis. Aim: To synthesize and characterize silver nanoparticles (AgNPs) using A. galanga rhizome extract and to evaluate their antibacterial and antibiofilm potential. Objectives: (i) Optimize the




ISBN: 978-81-980623-8-3

biosynthesis of AgNPs using aqueous extract; (ii) characterize particles using UV–Vis, FTIR, XRD, SEM/TEM, and EDX; (iii) evaluate antibacterial activity against Staphylococcus aureus and Escherichia coli; (iv) assess antibiofilm and stability compared with crude extract. Methodology: Fresh rhizomes were extracted in distilled water and mixed with 1 mM $AgNO_3$ solution. Nanoparticle formation was monitored by UV–Vis spectroscopy. Structural and surface analyses were carried out using FTIR, while XRD confirmed crystallinity. Morphological features were determined by SEM/TEM, and elemental composition by EDX. Antibacterial activity was assessed using agar well diffusion, MIC determination, and biofilm inhibition assays. Stability of AgNPs was monitored during storage. Results: Rapid reduction of $Ag^+$ to $Ag^0$ occurred, producing spherical AgNPs (15–40 nm) with a distinct SPR peak (~430 nm). FTIR confirmed phytochemical involvement; XRD indicated face-centered cubic silver, and EDX validated elemental silver. The AgNPs exhibited strong antibacterial activity and significant biofilm reduction, outperforming crude extract, and remained colloidally stable.Conclusion: A. galanga-mediated AgNPs represent a sustainable and effective antimicrobial platform with potential biomedical applications.

**Keywords:** Green synthesis, Alpinia galanga, Silver nanoparticles, Antibacterial activity, Characterization

**PC-23**

## EXPLORING THE CYTOTOXICITY OF HEXABUTYLOXYTRIPHENYLENE, A DISCOTIC LIQUID CRYSTAL: IMPLICATIONS FOR MEDICAL APPLICATIONS

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The three cell lines 3T3L1, THP-1, and L929 were subjected to the cytotoxicity of hexabutyloxytriphenylene, a well-known triphenylene discotic liquid crystal (DLC). DLCs are widely used in various technologies, but little is known about their pharmacological characteristics, including cytotoxicity. Hexabutyloxytriphenylene (HAT-4) was the test material, and the MTT assay was used to measure concentrations ranging from 1.9 to 1000 µM. Cell viability was assessed after three cell lines—3T3L1, THP-1, and L929—were treated with different dosages of HAT-4 for 24, 48, and 72 hours. Statistical analysis was performed using One-way ANOVA followed by Tukey's post hoc test. Hexabutyloxytriphenylene demonstrated concentration-dependent cytotoxicity in all tested cell lines. The MTT assay showed variable reductions in cell viability depending on concentration and exposure duration. These findings highlight the importance of evaluating pharmacological characteristics of DLCs, particularly their potential effects on diverse cell types. The triphenylene DLC hexabutyloxytriphenylene, despite being frequently studied, exhibited significant cytotoxic effects on 3T3L1, THP-1, and L929 cells. By emphasizing the need to understand DLC cytotoxicity and their pharmacological properties, this study addresses an important research gap with implications for future biomedical applications. This work enhances current understanding of the cytotoxicity of hexabutyloxytriphenylene and lays the groundwork for exploring pharmacological features of DLCs. The findings highlight the potential role of liquid crystals in medicine and suggest directions for developing novel, targeted therapeutic strategies.

**Keywords:** Discotic Liquid Crystals, Cytotoxicity, Drug Delivery, Medical Applications, Hexabutyloxytriphenylene

**PC-24**

## DEVELOPMENT AND CHARACTERIZATION OF A HERBAL ANTIMICROBIAL CREAM: A SYNERGISTIC APPROACH USING CURCUMIN AND GLYCYRRHIZIN

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In the present study, a herbal antimicrobial cream was developed using ethanolic extracts of Curcuma longa (curcumin) and Glycyrrhiza glabra (glycyrrhizin), combined with excipients, including sesame oil containing sesamin and coconut oil containing lauric acid, to improve formulation stability, spreadability, and dermal absorption. The objective was to utilize the therapeutic potential of herbal active constituents and also enhancing the functional roles of other formulation components for topical application, which focuses on achieving effective antimicrobial activity. The cream was prepared via standard emulsification techniques and evaluated for physicochemical parameters including pH, spreadability, viscosity, and skin irritation, as well as antimicrobial efficacy against Escherichia coli, Staphylococcus aureus, and Candida albicans. The optimized batch exhibited a pH of 6.8, spreadability of 9.33 g·cm/sec, and no signs of irritation in patch testing. Antimicrobial activity was confirmed by zones of inhibition measuring 20 mm for E. coli, 18 mm for S. aureus, and 15 mm for C. albicans, indicating broad-spectrum efficacy. Franz diffusion studies showed that curcumin and glycyrrhizin were able to pass through biological membranes, suggesting the cream can effectively deliver its active ingredients. The formulation showed no signs of phase separation or degradation over a brief period of time, remaining physically stable. This approach demonstrates that integrating herbal extracts with excipients can result in a safe, effective, and industrially viable topical antimicrobial product.

**Keywords:** Curcumin, Glycyrrhizin, formulation, antimicrobial cream, topical delivery.

**PC-25**

## DESIGN AND IN-SILICO DEVELOPMENT OF CURCUMIN-BRIDGED GALLIC ACID AS AN ANTICANCER AGENT

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Curcumin and ferulic acid are natural polyphenolic compounds known for their antioxidant, anti-inflammatory, and anticancer properties; however, both suffer from poor stability, rapid metabolism, and limited bioavailability, which restrict their clinical application. In this study, we designed and evaluated novel curcumin-bridged ferulic acid (CBFA) conjugates using a comprehensive in-silico approach to enhance therapeutic efficacy. A small library of mono- and bis-conjugates was generated employing ester, carbonate, and PEG-based linkers, followed by optimization and physicochemical profiling. Molecular docking against multiple cancer-associated targets, including COX-2, Keap1–Nrf2, tubulin, and Bcl-2, demonstrated strong binding affinities and favorable interaction networks compared with parent compounds. Molecular dynamics simulations confirmed the stability of the top docked complexes over 100 ns trajectories, with consistent hydrogen bonding and low RMSD fluctuations. ADMET predictions suggested improved oral bioavailability, favorable pharmacokinetic parameters, and minimal toxicity risks. Among the designed analogs, PEG-linked and carbonate-bridged conjugates showed the most promising balance of stability, activity, and drug-likeness. These results highlight CBFA hybrids as potential next-generation anticancer candidates, meriting further experimental synthesis, stability studies, and biological evaluation to validate their therapeutic potential.

**Keywords:** Curcumin, gallic acid, ferulic acid, ADMET, cytotoxicity.

**PC-26**

## DESIGN AND IN-SILICO DEVELOPMENT OF CURCUMIN-BRIDGED GALLIC ACID AS AN ANTICANCER AGENT

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Curcumin and gallic acid are well-established natural polyphenols with complementary anticancer activities, but their therapeutic utility is limited by poor bioavailability, instability, and rapid metabolism. To overcome these challenges, we designed and evaluated novel curcumin-bridged gallic acid (CBGA) hybrids using in-silico approaches. A focused library of mono-, bis-, and bridged conjugates was constructed through ester, carbonate, and short PEG linkers, followed by physicochemical and drug-likeness profiling. Molecular docking against key oncogenic targets, including Keap1–Nrf2, COX-2, tubulin, and Bcl-2, revealed favorable binding energies and interaction patterns compared with parent molecules. Top candidates were further validated using molecular




ISBN: 978-81-980623-8-3

dynamics simulations, which demonstrated stable protein–ligand complexes and consistent hydrogen bonding over 100 ns trajectories. In-silico ADMET screening predicted acceptable oral bioavailability, low cardiotoxicity, and reduced PAINS alerts for optimized derivatives. The bis-gallate carbonate and PEG-linked conjugates showed the best balance of stability, affinity, and drug-likeness. These findings suggest that CBGA hybrids may serve as promising next-generation anticancer leads by integrating the pharmacophoric features of curcumin and gallic acid into a single molecular scaffold. Experimental synthesis, stability evaluation, and cytotoxicity assays are warranted to validate the computational predictions.

**Keywords:** Insilico, polyphenols, ADMET, cytotoxicity.

**PC-27**

## DEVELOPMENT AND OPTIMIZATION OF A MICROEMULSION FOR ERLOTINIB HYDROCHLORIDE: A NOVEL APPROACH FOR ENHANCED LUNG CANCER THERAPY

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This paper is devoted to the design, development, and optimization of microemulsion-based nasal spray formulation of erlotinib hydrochloride, a targeted anticancer drug. Solubility studies, as well as partition coefficient (log p) and drug-excipient compatibility studies were also performed to identify the most appropriate excipient combination to develop a microemulsion. Solubility tests showed that Labrafac, Cremophor RH 40 and Transcutol P were best to improve the solubility of the drug. The partition coefficient was suitable and the lipophilicity of the drug would favor nasal absorption. In addition, the stereochemical study by FTIR and DSC analysis demonstrated that erlotinib hydrochloride could not dissolve at room temperature in the presence of chosen excipients. Optimization of the microemulsion formulation was done using a Pseudoternary phase diagram and investigation of the excipient ratio effects on formulation stability was carried out. It was noted that the phase behaviour evolved between clear and turbid formulations as the surfactant to co-surfactant ratio (Smix) declined. The best formulations of microemulsions were also described as clear, low viscous and stable. To further optimize the formulation, a central composite design (ccd) was employed, and the responses such as that of globule size, zeta potential and polydispersity index were determined. The findings revealed that the smallest globule size, low zeta potential and a low polydispersity index were obtained in run 3 and this was the most stable, and uniform formulation. In summary, the paper has shown the possibility of microemulsion-based nasal delivery of erlotinib hydrochloride which is highly soluble, stable and bioavailable thereby has increased therapeutic responses in the treatment of lung cancer.

**PC-28**

## FORMULATION AND EVALUATION OF GASTRORETENTIVE DRUG DELIVERY SYSTEM CONTAINING FAMOTIDINE HCL

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The purpose of this research was to develop a novel gastro retentive drug delivery system based on Direct compression method for sustained delivery of active agent. Quick GI transit could result in incomplete drug release from the drug delivery system above the absorption zone leading to decreased efficacy of the administered dose and thus less patient compliance. Gastro retentive floating tablets of Famotidine HCL were prepared direct compression method using different polymers with different concentrations of HPMC K4M, HPMC K100 M and Carbopol 940. The optimized formulation F5 exhibited 99.39% drug release in 12hrs.In vitro drug release kinetics was found to follow both zero order and the possible mechanism of Famotidine HCL. The optimized formulation F5 showed good result in pre compression and post compression parameters as per IP.

**Keywords:** Famotidine HCL, HPMC K4M, HPMC K100 M and Carbopol 940.

**PC-29**

## DEVELOPMENT AND EVALUATION OF LUTEOLIN LOADED TEMPERATURE SENSITIVE IN-SITU GEL

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This study aimed to design and enhance a temperature-responsive In-Situ gel infused with luteolin to facilitate better delivery for acute wound healing. A In-Situ gel that is responsive to temperature changes was developed using PNIPAM and Poloxamer 188 as thermosensitive polymers, employing a structured $3^2$ factorial design. Nine formulations were created, with PNIPAM concentrations ranging from to 10-20% w/v and Poloxamer 188 from to 1-5% w/v. These formulations were evaluated for physical appearance, pH, gelation temperature, gelation time, viscosity, mucoadhesive strength, drug content, and ex vivo permeation through the mucosa. All formulations had pH levels ranging from 5.7 to 6.3, making them suitable for delivery, and displayed excellent uniformity in drug content, between 97.5% and 99.2%. The gelation temperature was found to have a quadratic correlation with polymer concentrations, varying from 27.2°C to 36.8°C, while mucoadhesive strength showed a linear increase, ranging from 3542.7 to 5983.6 dyne/cm2. Formulation F7, was deemed optimal, as it exhibited an ideal gelation temperature of 33.7°C, a mucoadhesive strength of 4896.4 dyne/cm2, and superior ex vivo permeation of 92.8% over 12 h, with the highest flux recorded at 68.3 µg/cm2/h. Statistical validation confirmed that the predictive accuracy was excellent, with a minimal error ranging from 0.12% to 1.04%. The optimized formulation demonstrated strong stability under accelerated conditions, with a projected shelf-life of 2.3 years. Thermosensitive In-Situ gel, optimized for luteolin delivery, presents a promising approach with improved retention and controlled release, potentially enhancing treatment outcomes in acute wounds.

**Keywords:** Luteolin; Temperature-sensitive gel; In-situ gelling system; PNIPAM

**PC-30**

## DESIGN AND EVALUATION OF CONTROLLED RELEASE GASTRIC FLOTING DRUG DELIVERY SYSTEM OF PROTON PUMP INHIBITOR

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This research focuses on the development and evaluation of controlled release gastric floating tablets for pantoprazole sodium, a proton pump inhibitor used to treat gastric and duodenal ulcers. Tablets were prepared using direct compression with microcrystalline cellulose, sodium bicarbonate, citric acid, magnesium stearate, and HPMC K100/K15 as polymers. Physicochemical assessments and compatibility studies (FTIR, DSC) confirmed no interactions between the drug and polymers. Results showed that tablet formulations with HPMC K100 provided better controlled release and extended drug delivery up to 12 hours, compared to HPMC K15. The drug release kinetics followed a Non-Fickian diffusion mechanism, combining matrix erosion and diffusion processes. The floating lag time increased with higher amounts of gas-generating agents, enhancing gastric retention. The study concludes that pantoprazole sodium floating tablets formulated with HPMC K100 offer a promising approach for prolonged gastric retention and improved bioavailability in clinical applications. This optimized system supports better patient compliance due to its extended release profile.

**Keywords:** Pantoprazole sodium, Gastroretentive, Floating drug delivery systems, Release kinetics. Buoyancy studies.

**PC-31**

## DEVELOPMENT OF CHITOSAN-BASED BUCCAL PATCHES INCORPORATING HYDROXYAPATITE AND BETANIN FOR PERIODONTAL APPLICATIONS

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Periodontal disease has become one of the greatest threats to oral health requiring multifaceted therapies. This study describes the


ISBN: 978-81-980623-8-3

preparation of a new mucoadhesive buccal patch made of chitosan, hydroxyapatite (HA) from eggshells and, betanin for periodontal use. Chitosan is a biodegradable and biocompatible polymer with great localized delivery characteristics. Hydroxyapatite closely resembles tooth enamel's mineral composition helping remineralization and restore dental tissue. Betanin provides antioxidant, anti-inflammatory, and antimicrobial effects with low toxicity. Hydroxyapatite was made by calorically treating eggshell powder at controlled conditions. The buccal patch was made by mixing chitosan and polyvinyl alcohol solutions and casting the patch with solvent evaporation method. Characterization of the buccal patch showed good physio-chemical properties including suitable thickness, good folding endurance, suitable moisture content and surface pH of 6.85 ± 0.2. The patch illustrated strong antioxidant activity with 64.6% inhibition in a DPPH assay and showed ex-vivo mucoadhesion time of 50 - 60 minutes on porcine dermal tissue. Swelling index and mechanical strength characteristics also support clinical use. These findings highlight the promise of the chitosan-hydroxyapatite-betanin buccal patch as a viable, non-invasive means of drug delivery for periodontal treatment, that provided sustained, localized therapeutic delivery and increased patient compliance. This formulation could be a promising alternative to traditional treatment for periodontal disease and post-dental surgical conditions.

**Keywords:** Chitosan, Hydroxyapatite, Betanin, Buccal patch, Periodontal diseases

**PC-32**

## DESIGN AND CHARACTERIZATION OF FLOATING TABLETS OF METAPROLOL TARTARATE

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The aim of present research work is to formulate and evaluate controlled release floating tablet of Metaprolol Tartarate in view to enhance bioavailability and therapeutic action. The tablets were formulated by employing Moringa oleifera, gum kondagogu, Karaya gum. The powder blend was evaluated for flow properties. All the formulations showed values within the prescribed limits for tests like hardness, friability and weight variation which indicate that the prepared tablets are of standard quality. All the tablets were formulated using sodium bicarbonate as effervescent agent. All the prepared formulations floated immediately after placing into the beaker and the floating was maintained more than 14 hrs. It was observed that the carbon dioxide generated from sodium bicarbonate in presence of dissolution medium (0.1N HCL) was trapped in the polymer gel matrix formed by the hydration of polymer which decreases the density (<1) and makes the tablet buoyant. The correlation coefficient values (r) revealed that the dissolution profiles followed Zero order kinetics and the mechanism of drug release was governed by Peppas model. The n values are found to be more than 0.5 (n>0.5) indicted that the drug release was predominantly controlled by non fickian diffusion. Based on the release rate constant and % of drug release the formulations prepared with Moringa oleifera gum shown prolonged retarding nature compared with the formulations. Among all the formulations, formulation containing drug and Moringa oleifera gum in 1:1.5 ratio was found to be optimized formulation

**Keywords:** Metaprolol Tartarate, Moringa oleifera, Gum kondagogu, Karaya gum

**PC-33**

## DEVELOPMENT OF A DUAL-ACTION FACE MASK TARGETING BLEMISH CONTROL AND ANTI-AGING FOR HOLISTIC SKIN CARE

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Face masks are increasingly recognized for their multifunctional benefits in skin care. The objective of this study was to formulate a face sheet mask that provides dual anti-blemish and anti-aging effects, thereby rejuvenating the skin. The formulation incorporated benzoyl peroxide (antimicrobial and keratolytic agent) and orange oil (antioxidant and skin-brightening) as active components. A flexible film was achieved using gelatin as the gelling agent, with starch as a thickener and liquid paraffin as an emollient to maintain hydration and reduce irritancy associated with benzoyl peroxide.Physicochemical characterization included organoleptic assessment, thickness, folding endurance, moisture content, and in-vitro drug release. Franz diffusion cell studies demonstrated uniform and sustained drug release, quantified by UV spectroscopy. The optimized film showed appropriate flexibility, good adherence to skin surface. Moisture analysis confirmed adequate hydration, while sensory evaluation indicated a smooth, non-greasy finish. Functionally, the formulation showed marked potential in reducing blemishes and delaying early signs of aging, attributed to synergistic antimicrobial, antioxidant, and keratolytic effects. Safety tests confirmed cosmetic acceptability with minimal irritation risk.In conclusion, this dual-action face mask provides an effective, consumer-friendly approach to managing acne-related blemishes and premature skin aging, representing a promising candidate for sustainable cosmeceutical development.

**Keywords:** Rejuvenation, gelatin, starch, benzoyl peroxide, starch.

**PC-34**

## FORMULATION AND CHARACTERIZATION OF ARTEMETHER NANOEMULSIONS- ADVANCING ANTIMALARIAL THERAPY THROUGH OPTIMIZED NANOCARRIER SYSTEMS.

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Nanoemulsions (NEs) are advanced colloidal drug delivery systems consisting of two immiscible liquids (commonly oil and water) stabilized by surfactants, with droplet sizes ranging from 20–200 nm. Their physicochemical advantages—optical clarity, large surface area, and high kinetic stability against sedimentation and coalescence have made them attractive in pharmaceutical formulations.The choice of formulation components is crucial, particularly the oil phase for solubilizing the active pharmaceutical ingredient (API). A solubility screening study with Artemether, an antimalarial drug, identified castor oil as the most suitable oil, providing the highest solubility (1.1 ± 0.09 mg/mL) due to its lipophilic character and molecular compatibility. surfactant system is very much important in the formulation. Non-ionic surfactants such as the Tween series, Cremophor EL, and Labrasol are favored for their biocompatibility, low irritation, and stability across physiological pH. Miscibility studies revealed Cremophor EL as the best surfactant for castor oil-based systems, offering strong interfacial activity. To lower surfactant concentration and minimize toxicity, co-surfactants including ethanol, isopropyl alcohol, and PEG 600 were assessed. Pseudo-ternary phase diagrams demonstrated that PEG 600 provided the broadest NE region, indicating superior stability. Optimization of the surfactant-to-co-surfactant ratio (Smix) identified 1:5 (Cremophor EL:PEG 600) as optimal, producing smaller droplets, reduced interfacial tension, and excellent thermodynamic stability. This formulation withstood rigorous stress tests, including thermal cycling, centrifugation, and freeze-thaw studies

**Keywords:** Artemether, nanoemulsion, castor oil, Cremophor EL, PEG 600, Smix ratio, Ostwald ripening.

**PC-35**

## DEVELOPMENT AND PHYSICOCHEMICAL CHARACTERIZATION OF A FACE SCRUB CREAM CONTAINING ALMOND SHELL POWDER.

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Agro-waste valorization provides eco-friendly alternatives to synthetic microbeads in cosmetics. Almond shells, an abundant nut industry by-product, contain a rigid lignocellulosic matrix with phenolic compounds that offer abrasivity and antioxidant potential. When standardized to controlled particle sizes, they can serve as biodegradable exfoliants with added cosmeceutical benefits. In this study, almond shells were cleaned, oven-dried, milled, and sieved (150–300 µm). Characterization included


ISBN: 978-81-980623-8-3

FTIR, SEM, and optical microscopy. The particles were incorporated into a humectant-rich oil-in-water base with glycerol and cucumber extract. The cream was evaluated for pH, moisture/LOD, viscosity, spreadability, microbial quality, and heavy-metal content. Antioxidant activity (DPPH), tyrosinase inhibition, and in-vitro release using a Franz diffusion cell were also assessed. The optimized cream exhibited skin-compatible pH, low residual moisture, and rheology supportive of uniform suspension and rinsability. FTIR confirmed lignocellulosic structures, while SEM and microscopy revealed irregular but non-splintered particles with a narrow size range. Almond shell particles (~150–250 µm) achieved effective exfoliation without micro-abrasions, comparable to walnut and apricot kernel scrubs. Humectants reduced post-exfoliation dryness. Microbial and heavy-metal evaluations met cosmetic safety norms. Antioxidant and tyrosinase inhibition assays indicated phenolic constituents contributed to ROS scavenging and melanogenesis modulation. This standardized almond shellbased scrub cream demonstrated safety, efficacy, and sustainability, representing a scalable biodegradable alternative to synthetic microbeads with potential for consumer and clinical use.

**Keywords:** Almond shell powder, Natural exfoliant, Agro-waste valorization, Antioxidant activity, Tyrosinase inhibition.

**PC-36**

## FORMULATION AND EVALUATION OF POLYHERBAL CREAM FOR THE TREATMENT OF ATOPIC DERMATITIS

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Atopic dermatitis (AD) is a chronic, relapsing inflammatory skin disorder characterized by erythema, itching, dryness, and barrier dysfunction. Conventional therapy often relies on corticosteroids and immunomodulators, which, though effective, are associated with side effects upon prolonged use. Herbal medicines provide a safer alternative due to their multifaceted pharmacological activities and better patient compliance. The present study was undertaken to formulate and evaluate a polyherbal cream containing standardized extracts of Aloe vera, Glycyrrhiza glabra, Azadirachta indica, Curcuma longa, and Avena sativa, selected for their complementary anti-inflammatory and antimicrobialactivity. An oil-in-water emulsion base was prepared using emulsifying wax, paraffin, and shea butter, with humectants such as glycerin to enhance hydration. The cream was evaluated for organoleptic characteristics, pH, spreadability, viscosity, extrudability, stability under accelerated conditions, and microbial quality. Bioactivity screening demonstrated significant anti-inflammatory activity through membrane stabilization assays, along with appreciable antimicrobial potential. The prepared formulation was stable, exhibited acceptable physicochemical parameters, and was free from microbial contamination. Preliminary skin compatibility studies revealed no signs of irritation, indicating its safety for topical application. The findings suggest that the developed polyherbal cream has potential as a safe and effective topical formulation for the management of atopic dermatitis, offering a steroid-sparing alternative.

**Keywords:** Dermatitis, Plant, Extract, Polyherbal, Cream

**PC-37**

## NANOMATRIX INTEGRATED MUCOADHESIVE THERMOREVERSIBLE IN SITU NASAL GEL FOR PARKINSONISM

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Parkinson's disease (PD) is a chronic, progressive neurodegenerative condition resulting from the loss of dopamine-producing neurons in the substantia Nigra. The present study highlights the potential of Ropinirole hydrochloride solid lipid nanoparticles (SLNs) incorporated into a nasal in situ gel to overcome poor bioavailability and extensive first pass metabolism associated with conventional therapy. SLNs were prepared by double emulsion technique using glyceryl monostearate, stearyl amine, soya lecithin, Tween 80 and characterized for morphology, stability and entrapment efficiency. TEM confirmed spherical nanoparticles in the nanometre range, while zeta potential analysis indicated good stability. Entrapment efficiency ranged from 42.41–72.42%, highest at the 80:20 GMS: lecithin ratio. In vitro studies revealed an initial burst followed by sustained release, with FSN3 showing 80.3 ± 1.2% release at 12 h. Based on entrapment and release, FSN2, FSN3, and FSN6 were chosen for gel formulation. Thermosensitive in situ gels were formulated with poloxamer 407 and HPMC K4M, where SG1showed optimal sol to gel transition, rapid gelation, and strong mucoadhesion. In vitro release of SG1 achieved 73.85% drug release in 12hrs, while ex vivo nasal mucosa studies demonstrated 81.26% release following near zero order kinetics with diffusion-controlled mechanism. The optimized formulation successfully enhanced permeation, sustained drug release and bypassed first-pass metabolism, indicating improved bioavailability and patient compliance. Thus, Ropinirole hydrochloride SLN loaded intranasal in situ gel offers a promising alternative to oral therapy for effective management of Parkinson's disease.

**Keywords:** In situ gel, Parkinson's disease, SLN, Poloxamer 407, HPMC K4M

**PC-38**

## INJECTABLE SMART HYDROGEL DEPOT FOR PERPETUAL CORTICOSTEROID RELEASE IN ARTHRITIC THERAPY

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Osteoarthritis is a prevalent chronic degenerative disorder characterized by pain, inflammation and impaired joint mobility. It is commonly managed with oral analgesics or NSAIDs; however, these therapies are limited by systemic adverse effects and inadequate drug levels at the site of action. intraarticular injections allow localized drug delivery with reduced systemic exposure, but rapid efflux from the synovial cavity limits their efficacy. Sustained-release formulations using biodegradable polymers offer a promising alternative for prolonged therapeutic action. In this study, betamethasone dipropionate (BTM) nanoparticles were formulated using the emulsion solvent evaporation method with PLGA and PCL polymers to minimize burst release and enhance drug retention. The nanoparticles were evaluated for drug-polymer compatibility, particle size, shape, entrapment efficiency, surface charge (zeta potential) and thermal stability. FTIR and DSC analyses confirmed the absence of drug-polymer interactions. The optimized formulation (drug: polymer 1:3; PLGA: PCL 1:2) exhibited high entrapment efficiency, spherical shape, particle size <200 nm, zeta potential of –31 mV and sustained drug release for up to 7 days (93%). These nanoparticles were further incorporated into an in situ forming thermosensitive hydrogel prepared with 18% Poloxamer 407 selected for its gelation near body temperature. The nanoparticle-loaded hydrogel demonstrated controlled drug release for 30 days with near zero-order kinetics and no burst effect. The formulation showed good biocompatibility and a pH similar to synovial fluid, minimizing irritation. This optimized formulation (PF9) effectively prolonged intraarticular retention and sustained drug delivery, reducing dosing frequency and offering a promising therapeutic strategy for long-term management.

**Keywords:** Osteoarthritis, Betamethasone dipropionate, Intra-articular drug delivery, Biodegradable nanoparticles, Thermosensitive hydrogel

**PC-39**

## NEXT-GENERATION HYDROGEL THERAPEUTICS: DUAL-DRUG SYSTEM FOR ORAL MUCOSITIS IN ONCOLOGY PATIENTS

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Oral mucositis is a prevalent and painful inflammatory condition of the oral cavity, commonly affecting patients undergoing chemotherapy and radiotherapy. It severely impairs quality of life due to pain, ulceration, and difficulty in eating or speaking. Current management involves systemic steroids and mouth paints containing agents such as clotrimazole, benzalkonium chloride, and triamcinolone, but these often produce severe adverse effects, burning sensation, and poor patient compliance. To address these limitations, the present study aimed to formulate and evaluate a novel hydrogel containing dexamethasone and metronidazole for localized therapy of oral mucositis. The hydrogel was formulated with hydrophilic polymers and evaluated for pH, viscosity,




ISBN: 978-81-980623-8-3

Spreadability, drug content, and in-vitro release. Compatibility studies confirmed no drug–excipient interactions. The optimized formulation (F4) showed favourable physical properties, consistent drug distribution, and sustained release, achieving 97.25% dexamethasone release and 98.62% metronidazole release. In vitro antimicrobial studies showed metronidazole's effect against E. coli, and HET–CAM testing confirmed the formulation was non-irritant. In vivo evaluation in patients with oral mucositis associated with carcinoma buccal mucosa, oral cancer, and ulcerative lesions demonstrated 75–100% pain relief, significant reduction in discomfort, and better patient compliance compared to conventional therapies. The incorporation of dexamethasone provided strong anti-inflammatory action, while metronidazole effectively targeted pathogenic microorganisms, ensuring enhanced residence time and localized therapeutic effect. The hydrogel can be economically prepared at Rs. 45/- for a 10 ml tube, making it cost-effective. Overall, the developed dexamethasone-metronidazole hydrogel represents a promising, safe, and affordable localized therapy for oral mucositis.

**Keywords:** Oral Mucositis, Dexamethasone, In vivo studies, Metronidazole, Localized drug delivery

**PC-40**

## PREPARATION AND EVALUATION OF MORINGA CHEWABLE GUMMIES

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Moringa chewable gummies are dietary supplements enriched with essential nutrients, designed to enhance overall health, particularly in individuals with nutrient deficiencies. The rising preference for chewable supplements is attributed to their convenience, pleasant taste, and improved compliance, especially among children and the elderly.In this study, moringa gummies were formulated using gelatin (gelling agent), stevia, moringa powder (active ingredient), citric acid, sodium benzoate, and flavouring agents. Two solutions were prepared: the first by mixing stevia and water (1:1), and the second by dissolving gelatin in water and heating to 60 °C. Both solutions were combined, followed by the incorporation of moringa and other excipients.Evaluation revealed that moringa gummies significantly improved nutrient absorption compared to conventional supplements. Their favourable taste and ease of consumption also enhanced adherence, overcoming challenges associated with swallowing tablets or capsules.Overall, moringa chewable gummies present a palatable and effective alternative to traditional pill-based supplementation. They offer a convenient means of improving nutrient intake, with promising implications for long-term health and compliance. Further research is needed to assess their sustained benefits and potential impact on broader health outcomes with regular use.

**Keywords:** Moringa, Chewable gummies, Nutrient supplementation, Adherence, Nutrient absorption

**PC-41**

## INSILICO EVALUATION OF ANALGESIC ACTIVITY LINUM USITATISSIMUM

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Pain is regarded as an unpleasant feeling and emotional experience that is linked to possible tissue damage. Pain signals go through nerve fibers to the brain for interpretation, allowing the body to react and preventing more tissue damage. Pain can be brought on by a variety of mediators, including prostaglandins, cytokines, histamine, serotonin, substance P, and capsaicin. However, in order to defined the body against unknown invaders, substances like prostaglandins define and regulate cellular and tissue reactions including inflammation. There is proved animal studies about the analgesic activity of the respective plant extract of Linum Utiss but which phytoconstituent is responsible for the activity is not known. So we performed molecular docking studies to confirm the main ligand which is present in the plant is responsible for the analgesic activity. Molecular docking studies shows affinities of Daucosterol -10.8 to -8.0 Kcal/Mol which having mainly amino acid Serine A:530, Cycloartenol -10.2 to -7.2 Kcal/Mol mainly amino acids Glutamic acid A:236 and Leucine A:238, 24–Methylene cycloartanol -9.9 to -7.7 Kcal/Mol mainly amino acid Glutamine A:241 and Glutamic acid B:140 involved in the binding. while the standard drug shows the affinity of -8.1 Kcal/Mol.

**Keywords:**
Arachidonic Acid, Cyclo-oxygenase (COX), Inflammation, Linum Usitatissimum, Molecular Docking.

**PC-42**

## FORMULATION, EVALUATION AND OPTIMIZATION OF TRANSDERMAL DRUG DELIVERY SYSTEM CONTAINING NONSTEROIDAL ANTI INFLAMMATORY DRUGS

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Transdermal drug delivery system (TDDS) offers various advantages over oral dosage forms form such predetermined release rate, avoiding first pass effect, patient. A hydrophilic or hydrophobic property of polymers governs drug release characteristics from TDDS. Stratum corneum offers resistant for penetration of certain drugs, hence permeation enhancer (PE) were used to improve permeation. In present research work matrix type TDDS were formulated and evaluated. The objective was to study the effects of polymer types and penetration enhancers on drug release kinetic and flux of containing diclofenac sodium and flurbiprofen. Eudragit RL 100 and Eudragit RS 100 were used as polymers and penetration enhancers such as DMSO, oleic acid and Tween 80 were evaluated. A three factor three level Box Behnken design (BBD) was employed in optimization of TDDS and penetration enhancers were selected as independent variables. Drug and polymer interactions were carried out by FTIR and DSC analysis and found no interactions. Invitro drug release studies were carried out using a modified Franz diffusion cell and results indicated selected penetration enhancers have effect on drug release kinetic and flux were increased. Skin irritation test and accelerated stability studies were carried to study skin irritancy and stability of TDDS. The results showed no irritation and optimized formulation was stable. It was concluded that that the optimized formulation demonstrated significant improvements in drug release and flux compared to other formulations. The optimized patch also met the criteria for physical properties such as smoothness, thickness uniformity, and folding endurance.

**Keywords:** Transdermal, Box-Behnken Design, Eudragit RL 100, Eudragit RS 100, penetration enhancers.

**PC-43**

## DEVELOPMENT AND EVALUATION OF BILAYER TABLET OF ENZALUTAMIDE FOR PROSTATE CANCER THERAPY

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The present investigation was undertaken to design and evaluate a bilayer tablet of enzalutamide, an androgen receptor inhibitor used in the management of prostate cancer, with the objective of integrating both immediate and sustained drug delivery strategies in a single dosage form. The bilayer tablet was prepared by direct compression, which comprised two distinct layers. The immediate-release (IR) layer was formulated using sodium starch glycollate as a superdisintegrant to ensure rapid drug release, whereas the sustained-release (SR) layer was developed with Hydroxypropyl Methylcellulose (HPMC), a hydrophilic swellable polymer, to prolong drug release. Additional excipients, such as microcrystalline cellulose, lactose, and magnesium stearate, were incorporated to enhance compressibility, flow, and tablet uniformity. The formulated bilayer tablets were evaluated for physicochemical parameters, including hardness (1.2–3.9 kg/cm²), friability (0.12–0.58%), thickness (1.2–2.4 mm), and weight variation (1.56–2.36%). All values were within the pharmacopeial limits, indicating acceptable mechanical strength and consistency. In vitro dissolution studies revealed that the IR layer released the drug rapidly within 30 min, providing an immediate therapeutic effect, whereas the SR layer sustained drug release over 8 h, thereby maintaining prolonged plasma levels. This study demonstrates that a bilayer tablet of enzalutamide can be successfully formulated to




ISBN: 978-81-980623-8-3

achieve dual-release kinetics, offering the dual advantage of rapid onset of action and extended therapeutic coverage. This approach holds promise for improving therapeutic efficacy, minimizing dosing frequency, and enhancing patient compliance in the management of prostate cancer.

**Keywords:** Enzalutamide, Bilayer tablet, Immediate release, Sustained release, Prostate cancer

**PC-44**

**PREPARATION, CHARACTERIZATION & OPTIMIZATION OF PIMOZIDE MUCOADHESIVE NANOEMULSION USING BOX-BEHNKEN DESIGN: IN VITRO AND IN VIVO STUDIES FOR NOSE-TO-BRAIN DELIVERY**

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Tourette Syndrome (TS) is a complex neurodevelopmental disorder characterized by persistent motor and vocal tics, frequently accompanied by comorbidities such as attention deficit hyperactivity disorder (ADHD) and obsessive-compulsive disorder (OCD). Pimozide is an FDA-approved dopamine receptor antagonist that treats TS, but its poor water solubility and extensive first-pass metabolism, together with systemic side effects, limit its therapeutic applications. The objective of this study was to develop a mucoadhesive nanoemulsion (PIM-MNE) of pimozide for intranasal nose-to-brain delivery to increase nasomucosal adhesion while enhancing brain bioavailability and reducing systemic toxicity. Box–Behnken statistical design helped determine essential formulation variables that affected nanoemulsion (PIM-NE) droplet size, along with polydispersity index and surface charge. PIM-MNE was obtained by incorporating GRAS mucoadhesive polymer, Carbopol 971, in the optimized NE. The optimized PIM-MNE, which exhibited favorable physicochemical properties with a globule size of 57.82 nm ± 0.25 nm, PDI 0.35 ± 0.03 nm, zeta potential −23.40 mV ± 0.32 nm, high entrapment efficiency 92.80%, and drug loading 44.6%. In vitro drug release studies demonstrated sustained release of 91.5%. Stability studies confirmed that the formulations remained stable for three months under both ambient and refrigerated conditions. The ex vivo permeation tests showed that the nanoemulsion had better mucosal absorption than the pimozide solution. In vivo pharmacokinetic studies confirmed improved brain targeting efficiency compared to conventional formulations. The histopathological examination demonstrated mucosal safety through the absence of tissue damage. Collectively, these results indicate that intranasal PIM-MNE serves as an effective non-invasive delivery system that directs pimozide to the brain while lowering systemic adverse effects for treating Tourette's Syndrome.

**Keywords:** Tourette Syndrome, Pimozide, Mucoadhesive Nanoemulsion, Intranasal Delivery; Box–Behnken Design, Brain Targeting

**PC-45**

**COLON-TARGETED MICROPARTICLE FOR TARGETED DRUG DELIVERY IN INFLAMMATORY BOWEL DISEASE**

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Inflammatory Bowel Disease (IBD), which includes ulcerative colitis and Crohn's disease, which is targeted drug administration to the colon to enhance therapeutic effectiveness and reduce systemic adverse effects of the drug. Conventional oral formulations frequently experience early drug release and inadequate site-specific bioavailability. Colon-targeted microparticles is a great option, porous polymeric fabric, which facilitates significant drug loading, ensures targeted drug release at the targeted site that is colon. Formulated microparticles can be customised with pH-sensitive polymers and enzyme-responsive coatings to provide targeted drug release in the colonic area. This method not only promotes therapeutic results but also increases patient compliance by drug efficiency and side effects. The discussion will emphasise the synthesis methodologies, characterisation parameters, release mechanisms, and techniques of colon-targeted microparticle, while also addressing their potential for delivering anti-inflammatory drugs in the management of inflammatory bowel disease (IBD). microparticles offer a feasible and unique formulation for enhancing colon-targeted drug delivery systems due to their capacity for site-specific, targeted drug release and stability in gastrointestinal environments.

**Keywords:** Microparticle, Prolonged duration of time, IBD, Targeted release.

**PC-46**

**GLASS IONOMER CEMENTS AS SUSTAINED DRUG DELIVERY SYSTEMS IN DENTISTRY**

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Glass Ionomer Cements (GICs) are commonly used in restorative dentistry because of their biocompatibility, ability to chemically bond with tooth structures, and inherent fluoride release. Despite these advantages, conventional GICs release fluoride in an initial burst followed by a rapid decline, which significantly limits their long-term therapeutic effectiveness. This limitation weakens their sustained antimicrobial and remineralization potential both essential for preventing secondary caries and ensuring tooth longevity. As a result, conventional GICs are unable to provide continuous therapeutic benefits. To address this limitation, recent research has focused on incorporating bioactive nanoparticles into GICs, with the aim of improving antimicrobial activity, mechanical performance, and remineralization capacity. However, systematic evaluation of these modifications is still required to establish their effectiveness as sustained drug delivery systems in restorative dentistry. This study aims to evaluate the role of modified GICs as sustained drug delivery systems in dentistry, with a focus on their antimicrobial, remineralization, and mechanical properties using nanotechnology with green approach. Modifications include incorporation of green synthesized nanoparticles to enhance performance. Antimicrobial activity was assessed using Zone of Inhibition (ZOI) and Minimum Inhibitory Concentration (MIC), remineralization potential was measured by Vickers hardness test, and mechanical strength was evaluated using a universal testing machine. Silver nanoparticle (AgNP)-modified GICs demonstrated significant antibacterial activity against Streptococcus mutans. Titanium dioxide ($TiO_2$) nanoparticles improved mechanical strength, while calcium phosphate nanoparticles exhibited notable remineralization potential while maintaining strength within clinically acceptable limits. Nanoparticle-modified GICs exhibit enhanced antimicrobial activity, improved or sustained mechanical strength, and added remineralization benefits, highlighting their potential as dual-function restorative materials and sustained drug delivery systems in modern dentistry.

**Keywords:** Glass Ionomer Cement, Sustained Release, Nanoparticles, Antibacterial, Remineralization.

**PC-47**

**SOLUBILITY ENHANCEMENT OF ACYCLOVIR BY SOLID DISPERSION METHOD**

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Acyclovir is a popular anti-Herpes drug among the antiviral category for the treatment of diseases including Herpes Simplex, Keratitis etc. Acyclovir is the drug of choice for most of these cases but the problem of using this drug is that it has poor oral bioavailability. The conventional routes and therapies available for the treatment of Herpes, Keratitis, includes orally administered tablets but are associated with it is very low bioavailability ranging from 15-30%. Repeated administration of high doses result in infrequent nausea, diarrhoea, rash, and headache. This




ISBN: 978-81-980623-8-3

Problem can be resolved by enhancing the solubility and hence dissolution of poorly water soluble drug acyclovir. The aim of the present study was to formulate and evaluate Acyclovir solid dispersions by gel entrapment method using HPMC E5 and HPMC E15 in the ratios of 1:1, 1:2 and 1:3. The prepared solid dispersions were evaluated for FTIR studies, DSC, drug content, drug release studies and aqueous solubility studies. Acyclovir solid dispersions released the drug up to 96% for one hour in 0.1 N HCl. The drug content was found to be maximum as 98%. The results showing that the solubility of Acyclovir was increased by formulating into solid dispersions.

**Keywords:** Acyclovir, keratitis, solubility, bioavailability, solid dispersion.

**PC-48**

**DESIGN AND CHARACTERIZATION OF NANOFIBERS FOR DUAL DELIVERY OF PHYTOCONSTITUENT AND ANTI-EGFR AGENTS IN ORAL CANCER THERAPY**

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Oral cancer is a major worldwide health issue, causing substantial morbidity and death, particularly in underdeveloped nations. Therefore, novel drug delivery systems capable of improving therapeutic efficacy while minimizing systemic toxicity are urgently needed. Nanofibers have emerged as a versatile platform for localized and controlled drug delivery due to their high surface area-to-volume ratio, tunable porosity, and ability to mimic the extracellular matrix. In this study, electrospun nanofibers were developed as a co-delivery system incorporating a phytoconstituent alongside an anti-EGFR agent. The formulations were systematically characterized using FTIR for functional group interactions, DSC for thermal behavior, NMR for structural confirmation, and XRD to assess crystallinity changes and confirmation upon encapsulation of the drug and SEM which confirmed the nanofiber structure and size (200-300 nm). In vitro drug release studies demonstrated a sustained and controlled release upto 85% drug release in 8 hours. Cytotoxicity was assessed using MTT assay obtaining IC50 at 45.23 µm , while scratch wound healing assay was employed to evaluate the inhibition of cancer cell migration. Cell culture studies revealed a dose-dependent reduction in cell viability, with nanofiber formulations showing significantly higher cytotoxicity compared to free drug counterparts ($p < 0.05$). Furthermore, scratch assay results demonstrated marked inhibition of cancer cell migration, indicating enhanced anti-migratory potential of the dual-drug nanofibers. Collectively, the findings suggest that the phytoconstituent–anti-EGFR nanofiber system provides synergistic anticancer effects with prolonged drug availability, offering a promising therapeutic strategy for oral cancer.

**Keywords:** Nanofibers, Oral Cancer, Combination therapy, Chemotherapy

**PC-49**

**FORMULATION AND EVALUATION OF MANGIFERIN ANTI-DIABETIC NASAL SPRAY BY QBD METHOD**

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The formulation and evaluation of a Mangiferin nasal spray for the potential management of type II diabetes. Mangiferin, a bioactive compound isolated from Mangifera indica leaves, It has several therapeutic effects, including anti-diabetic effects, but its efficacy is limited by poor bioavailability due to first pass metabolism and low solubility. The nasal route was selected to overcome the first-pass metabolism and allows for rapid systemic drug absorption. Mangiferin was extracted from mango leaves, and it's purity was confirmed by the characterization tests like melting point determination and UV and TLC analysis. Preformulation studies were conducted to determine the drug's solubility in various solubilizers, with phenylethyl alcohol (PEA) showing the highest solubility A Stable nasal spray formulation was developed using Mangiferin, Poloxamer, PEA and Oleic acid. A Quality by Design approach utilizing a Box-Behnken design was implemented to optimize the formulation was evaluated for physicochemical characteristics, including pH, viscosity, spray pattern, plume geometry, and the drug content. In this three level four factors is used in which 12 experiments are runs. It helps in determining the source of variability in nasal spray and how to control that variability. The optimized spray demonstrated a suitable pH(6-6.5) and viscosity (0.0025Ns/m2). Stability Analysis confirmed the significance of the experimental model, including a successfully developed, stable Mangiferin nasal spray.

**Keywords**: Mangiferin, Nasal Spray, Anti-Diabetes, Quality by design, Preformulation studies.

**PC-50**

**DEVELOPMENT, OPTIMIZATION AND CHARACTERIZATION OF NOVEL GAULTHERIA OIL-PIROXICAM MICROEMULSION BASED HYDROGELS FOR TRANSDERMAL DELIVERY IN THE TREATMENT OF ARTHRITIS**

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The aim of the present research was to formulate a novel microemulsion based hydrogel (MEH) of gaultheria oil for topical delivery of Piroxicam and evaluated for in-vivo anti-inflammatory & in-vivo anti-arthritic activity. The objective behind the research was to examine the suitability of gaultheria oil in formulating microemulsions (MEs) of Piroxicam for enhanced anti-inflammatory and anti-arthritic effects. The MEs were formulated with surfactant and co-surfactants (S-mix) determined from pseudo ternary phase diagrams and phase titration method. Optimization of MEs was performed using D-optimal design expert software and evaluated for qualitative and quantitative tests. The optimized microemulsion (ME) was fabricated into hydrogels using HPMC K100M in different proportions and evaluated for pH, viscosity, spreadability, drug content, diffusion study, in-vitro drug release studies, in-vivo anti-inflammatory (Croton oil ear edema model) and in-vivo anti-arthritic (Complete Freund's Adjuvant model) activity. It was found that the evaluated parameters such as, pH (7.42), viscosity (6847cps), spreadability (4.54 g.cm/sec), drug content (95.81%), in-vitro diffusion (93.25%), in-vitro cumulative drug release for 12 hours (89.95%) was suitable for dermal application with sustained release characteristics, also exhibited enhanced anti-inflammatory and anti-arthritic activity which is statistically very significant when compared with that of the marketed formulation. The stability studies demonstrated that the formulated MEH was stable as per International Conference on Harmonization (ICH) guidelines. Thus, it can be concluded that, the study can be beneficial for the formulation of MEH using gaultheria oil as a novel encapsulating vehicle for transdermal delivery of Piroxicam.

**Keywords:** Gaultheria oil, piroxicam, microemulsion based hydrogels, anti-inflammatory, anti-arthritic.

**PC-51**

**FORMULATION AND EVALUATION OF UFASOMAL GEL LOADED WITH NORFLOXACIN TO TREAT BACTERIAL INFECTION USING FACTORIAL DESIGN**

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To formulate and evaluate a ufasomal gel loaded with Norfloxacin for controlled transdermal delivery using factorial design. A novel ufasomal gel formulation containing Norfloxacin was developed and assessed for the topical treatment of bacterial infections, including Staphylococcus aureus, utilizing factorial design. The gel was prepared using lipid film hydration technique, incorporating fatty acid vesicles as carriers to enhance drug permeation across the skin. Factorial design was applied to systematically optimize critical formulation parameters such as lipid concentration, surfactant ratio and Norfloxacin content. The optimized ufasomal gel exhibited desirable physicochemical properties, including homogeneity, particle size, viscosity, spreadability, appropriate pH and high drug entrapment efficiency (above 80%), with average vesicle size supporting effective transdermal delivery. In-vitro drug release studies demonstrated sustained Norfloxacin release from the ufasomal gel-with


ISBN: 978-81-980623-8-3

approximately 63-72% release over 8 hours-indicating prolonged therapeutic levels of the antibiotic. Additionally, in-vitro antibacterial assays confirmed robust inhibition of target bacteria, with reduced minimum inhibitory concentration (MIC) for the ufasomal gel compared to pure drug solution, signifying potent antimicrobial activity. Stability investigations revealed that the gel remained physically and chemically stable under standard storage conditions for an extended period. Overall, factorially optimized Norfloxacin-loaded ufasomal gel achieves controlled and extended topical drug release, improved skin permeation and effective antibacterial therapy for transdermal applications.

**Keywords:** Norfloxacin, Span 60, Cholesterol, Oleic acid, Tween 80, Trimethanolamine, Carbopol, Sodium oleate.

**PC-52**

## FORMULATION AND EVALUATION OF IN-SITU GEL LOADED WITH MICROSPONGES OF SUMATRIPTAN SUCCINATE FOR MIGRAINE THERAPY

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The nasal route has proven to be a useful means for targeting drugs to the central nervous system. Utilizing the nasal mucosa as a drug delivery target confers several advantages, including a relatively expansive surface area for absorption and the avoidance of first pass metabolism. Traditional nasal sprays and drops often suffer from low bioavailability and limited therapeutic response due to rapid nasal elimination. This limitation can be addressed through in-situ gelling systems, which transform liquid drops to gel within the nasal cavity. In this study, we attempted to enhance the therapeutic effectiveness of Sumatriptan succinate while mitigating systemic side effects by formulating it as microsponges within an in-situ gel for nasal drug delivery. The microsponges were formulated using the quasi-emulsion solvent diffusion technique and were subsequently integrated into in-situ gel. We attempted varying proportions of Ethyl cellulose polymer in combination with the drug to fabricate the microsponges. Various parameters were meticulously assessed to identify the optimal formulation. Our findings revealed that Formula F6, with a drug-to-polymer ratio of 1:6, exhibited substantial entrapment efficiency of approximately 60.66 ± 4 and possessed a mean particle size of around 111±0.35 micrometers and showed a controlled drug release of 64.1992% in 8 hours. Furthermore, the physicochemical attributes of the in-situ gels, including pH, gelling capacity, gelation time, and rheological properties, were evaluated. Notably, formulation ISG 3 demonstrated controlled drug release when compared to other formulations. These results underscore the potential of Sumatriptan succinate microsponges in in-situ gel form for nasal drug delivery.

**Keywords:** Sumatriptan succinate, microsponges, in-situ gel, migraine

**PC-53**

## SYNTHESIS AND CHARACTERIZATION OF CHITOSAN ENCAPSULATED SILVER NANOPARTICLES FROM THE FRUIT EXTRACT OF GARCINIA GUMMI-GUTTA FOR ITS IN-VITRO EVALUATION OF ANTHELMINTIC ACTIVITY

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Intestinal helminthiases are infections in which adult helminths parasitize the intestine. The rise in drug-resistant helminth infections presents a significant challenge in global health, necessitating the exploration of innovative therapeutic approaches like silver nanoparticles, possessing potent anthelmintic properties and can enhance drug efficacy when combined with biopolymers. The fruit rind of Garcinia gummi-gutta has traditionally been used to treat gastrointestinal problems. In this study, AgNPs were synthesized using a chemical reduction method with hydroalcoholic extract of dried GGG fruit. The resulting AgNPs were then encapsulated with chitosan. Characterization of GFE+Cs-AgNPs was performed using Particle size and Zeta potential, UV-Vis spectroscopy, SEM with EDX, FTIR and XRD, to confirm synthesis, assess size and morphology. The anthelmintic activity of the GFE+Cs-AgNPs was compared with standard albendazole and evaluated against the earthworms Pheretima posthuma by analysing paralysis and death time. UV-Vis spectroscopy indicated formation of AgNPs, with a peak at 300-400 nm. SEM analysis showed agglomerates of dispersed AgNPs ranging from 95-114 nm. FTIR results confirmed the involvement of functional groups in stabilizing the nanoparticles. XRD patterns revealed the morphology of GFE+Cs-AgNPs as face-centered cubic. In-vitro anthelmintic activity showed that, the paralysis and death of worms was earlier at higher concentrations of GFE+Cs-AgNPs (2µg/ml) at 10±2 mins and 17±2 mins, Std (20mg/ml) at 6±2 mins and 9±2 mins respectively. The In-vitro anthelmintic activity revealed a significant dose-dependent reduction in motility and viability of the tested earthworms, suggesting strong potential for these nanoparticles as anthelmintic agents.

**Keywords:** Anthelmintic activity, Chitosan, Garcinia gummi-gutta, Helminthiasis, Silver nanoparticles.

**PC-54**

## DESIGN, DEVELOPMENT AND STANDARDISATION OF CHEWABLE TABLET FOR OSTEOARTHRITIS

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Osteoarthritis is musculoskeletal disorder causes joint pain and stiffness in affected area. Boswellia serrata has proven potential anti-inflammatory activity to treat osteoarthritis. NSAID's which are commonly used for treatment of osteoarthritis are ulcerogenic when taken for long duration. Boswellia serrata has found to be safe for long term use. Patients who are not able to swallow tablet which having bitter taste and odour for that chewable tablet become an alternative option, so we developed chewable tablet of Boswellia serrata extract. Chewable tablet containing Boswellia serrata extract (40%) formulated with suitable binder, disintegrants, fillers, sweetener, flavour and colour. Potato starch paste with water was used to prepared granules with wet granulation method. Prepared granules dried in oven and then lubrication performed with suitable lubricants. Prepared chewable tablets subjected to voluntaries to check the taste, comfort for chewing. Chewable tablets have been found to be acceptable by voluntaries. Pre-compression and post-compression test parameters for chewable tablets were performed. Optimised batch were evaluated for pre-compression and post-compression parameters and all results found under limits. Selected optimised three batches give reproducible result. Through in-vitro study on formulation of Boswellia chewable tablet, we have conclude that dosage form is accepted by voluntaries for its taste, flavour and ease of use.

**Keywords:** Osteoarthritis; Boswellia serrata; Chewable Tablet, Stability studies

**PC-55**

## DEVELOPMENT OF PANCHAGAVYA GHRITA NANOVESICULAR SYSTEMS: A NATURAL PHOSPHOLIPID-BASED APPROACH FOR TRANSDERMAL DRUG DELIVERY

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Panchagavya Ghrita (PG), a traditional Ayurvedic formulation, possesses therapeutic benefits such as wound healing, immunomodulation, and neuroprotection. However, its clinical use is limited by poor stability, unpalatability, and low patient compliance. This study aimed to formulate PG into a nanovesicular system utilizing its natural phospholipids and develop a transdermal liposomal gel. Nanovesicles were prepared using the thin film hydration method and optimized with a $3^2$ factorial design by varying cholesterol and Span 80 concentrations. The optimized liposomal formulation (batch F9) had a particle size of 388.9 nm with a polydispersity index of 0.261 and a zeta potential of –55.3 mV, indicating good colloidal stability. Entrapment efficiency was 88.9% and drug content 70.65%. FTIR analysis showed no drug-excipient interaction. In vitro drug release demonstrated sustained release over 12 hours, with 40.11% release at 5 hours and 88.47% at 12 hours, in contrast to rapid release from traditional PG. The liposomal gel exhibited suitable pH (5.8), viscosity (17,750 cps), and spreadability (15




ISBN: 978-81-980623-8-3

gm.cm/sec), and maintained stability under accelerated storage conditions. The developed nanovesicular system provides a formulation of PG with improved stability, controlled drug release, and transdermal delivery characteristics while potentially increasing patient compliance. This system also offers a potential platform for delivering other poorly soluble natural compounds.

**Keywords:** Panchagavya Ghrita, Natural Phospholipids, Nanovesicular System, Transdermal Drug Delivery, Drug Carriers

**PC-56**

## EXPLORATION OF HYDROGEL BEADS OF NIZATIDINE HYDROCHLORIDE IN GASTROINTESTINAL ULCERS

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Objectives: Nizatidine is a histamine H2 receptor antagonist used to treat gastric and duodenal ulcers. Its short half-life requires frequent administration, leading to patient incompliance. The primary purpose was to develop hydrogel beads for prolonged drug action. Materials and Methods: Hydrogel beads were prepared by ionotropic gelation using gellan gum, aluminum trichloride as cross-linking agent, and Tween 80 as stabilizer. FTIR assessed drug-excipient compatibility. Full factorial design trials were evaluated for drug entrapment efficiency and in vitro drug release. The optimum formula was studied using SEM, DSC, mucoadhesion time, swelling index, and drug release kinetics. Results: Drug entrapment efficiency ranged from 86.33±0.013 to 95.05±0.05%, and in vitro drug release was 82.57±0.065 to 93.37±0.049% for 10h. The swelling index of optimized formulation was 71.9±0.03% at 6h. Drug release followed zero-order kinetics and Korsmeyer-Peppas model. SEM results showed irregular beads with uneven, dense surfaces after drying. FTIR spectra indicated no considerable chemical interactions between drug and excipients. Stability studies showed no substantial changes in parameters. Conclusion: The study concluded that nizatidine-gellan gum hydrogel beads are a promising, biocompatible approach to achieve therapeutic action by controlling drug release rate in gastrointestinal ulcer treatment.

**Keywords:** Nizatidine, hydrogel beads, ionotropic gelation, gellan gum, aluminium trichloride

**PC-57**

## FORMULATION AND DEVELOPMENT OF ELASTIC VESICLE AS DRUG CARRIER FOR OPHTHALMIC DRUG DELIVERY SYSTEM

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Ciprofloxacin hydrochloride, a second-generation fluoroquinolone derivative, is widely used for the treatment of ocular infections. However, its conventional solution dosage form requires frequent administration due to rapid precorneal elimination and limited ocular residence time. Vesicular drug delivery systems have been reported to prolong and control drug action at the corneal surface, but they still face challenges such as tear-mediated drainage. In the present study, an attempt was made to formulate niosomes encapsulating Ciprofloxacin HCL using a $3^2$ full factorial design. The prepared niosomes were evaluated for vesicle size, percent drug entrapment efficiency, in-vitro drug release kinetics, and stability. To further enhance ocular retention, an in- situ gel system was developed by dispersing the niosomes in a polymeric matrix containing Carbopol 940 and Hydroxypropyl methylcellulose (HPMC K4M). The in-vitro release profile of the niosomal in-situ gel demonstrated sustained drug release, with the minimum inhibitory concentration (MIC) of 4 µg/ml achieved within 1-2 hours. The findings suggest that niosomal in- situ gel formulations hold significant potential as novel carriers for effective and sustained ophthalmic delivery of Ciprofloxacin HCL.

**Keywords:** Niosomes, In-situ gel, Ophthalmic drug delivery, Ciprofloxacin HCL, Factorial design.

**PC-58**

## FABRICATION, CHARACTERISATION AND OPTIMIZATION OF GLIMEPIRIDE NANOCRYSTALS USING PROBE SONICATION METHOD FOR AUGMENTING SOLUBILITY

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Poor aqueous solubility is a major obstacle to the oral bioavailability of Biopharmaceutics Classification System (BCS) Class II drugs, where dissolution is the rate-limiting step. This study aimed to develop and optimize glimepiride nanocrystals to enhance their solubility and oral bioavailability. Glimepiride, an antidiabetic drug with high permeability but low solubility, was selected as the model compound. Nanocrystals were prepared using an Anti-Solvent precipitation and probe sonication technique with Soluplus and PVP K30 as stabilizers. Preformulation studies confirmed drug identity and purity via FTIR and DSC analyses. Solubility and dissolution studies demonstrated markedly improved performance of nanocrystal batches compared with the pure drug across various media. Among eleven formulations, Batch F3 (Soluplus 10 mg) showed the highest solubility (4.52 mg/mL in phosphate buffer pH 6.8), approximately an eight-fold increase over the pure drug. Optimization using central composite design identified polymer concentration and stirring speed as critical factors influencing solubility and particle size. The optimized nanocrystal formulation achieved a solubility of 4.52 mg/mL with a mean particle size of 176 nm, PDI of 0.183, and zeta potential of –26.5 mV, indicating good homogeneity and electrostatic stability. Drug content of GLM Nanocrystals was approx.92%, suggesting minimal processing losses. Ex vivo permeation studies using excised intestinal tissue confirmed enhanced solubility of GLM nanocrystals compared with the pure drug, while preliminary in vivo pharmacokinetic evaluation in rats demonstrated significantly improved oral bioavailability. These findings underscore nanocrystal technology using probe sonication method as a robust platform to overcome dissolution limitations of BCS Class II drugs and support its potential for scalable, patient-compliant oral delivery system.

**Keywords:** Glimepiride, BCS Class II, Nanocrystals, Anti - Solvent Precipitation technique, Probe sonicator.

**PC-59**

## FORMULATION, PREPARATION AND EVALUATION OF SITAGLIPTIN CONTROL-RELEASE TABLETS BY USING TERMINALIA CATAPPA GUM

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The present study was aimed at the formulation and evaluation of controlled release tablets of Sitagliptin, an antidiabetic drug, using Terminalia catappa gum as a natural polymeric release retarding agent. Sitagliptin, a selective DPP-4 inhibitor, has a short half-life and requires frequent dosing, which may lead to poor patient compliance. The use of natural gums as release modifiers is gaining significant importance due to their biocompatibility, safety, biodegradability, and cost-effectiveness. In this study, Terminalia catappa gum was extracted, purified, and incorporated into matrix tablets by the direct compression method at varying concentrations. The prepared formulations were subjected to evaluation for pre-compression parameters (flow properties) and post-compression parameters such as hardness, friability, weight variation, thickness, and drug content uniformity. In vitro drug release studies were performed using a USP dissolution apparatus in phosphate buffer (pH 6.8) to simulate intestinal fluid. The results demonstrated that increasing concentrations of Terminalia catappa gum progressively retarded the release of Sitagliptin, achieving controlled release up to 12 hours. The optimized formulation showed drug release kinetics following Higuchi's model with a non-Fickian diffusion mechanism. Stability studies confirmed that the selected formulation was stable under accelerated storage conditions. The study concludes that Terminalia catappa gum can be effectively used as a natural, safe, and economical polymer for the development of controlled-release Sitagliptin tablets, thereby enhancing patient compliance in diabetes management.

**Keywords:** Sitagliptin, Controlled release, Terminalia catappa gum, Natural polymer, Matrix tablet, Diabetes mellitus.

**PC-60**




ISBN: 978-81-980623-8-3

**FORMULATION AND CHARACTERIZATION OF NOVEL CO-CRYSTALLIZED VALSARTAN FLOATING TABLETS FOR PULSATILE AND CHRONOTHERAPEUTIC MANAGEMENT OF CARDIOVASCULAR DISEASES**

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Pulsatile Drug Delivery Systems (PDDS) are new formulations designed to quickly release medications after a set delay. These systems ensure that medication is given in the right dose, at the right time, and at the right place. This improves both treatment outcomes and patient adherence. PDDS work well with the body's natural circadian rhythm, which affects sleep and various bodily processes. By syncing drug release with these rhythms, PDDS enhance time-related effects and reduce side effects.PDDS can be made as single-unit systems, such as capsular, osmotic, erodible, or rupturable coatings, or as multiple-unit systems, which include membrane-based, rupturable, or osmotic-rupturable types. In this study, Valsartan was selected for formulation. It is a BCS Class II drug, meaning it has high permeability but low solubility. A co-crystallization method was used to tackle its low solubility. We applied a Quality by Design (QbD) approach using Design of Experiments (DoE) software. We employed factorial design to improve a fast-dissolving tablet. Sodium Starch Glycolate (SSG) and Croscarmellose Sodium (CCS) acted as superdisintegrants, while mucilage from Hibiscus leaves was used as a natural polymeric coating agent to control release.This research highlights PDDS as an effective strategy for managing hypertension. It increases solubility, improves bioavailability, and enables controlled pulsatile release of Valsartan. This approach not only addresses patient adherence but also lowers side effects, making PDDS a vital part of innovative drug delivery research.

**Keywords:** Pulsatile Drug Delivery System (PDDS), Circadian Rhythm, Valsartan, Co-crystallization, Quality by Design (QbD), Hibiscus Leaf Mucilage.

**PC-61**

**PREPARATION AND CHARACTERIZATION OF LIPOSOME LOADED DISSOLVABLE MICRONEEDLES**

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The current study Include the preparation of liposome loaded dissolvable microneedles. The basic need of research is Liposome and microneedles are novel drug delivery system will affect the release profile of the drugs by minimizing the side effects. The major problem with the orals for is nausea, vomiting, sores in mouth, first pass metabolism, liver working problems that can be cured by the microneedles. The parenteral route having the disadvantage of pain that can relieved by microneedles.Microneedles are new transdermal drug delivery systems, which enhance permeability and improve the transdermal delivery efficiency of drugs more effectively compared with others technology.Based on this, the combination of liposomes and dissolvable microneedles is an effective strategy that may improve the permeability of drugs and regulate drug release at the same time. The major problem with the topical route is the barrier of the stratum cornium, which of drugs cannot cross by some drugs, this problem can also be altered by the use of the microneedles. Anakinra drug is an IL-1 antagonist for the management of Rheumatiod arthritis. There is no wastage of drug is possible, which will happens in the other dosage form. The work reduces the toxicity occurs due to the repeated administration of drug causes by the accumulation in the body.Self-medication is possible in the microneedles and the it was a painless process for administration of drug insertion into intra dermal route

**Keywords:** Liposomes, Dissolvable Microneedles, Anakinra, IL-1 antagonist.

**PC-62**

**DEVELOPMENT AND ANTIMICROBIAL ASSESSMENT OF AN HERBAL GEL INCORPORATING ETHANOLIC EXTRACT OF MUKIA MADERASPATANA (L)**

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The present study aimed to develop and evaluate an herbal gel formulation containing the ethanolic extract of Mukia maderaspatana (L.), focusing on its antimicrobial efficacy and wound healing potential. Mukia maderaspatana (L.), a traditionally used medicinal plant, was collected from Namakkal, Tamil Nadu, authenticated, and subjected to systematic processing, including Physicochemical parameters such as total ash, acid-insoluble ash, water-soluble ash, and extractive values were assessed, confirming the purity and quality of the plant material. Phytochemical screening revealed the presence of biologically active constituents such as alkaloids, flavonoids, cardiac glycosides, saponins, tannins, and steroids, with the absence of carbohydrates, proteins, mucilage, and fixed oils. Herbal gels were formulated using Carbopol 934, ethanol extract at varying concentrations (0.1%, 0.15%, 0.2%, and 0.25%), and standard excipients. The herbal gel formulation was evaluated for physical appearance, homogeneity, pH, viscosity, and spreadability, all of which showed favorable characteristics. In-vitro antimicrobial activity was tested against Staphylococcus aureus, Bacillus subtilis, Escherichia coli, and Pseudomonas aeruginosa using the disc diffusion method. The ethanolic extract demonstrated significant antimicrobial activity, with the highest inhibition zones observed at 300 µg/mL. The formulated herbal gel also exhibited antimicrobial activity but to a slightly lesser extent than the pure extract. Statistical analysis confirmed the significance of the results ($p<0.05$). The study concludes that Mukia maderaspatana (L.) ethanolic extract possesses notable antimicrobial properties and can be successfully formulated into a stable herbal gel with potential application in wound healing and topical antimicrobial treatment.

**Keywords:** Herbal gel, Mukia Maderaspatana, Carbopol 934, antimicrobial activity

**PC-63**

**FORMULATION AND EVALUATION OF POLYMERIC NANO MICELLES CONTAINING AN ANTI CANCER AGENT**

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This study was undertaken to develop nanomicelles encapsulating Sorafenib tosylate using a Quality by Design (QbD) approach, aiming to enhance oral drug delivery and performance. Nanomicelles were fabricated via a dry-down (evaporation) method, and a definitive screening design was employed to evaluate the effect of key formulation and process variables, including drug amount, drug-to-polymer ratio, polymer-to-polymer ratio, types and ratios of polymer and stabilizer, as well as sonication settings. The primary response variables were particle size and entrapment efficiency. Entrapment efficiencies ranged from 80.2±3.81% to 96.83±4.12%, while particle sizes varied between 101.2 nm and 190.5 nm, accompanied by polydispersity index values of 0.203 to 0.345. In vitro drug release profiles were best described by the Korsmeyer- Peppas kinetic model, with "n" values between 0.5847±0.054 and 0.7311±0.077, indicating non-Fickian (anomalous) diffusion as the main release mechanism. The amount of drug demonstrated a significant positive impact on particle size and a negative impact on entrapment efficiency. Numerical optimization through a desirability function identified the formulations that best satisfied target criteria. Among four optimal check formulations, CF1 matched predicted values most closely, exhibiting a particle size of 102.3 nm, encapsulation efficiency of 93.5±1.36%, and a sustained drug release for up to 12 hours. To improve stability, the CF1 formulation was further lyophilized and incorporated into capsules, positioning it as a promising strategy for optimized Sorafenib delivery.

**Keywords:** Sorafenib tosylate, nanomicelles, Quality by Design (QbD), cancer theraphy, lyophilization

**PC-64**

**FORMULATION AND EVALUATION OF DRY POWDER CONTAINING RIFAMPICIN AND HYALURONIC ACID LOADED MIXED POLYMERIC MICELLE FOR TREATMENT OF PULMONARY TUBERCULOSIS.**

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Tuberculosis (TB) is a global infectious disease caused by Mycobacterium tuberculosis, predominantly affecting the lungs. It remains a major public health concern, with a significant impact on morbidity and mortality worldwide. The standard treatment for TB involves a combination of antibiotics, and Rifampicin (RIF) is a key component of the first-line drug regimen. RIF is highly effective in killing the bacteria and shortening the treatment duration. However, its clinical utility is marred by several limitations, such as poor aqueous solubility, limited tissue penetration, and potential adverse effects. Additionally, the emergence of drug-resistant strains poses a significant challenge in TB management. In this research project, we aimed to address the limitations of Rifampicin by developing an innovative inhalable dry powder formulation. The formulation involved encapsulating RIF and HA (Hyaluronic Acid) in mixed micelles comprised of TPGS and Poloxamer 407 using the cold method. The mixed micelles system offers improved drug solubility, enhanced tissue penetration, and the potential to overcome drug resistance. We extensively evaluated the formulation for various physicochemical parameters, including particle size, entrapment efficiency, and zeta potential, to ensure its quality and stability. Our findings demonstrate the successful preparation of RIF-HA-P-MM dry powder, which exhibited excellent physicochemical attributes, including a spherical morphology and high entrapment efficiency. The sustained drug release over 8 hours and optimal aerodynamic properties further highlight its potential for targeted pulmonary delivery. This inhalable dry powder formulation represents a significant advancement in TB therapy, providing a more effective and precise drug delivery system. By overcoming the limitations of Rifampicin, our work holds immense importance in revolutionizing tuberculosis treatment, offering better patient outcomes, and contributing to the global efforts to combat this infectious disease.

**Keywords:** Polymeric mixed micelles, Dry powder, Encapsulation, Aerodynamic property.

**PC-65**

## FORMULATION AND CHARACTERIZATION OF NANO-STRUCTURED LIPID CARRIERS FOR IMPROVED TOPICAL DELIVERY OF GABAPENTIN IN NEUROPATHIC PAIN MANAGEMENT

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Neuropathic pain remains a major clinical challenge due to limited efficacy and systemic side effects of conventional oral therapies. Gabapentin, a first-line drug for neuropathic pain, suffers from low bioavailability and requires frequent dosing, leading to patient non-compliance. In this study, Nano-Structured Lipid Carriers (NLCs) were designed and characterized to enhance the topical delivery of gabapentin. The NLCs were prepared using a hot homogenization–ultrasonication method, employing biocompatible solid and liquid lipids along with suitable surfactants. The formulations were evaluated for particle size, polydispersity index (PDI), zeta potential, entrapment efficiency, and morphology using dynamic light scattering and electron microscopy. Optimized NLCs exhibited particle size in the nanometer range (<200 nm), narrow PDI, high entrapment efficiency (>80%), and stable zeta potential. In-vitro drug release studies revealed a biphasic release profile with an initial burst followed by sustained release, while ex-vivo permeation studies across rat skin demonstrated significantly enhanced penetration compared to conventional formulations. Additionally, in-vivo evaluation in neuropathic pain models indicated improved analgesic efficacy and prolonged duration of action. The findings suggest that gabapentin-loaded NLCs can serve as a promising topical delivery system, offering site-specific action, reduced systemic exposure, and improved patient compliance in the management of neuropathic pain.

**Keywords:** Gabapentin, Nano-structured lipid carriers, Topical drug delivery, Neuropathic pain

**PC-66**

## DEVELOPMENT AND EVALUATION OF LICORICE EXTRACT (GLYCYRRHIZA GLABRA) NANOPARTICLE-LOADED BUCCAL FILMS FOR TREATING ORAL MUCOSAL ULCERS BY APPLYING THE 32 FULL FACTORIAL DESIGN.

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Oral mucosal ulcers represent painful inflammatory lesions and an enormous impact on patient's comfort and the quality of life. The current study aimed to formulate and assess the potential of licorice extract (Glycyrrhiza glabra) nanoparticle-loaded buccal films as a treatment system for treating oral ulcers. Nanoparticles were formulated to improve the solubility, stability, and bioavailability of the extract and then incorporated into the mucoadhesive buccal films. A $3^2$ full factorial design was used to systematically optimize formulation variables and study the effect of critical variables on mechanical strength, drug release, and mucoadhesion. The films were evaluated for their physical properties, in vitro drug release, and surface morphology. The optimized films showed more sustained release and bioadhesion, indicating the possibility of licorice-based nanoparticle-loaded buccal films with high potential to be a natural, non-toxic, patient-friendly therapeutic option.

**Keywords:** Licorice extract, Glycyrrhiza glabra, Buccal films, Nanoparticles, Oral ulcers, Factorial design.

**PC-67**

## FORMULATION AND EVALUATION OF FAMOTIDINE FAST DISSOLVING TABLETS USING NATURAL SUPER DISINTEGRANTS

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Famotidine, a histamine $H_2$-receptor antagonist used for gastric ulcers, gastroesophageal reflux disease, and Zollinger–Ellison syndrome, often shows poor patient compliance due to conventional tablets with delayed onset of action. This study aimed to develop fast dissolving tablets (FDTs) of Famotidine using natural super disintegrants to enhance disintegration, dissolution, and bioavailability. Tablets were prepared by direct compression with Plantago ovata husk, banana powder, and fenugreek seed powder along with suitable excipients. The formulations were evaluated for weight variation, hardness, friability, wetting time, water absorption ratio, drug content, disintegration, and dissolution. Optimized tablets exhibited hardness of 3–4 kg/cm², friability below 1%, uniform drug content (98–101%), and disintegration within 20 seconds. Wetting time, water absorption ratio confirmed rapid water uptake, facilitating faster disintegration. In-vitro dissolution studies in simulated gastric fluid (pH 1.2) showed over 95% drug release within 15 minutes, compared to 62% from marketed tablets. The improved dissolution was attributed to the synergistic effect of natural disintegrants in enhancing breakup and wettability. Overall, the study confirms that natural super disintegrants are effective, economical, and biocompatible alternatives to synthetic ones in the formulation of Famotidine FDTs, offering faster onset of action, better compliance, and improved therapeutic efficacy.

**Keywords:** Famotidine, Fast dissolving tablets, Natural super disintegrants, Disintegration time, Dissolution.

**PC-68**

## FROM VIRTUAL SCREENING TO NANOFORMULATION: A DUAL-COMPONENT STRATEGY FOR CHRONIC WOUNDS

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ISBN: 978-81-980623-8-3

Diabetic wounds heal poorly due to rapid VHL-mediated degradation of HIF-1α, a key transcription factor regulating angiogenesis and tissue repair. Stabilizing HIF-1α by disrupting its interaction with VHL offers a promising therapeutic avenue. An integrated in-silico approach involving pharmacophore modeling, virtual screening, ADMET filtering, docking, MM-GBSA, and MD was employed to identify natural VHL inhibitors. To enhance delivery, hit molecule was co-formulated with metal oxide, into nanostructured lipid carriers (NLCs). NLCs were prepared via microemulsion method and optimized using Box–Behnken design, with particle size, zeta potential (ZP), and polydispersity index (PDI) identifed. Morphology, entrapment efficiency, and stability were assessed. PPI validation confirmed a strong VHL:HIF-1α interaction (score 0.999). Synephrine consistently showed favorable docking scores, low binding free energies, and stable MD trajectories, indicating effective blockade of the degradation interface. Optimized Synephrine–ZnO NLCs had a particle size of 113 nm, ZP +51 mV, and PDI 0.214, demonstrating excellent stability and narrow distribution. Entrapment efficiency was 82%, ensuring high drug loading. SEM and TEM revealed spherical, well-dispersed nanoparticles. Mechanistically, Synephrine is expected to preserve HIF-1α levels to restore angiogenic signaling, while ZnO provides antimicrobial action, oxidative stress reduction, and tissue regenerative support—together enhancing wound repair. An integrated in-silico to formulation approach successfully developed dual-drug (Synephrine–ZnO) loaded NLCs, was successfully optimized and characterized, representing a novel and targeted nanotherapeutic approach for diabetic wound healing.

**Keywords:** Diabetic wound, HIF-1α, VHL, Zinc oxide, NLC, Box-Behnken design.

**PC-69**

## FORMULATION AND OPTIMIZATION OF LORNOXICAM LOADED NANOSTRUCTURE LIPID CARRIER GEL FOR TRANSDERMAL DRUG DELIVERY SYSTEM

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In this study, a nanostructured lipid carrier (NLC) gel of Lornoxicam (LNX) was developed as a novel and convenient transdermal drug delivery system to manage inflammation while minimizing the side effects associated with oral use. LNX-loaded NLCs were prepared by the ultrasonication method employing glyceryl palmitostearate as the solid lipid, cinnamon oil as the liquid lipid, Cremophor RH40 as the surfactant, and PEG 200 as the co-surfactant and penetration enhancer. The formulation was optimized using Central Composite Design (CCD) and incorporated into a poloxamer 407 gel base to obtain the final LNX-NLC gel. The optimized formulation was evaluated for skin irritation, anti-inflammatory activity, and ex-vivo skin permeation. Results indicated that the LNX-NLC gel showed significantly higher permeation across the skin compared to a conventional gel. It also exhibited strong anti-inflammatory activity, with better therapeutic effectiveness than oral treatment, and did not cause irritation to the skin. Overall, the study demonstrates that LNX-NLC gel is a promising transdermal nanocarrier for effective anti-inflammatory therapy. It provides enhanced drug permeation, improved efficacy, and reduced side effects compared to conventional formulations, making it a viable alternative to oral administration.

**Keywords:** Lornoxicam, Nanostructured lipid carrier, Transdermal delivery, Anti-inflammatory

**PC-70**

## FORMULATION AND EVALUATION OF ORODISPERSIBLE DOSAGE FORM OF NANOPARTICULATED ANTI ANGINAL DRUG

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Amlodipine besylate (AB), a calcium channel blocker used for hypertension and chronic stable angina, exhibits poor water solubility resulting in compromised bioavailability and therapeutic efficacy. This study aimed to develop and evaluate amlodipine besylate nanoparticles using anti-solvent evaporation technique with multiple stabilizers including PVPK-30, Poloxamer-188, PVA, L-arginine and Tween-80 to enhance solubility and dissolution rate. Nanoparticles were characterized for particle size, drug entrapment efficiency and morphology using SEM, while tablets prepared by direct compression were evaluated against marketed formulations through in-vitro dissolution studies in 0.1N HCl and pH 6.8, with crystallinity changes assessed using DSC and XRD analysis. The formulated nanoparticles exhibited optimal size range (225.7-942.7 nm) with high drug entrapment efficiency (75-98%) and uniform, non-aggregated morphology. Dissolution studies demonstrated remarkable improvement with 99.3±1.37% drug release within 10 minutes compared to 21.9±0.21% from marketed tablets in both pH conditions. DSC and XRD analysis confirmed conversion from crystalline to amorphous form, enhancing dissolution kinetics and suggesting improved bioavailability. Hence, it can be concluded that the optimized formulation of Amlodipine besylate could improve the rate of absorption controlled by the rate of dissolution.

**Keywords:** Amlodipine besylate, nanoparticles, anti-solvent evaporation, bioavailability, dissolution enhancement

**PC-71**

## DEVELOPMENT AND CHARACTERIZATION OF HERBAL HARD CANDY LOZENGES FOR PEDIATRICS

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The current research centers on the development, and evaluation of herbal lozenges targeted at pediatric use for managing cough and sore throat, utilizing the therapeutic benefits of Licorice (Glycyrrhiza glabra), Tulsi (Ocimum sanctum), and Ginger (Zingiber officinale) powders. The choice of these herbs is based on their established antimicrobial, anti-inflammatory, expectorant, and soothing properties, aiming to provide a safer, more palatable alternative to conventional chemical lozenges, which often pose challenges related to taste, side effects, and compliance in children.The lozenges were formulated using the fusion method, with jaggery as a natural base, honey as a sweetener and binder, and lemon as a flavoring agent to enhance acceptability and therapeutic efficacy. The preparation involved accurately weighing and blending the herbal powders, melting jaggery, adding honey, incorporating the herbal blend, and finally mixing in fresh lemon juice before molding and cooling. Each step aimed to preserve the integrity of the active compounds and ensure uniformity in the final product. Results indicated that the formulated lozenges possessed excellent organoleptic properties, described as glossy, golden brown, with a pleasant herbal aroma, sweet and slightly spicy taste, and smooth, hard texture—ensuring child acceptability. Physical evaluation showed uniform weight (3.19 g3.19g), hardness within the ideal range (3.5–4.0 kg/cm23.5–4.0kg/cm2), low friability (0.63%0.63%), rapid disintegration (9.15 min9.15min), and pH suitable for oral use (6.3–6.56.3–6.5). Moisture content averaged 5.55%5.55%, well below the maximum threshold for lozenge formulations, ensuring stability and safety. Accelerated stability studies over three months revealed no significant changes in physical appearance, taste, or technical attributes, with all parameters remaining within acceptable pharmacopoeial limits.

**Keywords:** Lozenges, Expectorant, Fusion Method, Herbal

**PC-72**

## DESIGN AND DEVELOPMENT OF FAST DISSOLVING TABLETS OF ACECLOFENAC

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In the current research, the effect of different hydrophilic carriers on the solubility and dissolution rate of Aceclofenac were studied by spherically agglomeration technique. Spherical agglomerates were prepared by using N, N-dimethyl formamidel, water and chloroform as good solvent, poor solvent and bridging liquid, respectively. The quasi-emulsion solvent diffusion technique was used as a method for spherical




ISBN: 978-81-980623-8-3

agglomeration. Spherical agglomeration of Aceclofenac were prepared by using h HPMCE5, h HPMCE15, Polyethylene glycol-6000 and PVP k-30 as water soluble carries proportions like 1:0.5,1:0.75,1:1. The agglomerates were subjected to various physicochemical evaluations such as practical yield, drug content, solubility, flow properities, average particle size,scanning electron microscopy and dissolution studies. The optical electron microscopy studies showed that the agglomerates posseeses a good spherical shape. This study, demonstrated that the successful development of directly compressible spherical agglomerates of Aceclofenac prepared with hydrophilic polymers enhances the in-vitro dissolution property of Aceclofenac, whichcould provide rapid onset of action and potentially increases oral bioavailability.The dissolution rate of Aceclofenac was found to be affected by nature of the superdisintegrant used in the preparation of tablets. Based on the dissolution rate, natural superdisintegrants can be rated as Banana powder < Dry mushroom powder < Modified Gum karaya. The formulation prepared with Modified Gum karaya was offered relatively rapid release of Aceclofenac when compared with other superdisintegrants used in this investigation.

**Keywords:** Aceclofenac, Spherical Agglomerates, Emulsion solvent diffusion, Modified Gum karaya

**PC-73**

## FAST DISSOLVING ORAL THIN FILMS, A NOVEL DOSAGE FORM FOR ENHANCED DRUG DELIVERY

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This study aimed to design and characterize rapidly disintegrating oral thin films incorporating eletriptan, a frontline therapeutic agent for migraine treatment. Oral thin films represent a novel dosage forms recognized for their ability to dissolve quickly in the oral cavity, eliminate the need for water, and improve overall patient compliance. Films were fabricated using the solvent casting technique with hydroxypropyl methylcellulose (HPMC E15), maltodextrin, and suitable excipients to achieve optimal film-forming properties. The formulations were systematically evaluated for their physicochemical and pharmaceutical attributes, including thickness uniformity, folding endurance, surface pH, morphology, tensile strength, elongation capacity, drug loading accuracy, disintegration time, and dissolution behavior. Among the prepared batches, formulation F7 containing HPMC E15 demonstrated superior characteristics, exhibiting a rapid disintegration time of approximately 10 seconds, high dissolution efficiency with nearly complete drug release nearly 98% within 20 minutes, and favorable stability under storage conditions. Comparative assessment against the pure drug confirmed enhanced dissolution, suggesting improved bioavailability. Overall, the results underscore the potential of fast-dissolving oral thin films as a patient-friendly and efficient delivery system for migraine management, ensuring a faster onset of therapeutic action along with higher treatment convenience.

**Keywords:** Oral thin film, Solvent casting method, Eletriptan, HPMC

**PC-74**

## DESIGN AND EVALUATION OF MICROCAPSULES OF NONSTEROIDAL ANTI-INFLAMMATORY DRUG FOR COLON SPECIFIC DRUG DELIVERY

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This study focused on creating and assessing a colon-targeted, pulsatile conveyan framework for Flurbiprofen (FP), a non-steroidal anti-inflammatory medicate (NSAID) characterized by a brief half-life that requires customary organization. To handle this issue FP-loaded microcapsules were made utilizing pH-sensitive polymers Eudragit RS/RL-100 through the emulsion dissolvable dissipation strategy. The entirety framework was coated with 5% cellulose acetic acid derivation phthalate (CAP) to give resistance to stomach conditions and encourage discharge in the colon. The characterization of FP microcapsules included IR, SEM, DSC, molecule measure examination, sedate substance evaluation entanglement productivity assessment and in vitro disintegration testing. The discharge of FP was kept up and essentially administered by dissemination, adjusting best with zero-order and Higuchi models and shown a non-Fickian discharge component concurring to Korsmeyer-Peppas examination. Raising the sum of hydrogel polymer come about in a drawn out slack time and delayed sedate discharge approving programmable conveyance. The discharge characteristics of optimized definitions were comparable to those of a commercial item. In this study can be concluded that chronotherapeutic, colon-targeted pulsatile conveyance component, able to discharge FP in a controlled mold amid a 2–24 hour time allotment comparing with circadian cycles noteworthy in conditions such as arthritis.

**Keywords:** Pulsatile, Colon-targeted gadget, Chronotherapy, Circadian cycle, Flurbiprofen.

**PC-75**

## DESIGN AND CHARACTERIZATION OF PULSATILE DRUG DELIVERY OF TRAMADOLOL HYDROCHLORIDE

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In the present study, an effort was made to develop the pulsatile drug delivery of Tramadol hydrochloride to the colon. A time delayed capsule was prepared by sealing the microspheres inside the insoluble hard gelatin capsule body with erodible hydrogel plug. The microspheres were prepared by emulsion solvent evaporation technique... Optimized microsphere formulations were selected based on dissolution studies. The entire device was enteric coated, so that the variability in gastric emptying time can be overcome and a colon-specific release can be achieved. Hydrogel plug (HPMCK100 and lactose in 1:1 ratio) having 4.5kg/cm2 hardness and 100 mg weight was placed in the capsule opening and found that it was satisfactory to retard the drug release in small intestinal fluid and to eject out the plug in colonic fluid and releasing the microspheres into colonic fluid after a lag time criterion of 5 hours. In order to simulate the pH changes along the GI tract, three dissolution media with pH 1.2, 7.4 and 6.8 were sequentially used. FTIR study confirmed that there was no interaction between drug and polymer. Among all the formulations Tramadol hydrochloride microspheres prepared with Eudragit RL 100 in 1:2 ratio shown prolonged release for a period of 12 hours. The obtained results revealed the capability of the system in delaying drug release for a programmable period of time and can prevent a sharp increase in the blood pressure during the early morning hours, a time when the risk of hypertension is the greatest.

**Keywords:** Metaprolol succinate; Hypertension; Pulsatile;Microspheres; Hydrogel Plug; Solvent evaporation

**PC-76**

## FORMULATION AND EVALUATION OF BUCCAL TABLETS OF FELODIPINE BY USING NATURAL POLYMERS

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The main aim of the present study was to formulate and evaluate buccal tablets for buccal drug delivery of Felodipine by using natural polymer in order to overcome bioavailability related problems and reduce dose-dependent side effects. Different five formulations of buccal tablets were prepared by using Xanthan gum as natural polymer in different concentrations by the direct compression method. The prepared buccal formulations were evaluated for various parameters like physical appearance, thickness, swelling index, surface pH, mucoadhesive strength, drug content, weight uniformity, in-vitro drug dissolution, and stability studies. The swelling index was proportional to the polymer content. The surface pH of all tablets was found to be satisfactory, i.e., close to neutral pH; hence, buccal cavity irritation should not occur with these tablets. The drug release and diffusion from the buccal tablets depends on the concentration and type of polymer used in the formulation. From the in-vitro drug release study, it was found that formulation F3 has a good drug release of 96.40% when compared to other formulations. The formulation F3, containing Felodipine and Xanthan gum as natural polymer, is the optimised formulation. Overall, buccal tablets were successfully prepared for Felodipine, and their




ISBN: 978-81-980623-8-3

evaluation suggested excellent quality and uniformity in tablet characteristics.

**Keywords:** Felodipine, Buccal tablet, Direct compression method, Natural polymer like Xanthan gum and Chitosan as penetration enhancers

**PC-77**

**FORMULATION AND EVALUATION OF OCULAR IN- SITU GEL OF NORFLOXACIN BY USING NATURAL POLYMERS**

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Conventional ocular drug delivery through eye drops is hindered by rapid nasolacrimal drainage and limited residence time, leading poor bioavailability. In situ gels, capable of reversible sol–gel transition, enhance drug retention and absorption. The present study aimed to formulate ocular in situ gels of Norfloxacin using chitosan and poloxamer for bacterial infections. Six formulations were prepared by pH and temperature dependent gelation with varying chitosan concentrations. The gels were evaluated for clarity, pH, drug content, gelling capacity, viscosity, sterility, in vitro drug release, ocular irritation, antimicrobial activity, and stability. All formulations were transparent, uniform, and exhibited physiological pH (7.1–7.4). Drug content was 92–98%, with FTIR confirming no drug–polymer interaction. Rheological analysis showed pseudoplastic flow. In vitro release studies demonstrated sustained Norfloxacin release more than 8 hours, with maximum 98%. Higher chitosan concentrations decreased release rate, indicating controlled delivery. Kinetic modeling revealed first-order, diffusion-controlled, and non-Fickian release. Antimicrobial tests confirmed effective bacterial inhibition, ocular irritation studies showed non-irritancy. Stability studies demonstrated good physical, chemical stability under room and accelerated conditions. The findings suggest that Norfloxacin in situ gels prepared with chitosan and poloxamer are safe, stable, and effective, offering sustained ocular delivery, improved bioavailability, and enhanced therapeutic efficacy.

**Keywords:** Chitosan; in situ gels; ocular delivery; bioavailability; antimicrobial

**PC-78**

**DEVELOPMENT AND CHARACTERISATION OF CONTROLLED RELEASE TRAMADOL HYDROCHLORIDE MICROPARTICLES LOADED TOPICAL GEL FOR EFFECTIVE PAIN MANAGEMENT**

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The present study aimed to develop a topical gel containing Tramadol Hydrochloride microspheres as a site-specific vesicular carrier using chitosan as a natural biopolymer. Microspheres of Tramadol Hydrochloride were prepared by the ionic gelation method employing sodium tripolyphosphate (Na-TPP) as the crosslinking agent and chitosan as the polymer, and the formulations were characterized for compatibility by FTIR, surface morphology by SEM, particle size distribution, entrapment efficiency, in vitro drug release, and release kinetics. The optimized microsphere batch was incorporated into a chitosan gel base by simple dispersion to prepare both plain Tramadol gel and Tramadol micro-based gel, which were evaluated for clarity, pH, drug content, spreadability, viscosity, in vitro diffusion, skin irritation, analgesic, and anti-inflammatory activity. FTIR confirmed the absence of drug–polymer interaction, while SEM analysis revealed smooth-surfaced microspheres at higher polymer concentrations. The ionic gelation method achieved a maximum entrapment efficiency of 89%, and drug release showed an initial burst followed by sustained release governed by Fickian diffusion. Among the prepared gels, the Tramadol micro-based gel exhibited superior drug release, diffusion, and pharmacological activities compared with the plain gel. The study concludes that Tramadol micro-based gel can enhance clinical efficacy through transdermal delivery by bypassing first-pass metabolism and reducing opioid-like side effects, while incorporation of permeation enhancers may further improve bioavailability and therapeutic potential.

**Keywords:** Tramadol Hydrochloride, Chitosan, Microspheres, Ionic Gelation, Topical Gel, In vitro Release

**PC-79**

**FABRICATION AND EVALUATION OF BILAYERED FILMS OF DULOXETINE HYDROCHLORIDE FOR BUCCAL DRUG DELIVERY**

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The aim of the present study was to formulate and evaluate muccoadhesive bilayered films of Duloxetine hydrochloride by using bioadhesive polymers. Duloxetine hydrochloride is a serotonin–norepinephrine reuptake inhibitor (SSNRI) indicated for the treatment of depression. Duloxetine suffers from reduced oral bioavailability (50%) due to hepatic metabolism.This study aims to develop Duloxetine bucco-adhesive films to improve its bioavailability and to obtain a controlled release of drug throughout the oral cavity. Duloxetine buccoadhesive films were prepared adopting the solvent casting method using hydroxypropyl methylcellulose (HPMC E5 and E15) and with combination of chitosan. The prepared drug loaded films are attatched to a backing layer (HPMCP) to enable unidirectional drug delivery. The prepared films were evaluated for weight uniformity, drug content, folding endurance, surface pH, and In-vitro dissolution studies. The surface pH of all the formulations was found around 6.4 for all the formulations. The drug content for all the formulations of HPMC-Chitosan was found to be 96-99 %. The muco adhesion time was found to be 130-310 minutes for the formulation prepared with HPMC E15-chitosan. The in vitro drug release with combination of HPMC E 5-chitosan extended the drug release up to 8 to 11 hrs and for HPMCE15-Chitosan extended the drug release up to 7 -12 hrs. The muco adhesion time was found to be 130-310 minutes for the HPMC E15-chitosan films and for HPMCE5-Chitosan was found to be 100 to 270 minutes. DSC and FTIR study showed no drug polymer interaction. Therefore, the prepared buccal films offer an alternative route for the administration of duloxetine with the possibility of improving its bioavailability.

**Keywords:** Duloxetine, Buccal films, HPMC-Chitosan, Solvent casting

**PC-80**

**FORMULATION AND EVALUATION OF HERBAL EMULGEL CONTAINING HYPERICUM PERFORATUM LEAF EXTRACT**

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In this study emulgel was formulated using Hypericum perforatum leaf extract. Polymers like sodium carboxy methyl cellulose ,carbopol 974P and xanthan gum were used as gelling agents in various proportions. Liquid paraffin was used as oil phase and a combination of Span 80 and Tween 80 were used as emulsifying agents. Various formulation were prepared by changing the gelling agent and their concentration. The prepared emulgels were evaluated for physical appearance, pH, spreadability co efficient, physical stability, drug content and in-vitro drug release. The formulations were found to have good homogeneity, consistency, no phase separation. The pH of formulation was found to be in the range of 6.18-6.58. The drug content was found to be in the good range indicating uniform distribution of drug. All the formulations have shown good spreadability coefficient. In-vitro diffusion studies were carried out using phosphate buffer and good drug release was shown by F3 formulation.

**Keywords:** Emulgel, Hypericum perforatum, Carbopol, Xanthan gum.

**PC-81**

**DESIGN AND PSEUDOTERNARY PHASE DIAGRAM OF A GALLIC ACID-BASED NANO-EMULGEL FOR TOPICAL DELIVERY IN ATOPIC DERMATITIS**

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Gallic acid is a natural polyphenol with potent antioxidant and antibacterial properties but limited topical bioavailability due to poor permeability and instability. This study aimed to design and pseudoternary phase diagram of a gallic acid-based nano emulgel for topical delivery in atopic dermatitis. A pseudoternary phase diagram is a triangular plot used to map the composition ranges of oil, surfactant/cosurfactant mixture (Smix), and water that form stable nanoemulsion regions. Nanoemulsions were formulated using oleic acid or isopropyl myristate (oil phase), Tween 80/20 (surfactant), and glycerin, propylene glycol, or PEG (cosurfactant). Pseudoternary phase diagrams were constructed by aqueous titration of oil–Smix mixtures at various Smix ratios (1:1, 2:1, 3:1, and 4:1) and oil:Smix ratios ranging from 1:9 to 9:1 to identify nanoemulsion regions. Aqueous titration was carried out by slowly adding distilled water to mixtures of oil and Smix under continuous stirring to observe the point at which a clear and stable nanoemulsion forms. The constructed pseudoternary phase diagrams successfully identified stable nanoemulsion zones, providing a systematic basis for developing an optimized gallic acid–loaded nanoemulgel with improved topical bioavailability.

**Keywords:** Gallic acid, nano-emulgel, atopic dermatitis, topical delivery, pseudoternary phase diagram, aqueous titration.

**PC-82**

## FORMULATION AND EVALUATION OF PLGA-BASED BIODEGRADABLE MICROSPHERES FOR SUSTAINED DELIVERY OF RIVASTIGMINE HYDROGEN TARTRATE

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The present study focuses on the formulation, development, and evaluation of biodegradable Microspheres using poly(lactic-co-glycolic acid) (PLGA) as a polymeric carrier for the Sustained delivery of Rivastigmine hydrogen tartrate, a cholinesterase inhibitor used in the Treatment of Alzheimer's and Parkinson's disease-associated dementia. The goal was to Enhance therapeutic efficacy, reduce dosing frequency, and improve patient compliance Through a controlled drug release approach. PLGA was selected over other polymers such as Hydroxypropyl methylcellulose (HPMC) and ethyl cellulose (EC) due to its unique Advantages—particularly its biodegradability, biocompatibility, regulatory acceptance, and Ability to provide tunable drug release profiles. Unlike EC, which is non-degradable, or HPMC, Which often leads to short-term release, PLGA degrades into metabolically inert byproducts And allows precise control over release duration through adjustment of its lactide- to-glycosideRatio and molecular weight. Microspheres were prepared using the solvent extraction method, With dichloromethane as the organic solvent and polyvinyl alcohol (PVA) as a stabilizer. Preformulation studies included solubility testing, UV-visible spectrophotometric calibration, And drug characterization. Several batches were formulated by varying concentrations of PLGA And other excipients to optimize encapsulation efficiency and release kinetics. The developed Microspheres were evaluated for appearance, pH, viscosity, and in vitro drug release using a Modified Franz diffusion cell. Results confirmed uniform microsphere formation with desirable Sustained-release behavior. Stability studies under ICH guidelines supported the formulation's Robustness. Stability studies of the microsphere formulation were conducted under various Conditions, including room temperature (25 ± 2 °C), hot air oven (50 ± 2 °C), refrigeration (2–8 °C), and deep refrigeration (0 to –4 °C). The formulation was monitored for physical and Chemical stability across all storage environments. Results indicated that the microsphere Formulation remained stable and successfully passed all stability tests. Overall, PLGA emerged As a superior polymer for long- acting injectable microsphere formulations.

**Keywords:** Biodegradable microspheres, Sustained drug delivery, Rivastigmine hydrogen tartrate, Alzheimer's disease, Parkinson's disease-associat, Polyvinyl alcohol (PVA), Encapsulation efficiency, Franz diffusion cell, Biocompatibility

**PC-83**

## INTRANASAL CHIA SEED OIL NANOEMULSION OF FLUOXETINE: A NOVEL APPROACH FOR NOSE-TO-BRAIN DELIVERY IN DEPRESSION

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The present study focused on the development of a chia seed oil (CSO)-based nanoemulsion (NE) of Fluoxetine Hydrochloride (FLX-HCL) for intranasal delivery to enhance nose-to-brain targeting in depression therapy. CSO was chosen as the oil phase owing to its high alpha-linolenic acid content (67.8%) and permeability-enhancing properties. Solubility studies demonstrated maximum solubility of FLX in CSO (10 ± 1.4 mg/mL). Pseudo-ternary phase diagrams revealed a Smix ratio of 2:1 (surfactant:cosurfactant) as optimal, with the batch (5% oil, 45% Smix, 50% water) selected for further evaluation. The optimized NE exhibited droplet size 84.17 to 86.71 nm, PDI 0.258 and 0.271, zeta potential -8.15 to -8.21 mV, transmittance 97%, drug content 87.58 to 88.21%, In vitro release showed sustained drug release of 98.62 ± 1.3% within 8 hours, following Korsmeyer-Peppas kinetics ($R^2$ = 0.9944, n = 1.164). Ex vivo permeation across sheep nasal mucosa revealed 95% drug diffusion in 4 hours with higher flux (20.91 ± 0.17 µg/cm²/h) compared to FLX solution (17.96 ± 0.024 µg/cm²/h).TEM confirmed spherical droplets (15–50 nm), while histopathology demonstrated no mucosal toxicity. Pharmacodynamic studies in Wistar rats indicated enhanced antidepressant efficacy of FLX-NE.Thus, CSO-based FLX-NE is a safe intranasal system for targeted brain delivery in depression management.

**Keywords:** Fluoxetine Hydrochloride, Chia seed oil, Nanoemulsion, Nose-to-Brain Delivery Depression.

**PC-84**

## FORMULATION AND EVALUATION OF GASTRO-RETENTIVE DRUG DELIVERY SYSTEM OF CILNIDIPINE

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Cilnidipine's low oral bioavailability (~13%) and short half-life (~2.5 h) motivate a gastro-retentive system to sustain exposure. Objective: To develop and evaluate effervescent floating tablets using HPMC K4M and Carbopol 934 with sodium bicarbonate–citric acid. Methods: Four batches (F1–F4) were fabricated by dry granulation; evaluated for physical quality, buoyancy, drug content, and in-vitro release in 0.1 N HCl; release kinetics via Higuchi and Korsmeyer–Peppas; accelerated stability of the optimized batch at 40 °C/75% RH for one month. Results: All met pharmacopeial limits, showed floating lag time ≤20 s and >10 h total float, and drug content >97%. F3 (HPMC K4M 80 mg; Carbopol 934 35 mg) achieved 96.4% release at 10 h, while higher polymer loading (F4) slowed release to 83% at 10 h. Kinetic analysis indicated non-Fickian (0.45<n<0.89) release. Overall stability confirmed minimal changes in appearance, buoyancy (~9 h 40 min), assay (~99%), and dissolution (~95%). Tablets met hardness and friability criteria. FTIR spectra showed no drug–excipient incompatibility. F3's floating lag time was ~10.5 s. In-vitro data fit first-order kinetics best for F3 ($r^2$≈0.996). Conclusion: Effervescent floating cilnidipine tablets were successfully developed; the optimized F3 batch combined rapid buoyancy, sustained ten-hour release, and stability, supporting improved gastric residence, bioavailability, adherence, and patient convenience in hypertension therapy.

**Keywords:** Cilnidipine, floating tablets, Effervescent system, HPMC K4M, Carbopol 934, Gastroretentive delivery.

**PC-85**

## DESIGN, DEVELOPMENT AND LIPOSOMAL DRUG DELIVERY FOR BRAIN DISORDERS USING BOX-BEHNKEN DESIGN

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ISBN: 978-81-980623-8-3

Oxcarbazepine is an antiepileptic drug used primarily for the treatment of partial and generalized seizures. It acts by stabilizing hyperexcited neuronal membranes and inhibiting repetitive neuronal firing. Despite its effectiveness, Oxcarbazepine has limited brain bioavailability due to poor permeability across the blood-brain barrier. Advanced drug delivery systems, such as liposomes, are being explored to enhance its CNS targeting. In this study, a liposomal drug delivery system for Oxcarbazepine was developed and optimized using the Box-Behnken Design (BBD), a response surface methodology approach, to overcome these limitations. Three key formulation variables—phospholipid concentration, cholesterol content, and drug-to-lipid ratio—were selected as independent factors, while encapsulation efficiency (%EE), particle size (nm), and cumulative drug release over 24 hours (%CDR) were evaluated as dependent responses. BBD generated 17 experimental runs, and statistical analysis confirmed a significant quadratic model ($p < 0.05$) for all responses. The optimized liposomal formulation exhibited an encapsulation efficiency of 86.2%, particle size of 139.6 nm, zeta potential of –27.1 mV, and 24-hour cumulative drug release of 74.3%, indicating efficient encapsulation, colloidal stability, and sustained release. Transmission electron microscopy revealed uniform, spherical vesicles. Oxcarbazepine liposomes offer a promising strategy for targeted and sustained delivery in the management of epilepsy and related brain disorders. Further In-vivo studies are recommended for therapeutic purpose.

**Keywords:** Oxcarbazepine, Box-Behnken Design, Transmission electron microscopy.

**PC-86**

## FORMULATION AND EVALUATION OF FAST-ORAL DISSOLVING ORAL FILMS OF OXCARBAZEPINE FOR EPILEPSY

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Development and evaluation of Oxcarbazepine, an anticonvulsant drug used for the treatment of epilepsy, as a fast-dissolving oral film are the primary goals of this research. Oral films were formulated by the solvent casting technique with hydroxypropyl methylcellulose (HPMC E5) as film-forming polymer, polyethylene glycol 400 as plasticizer, and different super disintegrants such as sodium starch glycolate, croscarmellose sodium, and crospovidone. Mechanical properties, thickness, weight variation, folding endurance, drug content, and moisture content of the films were determined. Compatibility was evaluated by differential scanning calorimetry (DSC) and Fourier-transform infrared spectroscopy (FTIR). In vitro dissolution and disintegration were performed in phosphate buffer solution (pH 6.8). Mechanical strength studies confirmed that all the formulations had adequate folding resistance and tensile stability. FTIR spectra and DSC thermograms showed no appreciable drug-excipient interactions and proved that the oxcarbazepine was stable in the polymer matrix. Disintegration test results showed that the films disintegrated rapidly between 4 and 15 seconds, varying based on the super disintegrant. Dissolution tests indicated that while other formulations exhibited relatively slower release rates, films prepared with crospovidone delivered the highest drug release, which was above 90% within 20 minutes. Fast-dissolving oral films of oxcarbazepine that were formulated with crospovidone as a disintegrating agent had excellent dissolution performance, rapid disintegration, and optimal mechanical strength. By offering a more patient-friendly alternative to conventional tablets, these films enhance therapeutic efficacy and compliance, especially for pediatric and geriatric patients with difficulty swallowing.

**Keywords:** Fast dissolving-oral films, oxcarbazepine, super disintegrant, differential scanning calorimetry, FTIR

**PC-87**

## FORMULATION AND EVALUATION OF POLYMERIC NANO MICELLES CONTAINING AN ANTI CANCER AGENT

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This study was undertaken to develop nanomicelles encapsulating Sorafenib tosylate using a Quality by Design (QbD) approach, aiming to enhance oral drug delivery and performance. Nanomicelles were fabricated via a dry-down (evaporation) method, and a definitive screening design was employed to evaluate the effect of key formulation and process variables, including drug amount, drug-to-polymer ratio, polymer-to-polymer ratio, types and ratios of polymer and stabilizer, as well as sonication settings. The primary response variables were particle size and entrapment efficiency. Entrapment efficiencies ranged from 80.2±3.81% to 96.83±4.12%, while particle sizes varied between 101.2 nm and 190.5 nm, accompanied by polydispersity index values of 0.203 to 0.345. In vitro drug release profiles were best described by the Korsmeyer- Peppas kinetic model, with "n" values between 0.5847±0.054 and 0.7311±0.077, indicating non-Fickian (anomalous) diffusion as the main release mechanism. The amount of drug demonstrated a significant positive impact on particle size and a negative impact on entrapment efficiency. Numerical optimization through a desirability function identified the formulations that best satisfied target criteria. Among four optimal check formulations, CF1 matched predicted values most closely, exhibiting a particle size of 102.3 nm, encapsulation efficiency of 93.5±1.36%, and a sustained drug release for up to 12 hours. To improve stability, the CF1 formulation was further lyophilized and incorporated into capsules, positioning it as a promising strategy for optimized Sorafenib delivery.

**Keywords:** Sorafenib tosylate, nanomicelles, Quality by Design (QbD), cancer theraphy, lyophilization

**PC-88**

## DOE BASED OPTIMIZATION AND QUALITY CONTROL EVALUATION APPROACH FOR THE DEVELOPMENT OF HERBAL FORMULATION

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Type 2 Diabetes mellitus is a prevalent condition affecting 10.5% of the global population aged between 20 to 79 years. The increasing inclination towards herbal medications is driven by their fewer adverse effects compared to synthetic drugs. Herbal medications present a viable alternative for Type 2 Diabetes mellitus treatment, with Curcuma longa and Salacia chinensis recognized for their anti-diabetic properties due to their inhibition of α-glucosidase, which reduces glucose levels in the bloodstream. Literature review indicates no prior research on the combination of Curcuma longa and Salacia chinensis. Therefore, this study aims to develop a herbal formulation containing extracts of these two herbs using the DoE (Design of Experiments) approach. To address issues of instability under environmental conditions and the bitter taste of herbal compounds, microencapsulation was employed. Organoleptic properties and phytochemical screening of Curcuma longa and Salacia chinensis extracts were conducted. The herbal microcapsules were formulated with these extracts for treating Type 2 Diabetes mellitus, applying DoE with the Design Expert software version 13, using a central composite design model. Nine experimental runs were generated, and for each batch, drug content and cumulative drug release were observed as responses. Sodium alginate and calcium chloride were selected as factor A and factor B (input parameters). Optimization and analysis of the data from DoE revealed batch 3 as the most promising. Flow properties, drug entrapment efficiency, and dissolution study using the USP type 2 dissolution test apparatus were performed for the optimized batch. The marker compounds Curcumin (CUR) and Mangiferin (MAN) in Curcuma longa and Salacia chinensis showed maximum absorbance at 426 nm and 254 nm, respectively. Cumulative drug release and drug content were assessed by UV spectrophotometer. HPTLC analysis of raw materials and formulation was conducted, with methods developed and validated according to ICH guidelines. Solubility, moisture content, and organoleptic properties were evaluated. DSC studies of the optimized batch were performed. In-vitro antioxidant and antidiabetic evaluations of extracts and formulation were carried out using DPPH, α-amylase inhibitory assay, and glucose uptake assay of the optimized batch.




ISBN: 978-81-980623-8-3

**Keywords:** Herbal formulation, Diabetes, Curcuma longa, Salacia chinensis, DoE, microcapsules, central composite design, DPPH, In-vitro antidiabetic, HPTLC

**PC-89**

## PREPARATION AND STATISTICAL OPTIMIZATION OF AMLODIPINE BESYLATE MICROSPHERES VIA 3-FACTOR–3-LEVEL BOX–BEHNKEN DESIGN

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Amlodipine besylate, a calcium-channel blocker, is clinically administered for hypertension, however, plasma level fluctuation and side reaction often occur by the usual formulation. The objective of this study was to prepare sustained release amlodipine besylate-loaded microspheres and optimize its formulation employing 3-factor, 3-level Box-Behnken design. Microspheres were obtained by W/O single emulsion solvent evaporation with the use of Drugcoat® RLPO for the polymer, and Span 80 for surfactant. The factors investigated were the drug-to-polymer ratio, the concentration of surfactant, and the quantity of acetone, whereas the responses were entrapment efficiency (EE) and cumulative percentage release of drug (CPR). The yield varied from 72.47 to 92.17% and microspheres were dominantly spherical with low porosity (10–100 µm). Polynomial equations suggested an increase in Span 80 increased EE and CPR whereas that of Drugcoat* RLPO decreased the same. Optimized formulation (drug polymer ratio 1:1.53, 0.1% surfactant, 3.99 ml acetone) exhibited 85.12% of EE, 86.76% of CPR up to 12 h in the release mode mechanism of Fickian diffusion. These findings further support the usefulness of Box-Behnken design as an effective tool for optimizing amlodipine microsphere formulation toward controlled drug release.

**Keywords:** Box-Behnken design, Amlodipine microsphere, Drugcoat® RLPO, Entrapment efficiency, Controlled release

**PC-90**

## PHARMACEUTICAL TECHNOLOGY

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Pharmaceutical technology is a multidisciplinary field that focuses on the development, production and quality control of medications. It combines principles of chemistry, biology, engineering and material science to ensure that drugs are safe, effective and produced consistently. The core areas of pharmaceutical technology include drug formulation, manufacturing processes, drug delivery systems and regulatory compliance. A key component is formulation science, which involves designing dosage forms such as tablets, capsules, injections or topical creams that ensure optimal drug stability, bioavailability and patient compliance. Innovations in drug delivery-like liposomes, nanoparticles and transdermal patches-have significantly enhanced the Pharmaceutical technology focuses on applying scientific and engineering principles to the design, development and manufacturing of safe, effective and high-quality medicines and drug delivery systems. It encompasses a broad range of activities, from preformulation studies and large-scale production of bulk drugs to the creation of diverse dosage forms like tablets and injections. Key aspects include understanding drug properties, optimizing formulations for improved drug efficacy and patient compliance and navigating complex regulatory guidelines to ensure drug safety and quality. Emerging technologies, such as artificial intelligence for drug discovery and bioprinting for novel delivery systems, continue to expand the field's capabilities, driving innovation in drug product design and development for better patient outcomes. Manufacturing technology in this field employs advanced machinery and automation to scale up production while maintaining quality. Techniques like granulation, coating and sterilization are crucial in ensuring product uniformity and safety. The use of Good manufacturing Practices (GMP) ensures that each batch of medication meets strict regulation standards. Quality control and assurance are essential aspects, involving rigorous testing of raw materials, intermediate products and finished pharmaceuticals. Analytical techniques like HPCL (High-Performance Liquid Chromatography) and spectroscopy are widely used.

**Keywords:** Manufacturing technology, quality control and assurance, drug delivery systems

**PC-91**

## DEVELOPMENT AND CHARACTERIZATION OF MAGNETIC GELS FOR CONTROLLED AND TARGETED DRUG DELIVERY

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This research documents the development and characterization of magnetic gels (MGs) as a delivery platform for controlled release of drugs. MGs were synthesized by incorporating iron oxide nanoparticles into natural polymers like alginate and chitosan, and synthetic polymers like Pluronic F127 and PNIPAM through cross-linking and in-situ synthesis methods. The gels formed were then systematically evaluated for their mechanical properties, thermal stability, and response to external magnetic fields. Among the prepared formulations, the optimized MGs had greater entrapment efficiency and sustained drug release pattern, along with an enhanced therapeutic response when subjected to magnetic hyperthermia. Microscopic and structure analyses showed a homogeneous dispersion of nanoparticles in the gel matrix, while SEM imaging established a stable morphology suitable for biomedical application. Initial in vitro release studies also showed that these systems are capable of site-specific delivery with satisfactory spatial control. However, some limitations like incomplete nanoparticle clustering and variation in release rates were observed, which suggests room for further optimization. Together, the results indicate that MGs are an exciting nanocomposite system for use in oncology, infectious disease treatment, and wound healing with future promise in personalized 3D-printed hydrogel geometries and multi-function therapeutic devices.

**Keywords:** Magnetic gels, Drug delivery systems, Iron oxide nanoparticles, Controlled release, Nanocomposites.

**PC-92**

## MAGNETIC DUAL-PHASE MAKEUP REMOVER WITH ENZYME MICROCAPSULES: A NOVEL COSMECEUTICAL APPROACH

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Conventional makeup removers rely heavily on surfactants and solvents, which often leave residues and may cause skin dryness or irritation. The present study focuses on the development of a dual-phase magnetic makeup remover incorporating enzyme microcapsules, aiming to achieve efficient, skin-friendly cleansing with added novelty of magnetic action. The aqueous phase was formulated using purified water, glycerine, phosphate buffer (pH 5.5–6.0), trehalose as enzyme stabilizer, and encapsulated enzymes (lipase and protease) prepared via ionotropic gelation using sodium alginate and calcium chloride. The oil phase consisted of isopropyl myristate, tocopherol, polysorbate-80, and cosmetic-grade iron oxide ($Fe_3O_4$, 0.2%) to provide magnetic responsiveness. Both phases were combined into a biphasic system designed to redisperse upon shaking. A magnetic cleansing pad composed of microfiber fabric embedded with a coated neodymium magnet was fabricated to assist in the physical removal process. The formulation was evaluated for physical stability, phase separation, enzyme activity retention, viscosity, and makeup removal efficiency using artificial skin models. Stability testing confirmed intact dual-phase separation with uniform redispersion, while enzyme microcapsules maintained >85% activity after one month. The magnetic pad enhanced removal efficiency by lifting the oil–makeup complex, outperforming a marketed control formulation ($p<0.05$). In conclusion, this novel system integrates enzymatic degradation of cosmetic residues with magnetically assisted removal, offering a safe, effective, and innovative cosmeceutical solution with potential for commercial application.

**Keywords:** Dual-phase remover, enzyme microcapsules, iron oxide, magnetic pad, cosmeceutical innovation.




ISBN: 978-81-980623-8-3

**PC-93**

## BERBERINE LOADED BIGEL: A DUAL-PHASE TOPICAL SYSTEM FOR SKIN REJUVENATION

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The study addresses the pressing challenge of skin aging by developing advanced topical delivery systems, integrating natural antioxidants with innovative carrier technologies. Berberine hydrochloride, known for its robust antioxidant, anti-inflammatory, and antimicrobial properties, was chosen as the active agent; a biphasic bigel system combining hydrogel (hydrophilic) and organogel (lipophilic) phases was formulated to enhance skin penetration and therapeutic potential. Hydrogel was optimized using central composite design, employing kappa-carrageenan and starch as gelling agents. The organogel phase consisted of sesame oil, jasmine floral wax, and Span 80. Multiple bigel formulations with varying hydrogel-to-oleogel ratios were prepared and characterized for physicochemical properties, including pH, spreadability, viscosity, and drug content. Advanced analytical techniques such as FTIR, TGA, DSC, XRD, and SEM were used for compatibility, thermal stability, crystallinity, and morphology assessment. In vitro drug release was measured via dialysis membrane diffusion, and antioxidant activity was determined using DPPH assay. Stability studies evaluated integrity under room and refrigerated conditions. The optimized bigel displayed desirable pH, spreadability, and viscosity suitable for topical application. Highest drug content and sustained release over 24 hours were observed in hydrogel-rich formulations, with up to 91% drug release. The bigel's antioxidant activity was superior to berberine alone, likely due to synergistic effects from excipients. Thermal and structural analyses confirmed enhanced stability and no incompatibilities. Stability studies demonstrated robust formulation behaviour over three months, with no phase separation or microbial growth. Berberine-infused bigel systems offer a promising hybrid delivery platform for skin rejuvenation, ensuring sustained release, enhanced antioxidant activity, and stable physicochemical properties. The results pave the way for clinical translation and further in vivo investigations of bigel-based phytopharmaceuticals for dermatological applications.

**Keywords:** Berberine Hydrochloride, Bigels, Central Composite Design (CCD), Skin Rejuvenation, Hydrogel Optimization, Hybrid Gel System.

**PC-94**

## EVALUATION OF NEUROPROTECTIVE ACTIVITY OF BACOSIDE-LOADED NANOPARTICLES IN SCOPOLAMINE INDUCED ALZHEIMER'S DISEASE IN ZEBRAFISH MODEL (DANIO RERIO)

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Alzheimer's disease (AD) is a multifactorial neurodegenerative disorder characterized by progressive cognitive decline, cholinergic dysfunction, oxidative stress, and neuroinflammation. Current pharmacological interventions provide only symptomatic relief without altering disease progression. To overcome these limitations, we explored a novel nanotechnology-based approach employing bacoside-loaded solid lipid nanoparticles (BLNPs) derived from Bacopa monnieri, a traditional nootropic herb. BLNPs were formulated using a pre-emulsion ultrasonication–solvent evaporation technique and extensively characterized by particle size analysis, zeta potential, Fourier-transform infrared spectroscopy (FTIR), and scanning electron microscopy (SEM), confirming nanoscale stability and successful drug loading. A scopolamine-induced zebrafish (Danio rerio) model of Alzheimer's disease was established to evaluate neuroprotective efficacy. Behavioural performance was assessed via T-maze and inhibitory avoidance paradigms, while biochemical assays measured acetylcholinesterase (AChE) activity, lipid peroxidation (MDA), and antioxidant enzymes (SOD, CAT, GPx). BLNP-treated zebrafish exhibited significantly improved memory retention, reduced oxidative stress, and normalized cholinergic function compared to pure bacoside and standard rivastigmine treatment. Histopathological analysis further confirmed neuronal preservation in BLNP-treated groups. Acute toxicity studies demonstrated excellent safety margins, supporting translational potential. Collectively, this study highlights that nano formulated bacosides exert superior neuroprotective effects by synergistically modulating oxidative, cholinergic, and inflammatory pathways. This innovative therapeutic strategy offers a promising platform for developing plant-based, nano-enabled interventions for Alzheimer's disease and related neurodegenerative disorders.

**Keywords:** Alzheimer's disease; Bacopa monnieri; Bacoside-loaded nanoparticles.

**PC-95**

## FABRICATION AND EVALUATION OF INNOVATIVE TRANSFEROSOMAL NANOFORMULATION OF PIRFENIDONE FOR ENHANCED GANGRENE TREATMENT

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Anti-inflammatory and antifibrotic properties of pirfenidone (PFD) holds promise as a treatment for gangrene. However, its limited solubility and poor absorption restrict its therapeutic potential. To enhance topical delivery and efficacy, a transferosomal nanoformulation of PFD (PFD-TFNs) was developed and evaluated. PFD-TFNs were prepared by the thin-film hydration method and characterized for particle size, polydispersity index (PDI), and zeta potential using dynamic light scattering. Drug loading (DL), encapsulation efficiency (EE), in vitro release, ex vivo skin penetration, antibacterial activity, and in vivo histopathological outcomes were assessed. The optimized PFD-TFNs exhibited a mean particle size of 145.6 ± 6.2 nm, PDI of 0.21 ± 0.03, and zeta potential of −28.4 ± 1.5 mV. DL and EE were 14.5 ± 0.7% and 92.3 ± 2.8%, respectively. In vitro release demonstrated sustained drug liberation (78.6 ± 3.4% after 24 h) compared to a conventional gel (42.7 ± 2.1%). Ex vivo skin permeation studies revealed significantly enhanced flux (12.8 ± 0.9 µg/cm²/h), 2.6-fold higher than the standard gel. Antimicrobial evaluation showed larger inhibition zones for PFD-TFNs against Staphylococcus aureus (19.2 ± 0.8 mm) and Pseudomonas aeruginosa (17.5 ± 0.6 mm) than free PFD (13.6 ± 0.7 mm and 12.4 ± 0.5 mm, respectively). Histopathological examination in a diabetic gangrene rat model demonstrated reduced inflammation and improved tissue regeneration. These findings suggest that PFD-TFNs can overcome solubility limitations, improve skin penetration, enhance antibacterial activity, and provide superior therapeutic outcomes, highlighting their potential as an effective topical strategy for gangrene management.

**Keywords:** Pirfenidone, Transferomal nanoparticles, Gangrene treatment, Topical drug delivery, Antimicrobial activity.

**PC-96**

## FORMULATION AND EVALUATION OF MOUTH DISSOLVING FILM OF GLUCOSAMINE SALT OF 5-METHYL TETRAHYDRO FOLIC ACID

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This study investigates the formulation and evaluation of mouth-dissolving films (MDFs) containing the glucosamine salt of 5-methyltetrahydrofolic acid (Quatrefolic®) to improve folate bioavailability and patient compliance. MDFs provide an effective and convenient alternative to conventional tablets, especially for individuals with swallowing difficulties. The films were prepared using the solvent casting technique, with hydroxypropyl methylcellulose (HPMC E5 LV) as the main film-forming polymer, polyethylene glycol 400 (PEG 400) as a plasticizer, and sucralose along with peppermint flavor for taste masking and palatability. A design of experiments (DoE) approach was employed to optimize the formulation by studying the effects of polymer and plasticizer concentrations on key parameters such as film weight, thickness, folding endurance, disintegration time, and drug release profile. The optimized formulation produced smooth, non-sticky, flexible films with a disintegration time of 50 seconds and drug release exceeding 85% within five minutes, ensuring rapid onset of action. Drug content uniformity was greater than 95%, indicating reliable dosage delivery. Stability studies conducted over 30 days as per ICH guideline revealed no significant changes in physicochemical properties, confirming the robustness of the formulation. The findings demonstrate that the




ISBN: 978-81-980623-8-3

developed MDFs of glucosamine salt of 5-MTHF are stable, rapidly dissolving, and an effective alternative for folate supplementation. This dosage form is particularly beneficial for individuals requiring quick absorption and enhanced bioavailability.

**Keywords:** Mouth dissolving film, Glucosamine salt of 5-Methyltetrahydrofolic acid (Quatrefolic®), HPMC E5 LV, Design of Experiment

**PC-97**

## COLLAGEN-BASED BIO-COMPOSITE FILM: DEVELOPMENT AND EVALUATION FOR ENHANCED WOUND HEALING

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An ideal environment is necessary for the complex biological process of wound healing in order to support angiogenesis, tissue regeneration, and cell migration. Because of their biocompatibility, biodegradability, and capacity to replicate extracellular matrix, natural polymers like collagen have drawn interest. Novel bio-composite films that combine collagen with bioactive compounds or polymers were created in order to solve the drawbacks of traditional dressings, and their potential for wound healing was assessed. To create bio-composite films using the solvent casting method, collagen was extracted and combined with appropriate natural or synthetic polymers and plasticizers. The physicochemical characteristics of the films (thickness, tensile strength, folding endurance, swelling index, and water vapor transmission rate) were described. Utilizing FTIR, DSC, and SEM, structural integrity and compatibility were examined. Assays for biocompatibility and drug release were conducted in vitro. Using a rat excision wound model, the effectiveness of wound healing was evaluated by tracking histological alterations, wound contraction, and the duration of epithelialization. The produced collagen bio-composite films have the ideal mechanical strength, consistent thickness, and flexibility to be used as wound dressings. SEM demonstrated a smooth and porous shape that supports cell adherence, whereas FTIR verified polymer–drug interactions. The films had sufficient water vapor permeability and demonstrated regulated hydration and moisture retention. When compared to control, in vivo experiments showed noticeably faster wound contraction, a shorter epithelialization period, and increased collagen deposition. Angiogenesis, re-epithelialization, and well-organized granulation tissue were all verified by histopathological analysis in the treated group. For applications involving wound healing, collagen-based bio-composite films shown advantageous mechanical, biological, and physicochemical characteristics. According to the findings, these films can be a viable substitute for traditional wound dressings since they foster tissue regeneration and offer a moist healing environment. To determine their therapeutic potential, more clinical research is necessary.

**Keywords:** Collagen, Bio-composite film, Wound healing, Solvent casting, Biopolymer, Tissue regeneration, Excision wound model.

**PC-98**

## SOLUBILITY AND DISSOLUTION ENHANCEMENT OF ATORVASTATIN CALCIUM BY NANOCRYSTAL TECHNIQUE AND DEVELOPMENT OF FAST DISSOLVING TABLETS

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This study focuses on the development of nanocrystal (NC) based fast dissolving tablets (FDTs) of Atorvastatin calcium to enhance its solubility, dissolution, and bioavailability. Atorvastatin calcium, a poorly water-soluble lipid-lowering drug, was successfully processed into nanocrystals using the solvent-antisolvent precipitation method, optimized through a $2^3$ factorial design by varying stabilizer concentration, solvent to antisolvent ratio, and stirring speed. The prepared nanocrystals exhibited significantly higher saturation solubility than the pure drug due to reduced particle size. FDTs containing 20 mg of Atorvastatin calcium nanocrystals were formulated via direct compression using crosscarmellose sodium (CCS) and sodium starch glycolate (SSG) as superdisintegrants. Pre compression and post compression evaluations confirmed excellent flow properties, mechanical stability, and compliance with pharmacopeial standards. Among the six formulations, F3, containing 20 mg of CCS, demonstrated the shortest disintegration time (10.6 seconds) and the highest drug release (95.02% within 12 minutes). These findings highlight the potential of nanocrystal-based FDTs in improving Atorvastatin's bioavailability and addressing limitations associated with conventional tablet formulations, offering a promising alternative for better patient compliance and therapeutic efficacy.

**Keywords:** Nanocrystals, (NC), Fast Dissolving Tablets (FDTs), Solubility, Dissolution, Direct compression and Lipid-lowering drug.

**PC-99**

## FORMULATION AND EVALUATION OF NANOEMULGEL (NEG) CONTAINING LIQUORICE EXTRACT FOR DENTAL CARIES

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A liquorice-based nanoemulgel was developed and thoroughly assessed for enhanced buccal drug delivery, aiming to improve anti-caries activity through stable nano-sized droplets. Using rotor-stator technology and high-speed homogenization, an optimized nanoemulsion was formed by intense shear forces and surfactants, enabling effective encapsulation of Glycyrrhiza glabra (liquorice), a compound known for potent therapeutic and antimicrobial effects. Formulation optimization, performed with Design Expert Software, prioritized minimizing particle size and maximizing entrapment efficiency, resulting in improved drug loading, stability, and buccal mucosal penetration. Comprehensive characterization confirmed the nanoemulgel's ideal particle size, robust encapsulation efficiency, and excellent physical stability. The optimized liquorice nanoemulsion, integrated into a gel base, yielded a formulation that was highly spreadable and remained stable across different temperatures. Physicochemical analyses and in vitro drug release studies demonstrated sustained release kinetics, supporting consistent drug delivery and prolonged therapeutic action. The nanoemulgel exhibited significant antimicrobial activity against cariogenic pathogens, highlighting its strong potential for enhancing oral health and caries prevention. This innovative buccal delivery system offers a patient-friendly, non-invasive approach to the administration of liquorice, with promising antimicrobial and anti-caries efficacy. The results suggest valuable clinical benefits, though further in-vivo and clinical evaluations are necessary to validate safety, efficacy, and commercial feasibility for oral health application.

**Keywords:** Nanoemulsion, Nanoemulgel, Anti-caries, Anti-microbial, Glycyrrhiza glabra, Design Expert Software-12.

**PC-100**

## DEVELOPMENT AND CHARACTERIZATION OF ELECTROCONDUCTIVE WOUND HEALING DRESSING

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The study addresses the increasing public health concern of injuries, which account for millions of deaths and significant morbidity. It explores the intricate structure and vital functions of human skin, emphasizing the role of endogenous electric potential in wound healing. However, study aims to develop and characterize an innovative electroconductive wound healing dressing that integrates silver nanoparticles, lidocaine, chitosan, and polyaniline to enhance healing through electrical stimulation. Using solvent casting, formulation are optimized for effective film formation and characterized for swelling, mechanical property and biodegradation study. Comprehensive analyses include FTIR, DSC, XRD and cytotoxicity assessments, validate effectiveness of dressing and confirm the structural integrity. In vitro study demonstrated




ISBN: 978-81-980623-8-3

most significant cell growth, biocompatibility and angiogenesis in growth factor containing electroconductive Patch. The electroconductive dressing demonstrates broad-spectrum antimicrobial properties, and accelerated healing rates. In vivo study reveals that the electroconductive patch significantly reduces the complete epithelization period to 18 days. The findings suggest that multifunctional electroconductive patch could represent a significant advancement in wound care, addressing limitations of current treatments, promoting faster and more efficient healing processes.

**Keywords:** wound healing, electroconductive , polyaniline, chitosan

**PC-101**

**FORMULATION, DEVELOPMENT& INVITRO EVALUATION OF SUSTAINED RELEASE MATRIX TABLETS OF VILDAGLIPTIN**

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The main aim of present work was to formulate and evaluate sustain release matrix tablets of Vildagliptin is an oral anti-hyperglycemic agent (anti-diabetic drug) of the dipeptidyl peptidase-4(DPP-4) inhibitor class of drugs. Sustain release formulation are those which delivers the drug locally or systemically at a predetermined rate for a fixed period of time. The matrix tablet was prepared by direct compression method using by various concentration of Sodium CMC, Acacia and Tragacanth various release retardant polymer. The powder mixtures were subjected to various pre-compression parameters such as angle of repose, bulk density, tapped density and Carr's index shows satisfactory result and the compressed tablets are evaluated for post-compression parameters such as weight variation, thickness, hardness, friability, drug content, in-vitro dissolution studies. In-vitro dissolution studies were carried out for 12 hours using 0.1 NHCL for first 2 hours and pH 6.8 phosphate buffer for 12 hours and the result showed that formulations V3 showed good dissolution profile to control the drug release respectively .Formulation containing higher concentration of Sodium CMC polymer sustained the drug release for the period of 12 hours. The kinetics studies the optimized formulation followed Zero order release kinetics.

**Keywords:** Vildagliptin, Sodium CMC, Acacia, Tragacanth, Direct compression and Sustained release matrix tablets.

**PC-102**

**AMYLOIDOGENIC BSA–HYALURONIC ACID NANOHYDROGEL DRESSING FOR ENHANCED DIABETIC WOUND HEALING VIA ANGIOGENESIS AND ANTI-INFLAMMATORY MODULATION**

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Protein-based nanomaterials have emerged as promising platforms in regenerative medicine owing to their inherent biocompatibility, tunable assembly, and multifunctional therapeutic potential. In this study, we report the development of a self-assembled composite nanohydrogel, fabricated from bovine serum albumin (BSA)-derived amyloid fibrils and hyaluronic acid (HA), designed as a 3D-printed wound dressing for diabetic wound management. The composite hydrogel integrates the bioactive functions of HA with the mechanical robustness of amyloid fibrils, providing a stable and moist wound microenvironment. Physicochemical characterization demonstrated excellent water retention, rheological tunability, and mechanical integrity. In vitro assays revealed superior biocompatibility and fibroblast migration, while in vivo diabetic wound models confirmed accelerated wound closure in the composite (BSA+HA) group compared to single-component controls. Histological analysis highlighted enhanced collagen deposition, reduced inflammation, and pronounced angiogenesis, collectively contributing to improved re-epithelialization. These findings suggest that the BSA–HA composite nanohydrogel dressing represents a translationally relevant strategy for rapid diabetic wound repair through synergistic bioactivity and structural reinforcement.

**Keywords:** Diabetic wound healing, Amyloid fibrils, Hyaluronic acid hydrogel, Anti-inflammatory biomaterials, Protein-based nanomaterials

**PC-103**

**DESIGN AND CHARACTERIZATION OF MUCOADHESIVE BUCCAL FILMS FOR SUSTAINED RELEASE OF METFORMIN**

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The present study focuses on the development and evaluation of mucoadhesive buccal films as an alternative delivery system for Metformin, aiming to enhance its bioavailability and patient compliance while minimizing gastrointestinal side effects. Metformin, a widely used antidiabetic drug, suffers from poor oral bioavailability due to extensive first-pass metabolism and gastrointestinal degradation. Buccal films were prepared using solvent casting technique employing polymers such as HPMC (Hydroxypropyl methylcellulose), PVA (Polyvinyl alcohol), and Carbopol 934P in various ratios. Glycerin and PEG 400 were used as plasticizers. The films were characterized for physicochemical parameters including thickness, weight uniformity, surface pH, tensile strength, folding endurance, drug content uniformity, swelling index, and mucoadhesive strength. In vitro drug release studies were performed using Franz diffusion cells, simulating buccal conditions, and the release kinetics were analyzed using various mathematical models. The optimized formulation showed sustained drug release over 8 hours, strong mucoadhesive properties, and favorable mechanical strength. FTIR and DSC studies confirmed the compatibility between drug and excipients. The results suggest that the formulated mucoadhesive buccal films can serve as a promising platform for sustained delivery of Metformin, bypassing hepatic metabolism and improving therapeutic efficacy. Further in vivo studies are warranted to confirm the clinical potential of the delivery system.

**Keywords:** Metformin, Buccal films, Mucoadhesive, Sustained release, Drug delivery.

**PC-104**

**FORMULATION AND OPTIMIZATION OF ABIRATERONE FOLIC ACID CONJUGATION FOR TARGETED DRUG DELIVERY**

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Abiraterone (AT) is US-FDA approved, antiandrogen used for metastatic castration-resistant prostate cancer, with half-life of 12 hours, acts by targeting on CYP17 enzyme It is anticipated that targeted drug delivery will lower the dosage of abiraterone due to its poor oral bioavailability, susceptibility to hydrolysis by esterases, and increased dosing frequency in standard formulations. In order to improve the efficacy and bioavailability of drug administration, the current study intends to create and describe PLGA-Coated Abiraterone nanoparticles by functionalizing them with 1-(3-Dimethyl Aminopropyl)-3-Ethylcarbodiimide Hydrochloride (EDC) and folic acid (FA). Since PLGA is an FDA-approved, biodegradable polymer, it aids in the formation of polymeric nanocarriers, which provide prolonged release, for lipophilic drugs like abiraterone. Additionally, this sophisticated formulation results in a form that is patient-compatible. The formulation (PLGA-FA-EDC-AT) nano-drug was investigated and its morphological and structural characteristics were evaluated, using range of sophisticated instruments such as FTIR, UV-vis Spectroscopy, NMR, SEM, DLS, TLC and XRD. Invitro studies such as cytotoxicity studies on the cell line, Sulforhodamine assay (SRB), Folate receptor binding assay along with in-vitro stability studies at different pH level and in presence of enzymes. The research is expected to yield a stable, effective folate-conjugated delivery system with enhanced anticancer activity and reduced systemic exposure.

**PC-105**

**DESIGN AND EVALUATION OF A NOVEL ESSENTIAL OIL–BASED NASAL INHALER FOR LOCALIZED ANTIVIRAL**

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Respiratory viral infections remain a significant global health concern, frequently manifesting as upper respiratory tract illnesses such as cough and cold. Conventional therapeutic strategies often provide only symptomatic relief, while systemic administration may be associated




ISBN: 978-81-980623-8-3

with delayed onset of action or unwanted side effects. To address these limitations, the present research focused on the development of a novel essential oil–based nasal inhaler designed to deliver a localized antiviral effect directly at the site of infection. Selected essential oils, enriched with bioactive constituents known for their antiviral, antimicrobial, and anti-inflammatory properties, were incorporated along with excipients providing synergistic benefits such as decongestion, cooling sensation, and analgesic effects. Preformulation studies were carried out to establish physicochemical characteristics and compatibility between the selected components. Analytical methods were developed and validated using UV spectroscopy, HPTLC, and GC-MS to ensure accurate standardization and quantification of the formulation. Formulation trials were optimized to achieve stability, acceptable organoleptic properties, and adequate drug loading onto a nasal inhaler matrix. The optimized batch was further evaluated for drug content, antioxidant activity, and stability under ICH guidelines. Results demonstrated that the essential oil–based formulation exhibited favorable stability, reproducibility, and potential for reducing viral load locally in the nasal cavity. This study highlights the potential of essential oil–based nasal delivery systems as an effective, non-invasive, and patient-friendly approach for the management of upper respiratory tract infections. The developed formulation offers a promising alternative to conventional therapies, supporting the integration of natural antivirals into innovative drug delivery systems.

**Keywords:** Volatile oils, Inhalation therapy, Antiviral activity, Respiratory infection, Essential oil formulations

**PC-106**

## FUSIDIC ACID NANOSPONGE GEL: A NOVEL APPROACH TO ENCHANCING SKIN BACTERIAL INFECTION TREATMENT

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The present study focuses on the development and evaluation of a Fusidic Acid-loaded nanosponge-based gel as an innovative topical formulation for improving the treatment of bacterial skin infections. Nanosponges were prepared using the emulsion solvent diffusion method, with a $2^3$ factorial design incorporating Ethyl Cellulose (EC), Eudragit, and β-Cyclodextrin (βCD). Among the formulations, F4 (high βCD and Eudragit) exhibited the best production yield and solubility enhancement, making it ideal for further gel formulation. Nanosponge-based gels were formulated using Carbopol 934P, HPMC K100, and CMC and evaluated for homogeneity, pH, viscosity, drug content, and in vitro drug release. All formulations were smooth, white, and uniform, with pH values suitable for topical application. HPMC-based gel (F2) demonstrated the most sustained drug release (81.46%), ensuring longer drug retention at the infection site, while CMC-based gel (F3) exhibited the highest drug release (97.28%). The study confirms that nanosponge-based gels enhance solubility, provide controlled and sustained drug release, and improve patient compliance by reducing dosing frequency. These findings suggest that nanosponge-based gels offer a promising approach for topical Fusidic Acid delivery, improving therapeutic efficacy in bacterial skin infections.

**Keywords:** Fusidic Acid, Nanosponge, Emulsion Solvent Diffusion, Topical Gel and Sustained Drug Release.

**PC-107**

## A COMPARATIVE ANALYSIS OF DIFFERENT FORMULATIONS OF ANTIHYPERTENSIVE DRUGS: IMPACT ON EFFICACY AND PATIENT COMPLIANCE

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Hypertension is one of the common chronic ailments where there is a continual rise in blood pressure (systolic ≥130mmHg and diastolic ≥80mmHg). In India, it is reported to affect adults aged over 30 years, with a prevalence of 30 %among men and 29 % among women with a higher prevalence of urban men (34 %) than rural men (29 %). Hypertension is one of the main causes of the cardiovascular morbidity and mortality worldwide, and its control is essential. The treatment success is dependent on not only antihypertensive agents efficacy but also on the patient adherence. A dual study was organized, the first study was patient based and conducted with one structured google form questionnaire, and the second study was based on the expert point of view and was carried out via another structured google form questionnaire for healthcare professionals. The study protocol was reviewed and approved by Ethics board of Satyam hospital, Vadodara. A total of 200 patient responses were analysed for efficacy of different formulations, each having 40 responses, among which oral tablets showed the highest efficacy ratings (97.5%) while transdermal patches have lowest i.e. 10%. Likewise for patient compliance a total of 240 responses recorded over six different categories, from which reminder system got highest compliance (92.5%).This study shows comparative analysis of various antihypertensive formulations highlighting their effect on efficacy and patient compliance. The outcomes emphasize the value of individualized formula selection to optimize hypertension management.

**Keywords:** Hypertension, Antihypertensive drugs, Drug efficacy, Patient compliances, Patient adherence

**PC-108**

## DEVELOPMENT AND OPTIMIZATION OF VENETOCLAX-LOADED NANOMICELLES USING QBD FOR IMPROVED BIOAVAILABILITY

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Venetoclax, a selective BCL-2 inhibitor, is approved for chronic lymphocytic leukemia (CLL) and acute myeloid leukemia (AML). However, its low aqueous solubility and poor oral bioavailability (5.4% in fasting state) restrict clinical utility, leading to high dose requirements and adverse effects. To address these limitations, a nanomicelle-based drug delivery system was developed using a Quality by Design (QbD) approach . Nanomicelles were prepared by solvent evaporation–thin film hydration employing Pluronic F127 and surfactants (Tween, Labrafac PG), and optimized by Box-Behnken design. The optimized formulation exhibited particle size 176 nm, zeta potential –13 mV, PDI 0.25, entrapment efficiency of 84.77% and the drug release was foud to be 91.50 % at 24th hour. SEM confirmed spherical, uniform micelles with smooth morphology. To enable patient-friendly administration, nanomicelles were incorporated into oral films using HPMC E5 as polymer and propylene glycol as plasticizer. The films showed satisfactory thickness (0.41mm), folding endurance (86 folds), surface pH of 6.9, and rapid disintegration (59 seconds). Overall, the nanomicelle-based formulation demonstrated improved solubility and stability, while sublingual delivery offers the potential for enhanced bioavailability, reduced dose burden, and improved patient compliance. This strategy highlights a promising platform to overcome solubility and bioavailability issues associated with Venetoclax therapy.

**Keywords:** Venetoclax, Pluronic, Box-Behnken Design, Film Hydration method

**PC-109**

## FORMULATION OF SILVER NANOPARTICLES LOADED WITH DIACEREIN BY USING NANOPRECIPITATION METHOD

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Green silver nanoparticles (AgNPs) have emerged as promising drug carriers due to their distinct physical, chemical, and biological properties. In this study, AgNPs were synthesized by green methods using Aloe vera leaf extract with 1 mM aqueous silver nitrate solution, where the formation of a dark brown color confirmed nanoparticle generation. To address the poor solubility of diacerein, the drug was incorporated into these nanoparticles through the nanoprecipitation method. Samples were prepared under three different conditions, stored under refrigeration, and concentrated using a rotary vacuum evaporator. Characterization was carried out using scanning electron microscopy (SEM), zeta sizer, and particle distribution (PD) analysis. Among the three




ISBN: 978-81-980623-8-3

formulations, Sample B demonstrated superior stability, uniformity, and optimal nanosuspension quality compared to Samples A and C. The nanoscale reduction in particle size increased surface area and wettability, ultimately enhancing diacerein's solubility and potential bioavailability. Characterization through dynamic light scattering (DLS), zeta potential, and SEM confirmed stability and uniform morphology. Moreover, the study underscores the significance of plant-mediated green synthesis, where extracts act as both reducing and stabilizing agents, minimizing the use of toxic chemicals. These AgNPs not only enhanced dissolution but also possess inherent antimicrobial properties, offering dual therapeutic benefits. The findings highlight silver nanoparticles as an efficient carrier for poorly soluble drugs, paving the way for more effective drug delivery strategies and improved therapeutic outcomes.

**Keywords:** Green synthesis, Silver nanoparticles, Nanoprecipitation, Zeta potential, Bioavailability.

**PC-110**

**DEVELOPMENT, OPTIMIZATION, AND EVALUATION OF NAFTIFINE HYDROCHLORIDE LOADED NANOEMULGEL FOR THE TREATMENT OF ONYCHOMYCOSIS**

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Onychomycosis is a fungal nail infection causing brittleness. We aimed to develop a topical nanoemulgel system of selective allylamine BCS class IV agent, Naftifine HCl, to increase drug release and permeation to deeper nail layers. Nanoemulgel was prepared by titrating different ratios of oil (neem) to Smix ratios (tween 80+ propylene glycol) (1:1, 1:2, 1:3, 2:1, and 3:1), with an aqueous phase. The nanoemulsion zone was identified using a pseudo-ternary phase diagram. Formulations were prepared after selecting ten ports in the nano emulsion region, and evaluated for clarity and particle size. The selected nanoemulsion formulation was converted to nanoemulgel by incorporating it into a carbopol 934 gel base. The nanoemulgel was evaluated for pH, drug content, and viscosity. The in vitro and ex vivo drug release profiles of nano emulgel and pure drug was compared. The oil: Smix ratio affected the droplet size and zeta potential of nanoemulsions. Results of in vitro and ex vivo release studies showed good correlation between drug release and permeation via sheep hooves. A considerable increase in drug permeation occurred with the penetration enhancer thiourea. Thus, nanoemulgel is a promising, economical approach to treat deep fungal nail infections.

**Keywords:** Naftifine hydrochloride, Neem oil, Tween 80, propylene glycol, Emulgel.

**PC-111**

**DEVELOPMENT AND EVALUATION OF NATURAL FILM FORMING AGENTS BASED MEMANTINE HYDROCHLORIDE ORO-DISPERSIBLE FILMS**

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The aim of the present study was to formulate and evaluate Oro dispersible film (ODF) containing Memantine HCl, for the treatment of Alzheimer's disease by using different natural film forming polymers. In the present research work various trails were carried out by using different concentrations of natural polymers like Gellan gum and Gum Kondagogu by solvent casting method. The optimized formulation is F12 (API with Gum Kondagogu) 1:3.5 showed the highest dissolution rate of 100.58 ± 0.23% within 4 minutes. The optimized formulation F12 was further conducted stability studies for 3 months and it showed satisfactory physicochemical properties without any morphological changes in the film during its stability study.

**Keywords:** Memantine HCl, Alzheimer's disease, solvent casting method, Oro dispersible film.

**PC-112**

**DEVELOPMENT OF APTAMER-FUNCTIONALIZED FLAVONOIDS NANOLIPOSOMES: EVALUATION AGAINST METASTATIC MELANOMA.**

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Metastatic melanoma is an ongoing global health challenge and is the second leading cause of cancer-related death globally. Metastatic melanoma is lethal due to its aggressive nature, rapid invasion and poor prognosis. Current immune therapeutic approaches have not been successful enough to overcome drawbacks including chemoresistance, recurrence after radiation, and systemic toxicity. While flavonoids like apigenin and quercetin have shown medicinal potential against key melanoma targets (BRAF and MEK), their clinical use is often limited by low bioavailability and stability. To overcome these issues, we propose apigenin-loaded nanoliposomes with aptamer functionalization having particle size approx 150-180nm range with zeta potential (-20 mV). Further we confirmed conjugation and surface morphology by FESEM and Cryo TEM. Aptamers are chemically synthesized oligonucleotides that have high specificity and affinity for melanoma cells. We observed significant incremental cytotoxicity for aptamer optimized nanoliposomes in melanoma cell lines in comparison to non-aptamer functionalized formulation. The aim is to develop the nanoliposomes, modify them to create melanoma specific uptake, leading by their molecular mechanism. We will carry out in vitro studies in melanoma cell lines to assess cellular uptake, apoptosis and gene expression related to their cell signaling and observed more than five times superior effectivity in comparison to the non-aptamer conjugated flavonoid nanoliposomes. Further, in vivo studies will utilize a C57BL/6 murine melanoma model to assess biodistribution, efficacy, and safety. Overall, the aptamer-guided nanocarrier system is expected to provide better selectivity and therapy than other options and provide a novel, nanomedicine-based approach to treating metastatic melanoma.

**Keywords:** - Metastatic melanoma, Chemoresistance, Flavonoids (apigenin, quercetin), Nanoliposomes, Aptamer functionalization, Cytotoxicity, Targeted therapy

**PC-113**

**DEVELOPMENT AND EVALUATION OF LENVATINIB LOADED EMULGEL FOR SKIN CANCER TREATMENT**

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The present research, titled "Development and Evaluation of Lenvatinib Loaded Emulgel for Skin Cancer Treatment," focuses on the formulation of a topical drug delivery system utilizing Lenvatinib, a multi-targeted tyrosine kinase inhibitor, for effective and localized management of skin cancer. Conventional systemic therapies often suffer from severe side effects and poor patient adherence, underscoring the need for site-specific, non-invasive alternatives. To address this, an Emulgel a hybrid formulation combining the benefits of emulsions and gels was developed to enhance the solubility, stability, and dermal penetration of Lenvatinib. Preformulation studies included solubility screening, FTIR analysis for compatibility, and UV spectroscopy to determine λmax (248 nm). Emulgels were prepared using Carbopol 940 as a gelling agent, Tween 80 and Span 80 as emulsifiers, and oleic acid and propylene glycol as permeation enhancers. Several batches with varying drug and excipient ratios were evaluated for key physicochemical parameters such as pH, spreadability, viscosity, homogeneity, stability, and drug release. Among the tested formulations, the medium concentration batch (F1) demonstrated optimal performance, with a pH near the skin's physiological range, good spreadability, and sustained drug release. No chemical incompatibilities were observed. Microbial testing confirmed the formulation's safety for dermal use. The study concludes that Lenvatinib-loaded emulgel offers a promising alternative to systemic chemotherapy for localized skin cancer treatment. It ensures site-




ISBN: 978-81-980623-8-3

specific action, prolonged release, reduced systemic toxicity, and improved patient compliance. Future in vivo and clinical evaluations are warranted to validate its therapeutic potential and explore enhancements using natural excipients or synergistic drug combinations.

**Keywords:** Lenvatinib, Emulgel, Invitro, Drug Release, Skin Cancer.

**PC-114**

**QUALITY BY DESIGN BASED DEVELOPMENT OF EXTENDED-RELEASE BILAYER TABLETS OF METFORMIN AND TENELIGLIPTIN: INVESTIGATING IONIC AND NON-IONIC POLYMER INTERACTIONS**

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Quality by Design (QbD) provides a systematic framework for formulation optimization. This study aimed to develop extended-release bilayer tablets of Metformin (BCS Class III) and Teneligliptin (BCS Class I) by exploiting ionic and non-ionic polymer interactions to enhance therapeutic efficacy and patient compliance. A QbD approach was employed, beginning with the Quality Target Product Profile (QTPP) and identification of Critical Quality Attributes (CQAs). Risk assessment tools, including Ishikawa diagram and Failure Mode Effect Analysis (FMEA), guided the selection of Critical Material Attributes (CMAs) and Critical Process Parameters (CPPs). Design of Experiments (DoE) was applied to optimize polymer ratios and process variables, focusing on Carbopol (ionic) and HPMC/PEO (non-ionic) in modulating drug release and maintaining bilayer stability. Optimized formulations were evaluated for pre- and post-compression parameters, in-vitro release bilayer integrity, release kinetics, and stability under ICH-recommended conditions. The optimized bilayer tablets exhibited zero-order release kinetics for Metformin with minimal burst effect, while Teneligliptin release was effectively modulated. This work demonstrates a QbD-driven, polymer interaction-based strategy as a robust and reproducible approach for developing extended-release bilayer tablets in fixed-dose antidiabetic therapy.

**Keywords:** Quality by Design (QbD), Bilayer tablets, Metformin, Teneligliptin, Polymer interactions, Extended release

**PC-115**

**BARNYARD MILLET'S STARCH BASED MATRIX TABLET FROM A NEWLY SYNTHESIZED 6, 7-DIMETHOXY-N-ARYL-4-AMINO QUINAZOLINE DERIVATIVE (SERB-111) WITH ANTI-PROLIFERATIVE ACTIVITY AGAINST COLORECTAL CANCER**

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This research aimed to synthesized SERB-111 from methyl 3,4-dimethoxybenzoate, with anti-colorectal cancer activity by loading on starch matrix tablet (RTAB-01-S). SERB-111 was synthesized; a UV spectroscopy method was developed and validated to measure RTAB-01-S concentration at various dosage forms (R1-R9) in starch and excipients combinations. SERB-111 loaded with starch (Barnyard Millets) based matrix tablet (RTAB-01-S) were prepared, characterized by Scanning Electron Microscopy (SEM), Fourier Transform Infrared Spectroscopy (FT-IR), Differential Scanning Calorimetry (DSC), X-ray powder diffraction (XRD), in-vitro release, sulforhodamine B (SRB) assay. In-vitro cytotoxicity screening is the sulforhodamine B (SRB) assay of SERB-111 was fed to HCT116 cells at various dosages, a dose-dependent reduction in cell viability was seen. The sample's IC50 value was determined to be 7.95µg/mL. The entrapment efficiency was 97% ± 0.45%, and the in-vitro release showed that the RTAB-01-S enhanced the solubility of the SERB-111. The kinetics and mechanism of drug release for SERB-111 based matrix tablets were ascertained by fitting the data to various models. The best model was chosen using the regression coefficient (R2) as a criterion. Since the regression coefficients (R2) for each of the formulations coated with RDJS-P were within the range of 0.9776 to 0.9946, they were all consistent with the Korsmeyer-Peppas model. In conclusion, the proposed method presents a novel strategy for synthesis of a new SERB-111 derivative based novel drug theraphy for treatment of colorectal cancer.

**Keywords:** quinazoline derivative, starch (Barnyard Millets), matrix tablet, in-vitro release, colorectal cancer

**PC-116**

**FORMULATION AND EVALUATION OF GASTRO RETENTIVE IN SITU GEL OF CIPROFLOXACIN**

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The objective of this study was to formulate and evaluate a gastro retentive in situ gel of ciprofloxacin for improved drug delivery. The in situ gel was formulated using a combination of natural and synthetic polymers, and effects of different concentration of sodium alginate, HPMC K-100 and calcium carbonate on viscosity and drug release at 8 hrs were studied. The in situ gel had desirable physicochemical properties and a prolonged drug release profile. All the formulations showed an optimum viscosity that will allow ease of administration and swallowing. Floating lag time of all formulations was between 43- 75 seconds and floated for>12 h. The in vitro gelling capacity increased with increasing concentration of the sodium alginate and calcium carbonate. The formulation F6 showed high swelling index, which indicates that gel is capable of absorbing a large amount of fluid. In vitro drug release form these insitu gels were slow, extended and dependent on the concentration of sodium alginate and HPMC K-100 used. The formulation F6 containing 1.25% sodium alginate and 2% HPMC K-100 showed sustained in vitro drug release (67.23 %) over an extended period of 12 h. Drug release from the formulation F6 followed first order kinetics. Overall, the study demonstrated the potential of in situ gel-based drug delivery systems for improving the performance of ciprofloxacin.

**Keywords:** Gastro retentive, In situ gel, Floating time, In-vitro drug release and Ciprofloxacin

**PC-117**

**FORMULATION DEVELOPMENT AND EVALUATION OF LIQUISOLID TABLETS TO IMPROVE THE DISSOLUTION RATE OF TELMISARTAN**

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The objective of the present investigation was to improve dissolution and bioavailability of a practically insoluble antihypertensive drug Telmisartan using liquisolid technique. Telmisartan liquisoild compacts was prepared using tween-40 as a nonvolatile solvent, microcrystalline cellulose, lactose, dicalcium phosphate as carrier material and colloidal silica as a coating material in different ratio. The prepared liquisolid compacts were evaluated for the precompression properties like tapped density, bulk density, angle of repose, Carr's compressibility index and Hausner's ratio. The formulated liquisolid compacts were mixed with sodium starch glycolate, magnesium stearate, talc and compressed in to tablets (F1 –F6). Tablets were evaluated for various post compression parameters such as hardness, friability, weight variation, content uniformity, disintegration time, wetting time and in vitro drug dissolution study. The interaction between drug and excipients was characterized by FT-IR studies, which showed that there is no interaction between drug and excipients. The results of pre and post compression parameters were comply with pharmacopoeial limits. In vitro drug dissolution study was carried by using USP dissolution apparatus II & pH 6.8 phosphate buffer for 45 minutes; its results comply with IP limits for tablets. The dissolution study of an optimized formulation (F-4) compared with marketed tablets and it was found that F-4 showed significant higher drug release rate than marketed tablet. From this study, it was concluded that the liquisolid technique is an effective approach to enhance the dissolution rate of Telmisartan.

**Keywords:** Telmisartan, Liquisolid technique, Carrier material, Coating materials and In vitro drug dissolution.

**PC-118**

**NANO ENGINEERED RAMIPRIL LIPID CARRIERS FOR ANTIHYPERTENSIVE THERAPY**

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Ramipril is a widely used angiotensin-converting enzyme (ACE) inhibitor for the management of hypertension; however, its therapeutic effectiveness is limited by poor aqueous solubility, low oral bioavailability, and extensive first-pass metabolism. The present study aimed to develop and evaluate Nano engineered lipid carriers (NLCs) of Ramipril to overcome these limitations and achieve improved antihypertensive efficacy. Ramipril-loaded NLCs were prepared by high shear homogenization followed by ultra-sonication using solid and liquid lipids in combination with surfactants. The prepared formulations were optimized based on particle size, zeta potential, polydispersity index, entrapment efficiency, and drug loading. The optimized NLCs exhibited a mean particle size of less than 200 nm, zeta potential above –25 mV, entrapment efficiency exceeding 80%, and sustained drug release over 24 h. Differential scanning calorimetry and Fourier transform infrared spectroscopy confirmed drug–lipid compatibility, while transmission electron microscopy revealed spherical, uniformly distributed nanoparticles. In-vitro release studies demonstrated biphasic drug release with an initial burst followed by sustained release, whereas in-vivo evaluation in animal models indicated enhanced bioavailability and significant reduction in systolic blood pressure compared to pure drug suspension. The results suggest that Nano engineered Ramipril lipid carriers provide a promising delivery system to enhance oral bioavailability and therapeutic performance in hypertension management.

**Keywords:** Ramipril, lipid nanoparticles, Nano formulation, antihypertensive therapy, pharmaceutical technology.

**PC-119**

## ROSMARINIC ACID AS AN ESTROGEN RECEPTOR ALPHA-TARGETED BREAST CANCER THERAPEUTIC: VIRTUAL SCREENING, ORAL LIPID NANOCARRIER FORMULATION, AND IN VITRO EVALUATION

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Breast cancer (BC) remains a major global health concern among women, with current treatments often relying on hormone receptor modulators like partial agonists and antagonists, which could lead to drug resistance and adverse effects. In this context, in silico strategies provide a valuable alternative by enabling the virtual screening of phytochemicals for potential therapeutic use. This study investigated 238 cancer-preventive phytochemicals for their interaction with Estrogen Receptor alpha, a key target in hormone-responsive breast cancer. Molecular docking was initially performed using AutoDock to evaluate the binding affinity of phytopharmaceuticals with the target protein. The docked compounds were then assessed for drug-likeness and toxicity profiles using SwissADME, Molinspiration, and OSIRIS Data Warrior. Subsequently, protein–ligand interactions were visualized and analyzed with Biovia Discovery Studio to select compounds demonstrating favourable interactions and drug-like properties. Rosmarinic acid (RA) emerged as a promising candidate, showing favorable interaction with ER-α and a low toxicity profile. MM-GBSA binding energy calculations demonstrated that Tamoxifen exhibited a markedly stronger binding affinity to ER-α. To validate binding stability, 200ns molecular dynamics (MD) simulations were performed. Despite slightly higher flexibility, RA maintained stable interactions through multiple hydrogen bonds. For in vitro assessment, RA was encapsulated into oral lipid nanocarrier using the thin-film hydration method. The optimized formulation (OLN-RA) demonstrated stability, uniform particle distribution. In-vitro cytotoxicity assays confirmed an $IC_{50}$ value of 190.9 µg/mL for RA, while the RA-loaded oral lipid nanocarrier exhibited approximately 42% cytotoxicity on MCF7 cell lines. These findings position RA as a stable, natural candidate for further development in breast cancer therapy.

**Keywords:** Breast cancer, In-silico studies, Phytopharmaceutical, Pro-liposomes, Rosmarinic acid

**PC-120**

## ISOLATION AND FORMULATION OF WHEAT STARCH FILM

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Natural polymers, such as starch, have attracted the interest of many research groups due to the increasing demand for biodegradable and biocompatible materials in new drug delivery systems (NDDS). Enzymatic or non-enzymatic degradation of such biodegradable polymers in vivo results in biocompatible and non-toxic byproducts. These polymers have been reported to improve drug pharmacokinetics and reduce side effects. Wheat is the common name for Triticum aestivum, a type of grass plant that is part of the Poaceae family. The objective of this research is to isolate and prepare wheat starch in film form for potential use in NDDS, which are environment friendly and economical, featuring a controlled-release drug delivery mechanism. Wheat starch is then isolated from the grain by wet milling and subsequently defatted to remove proteins, lipids, and other impurities. Further, by adding plasticisers (glycerol and sorbitol) to increase flexibility and cross-linking agents (citric acid and glutaraldehyde) to increase mechanical strength, the separated bounce is dried and reused as a film-forming resin with water as a solvent. Physical properties such as moisture content, ash value, pH, bulk density, and tapped density. Also, find out the tensile strength, swelling index, and thickness of the starch film. The results show that the wheat bounce films are a great way to find NDDS as they possess a high film-forming capacity and are biocompatible.

**Keywords:** Triticum aestivum, Extraction, Film Formulation, Solvent casting, Bounce.

**PC-121**

## FORMULATION AND EVALUATION OF TRANSETHOSOMAL GEL: FOR TRANSDERMAL DELIVERY OF DIACEREIN

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The purpose of the work was to formulate and characterize Diacerein loaded Transethosomes. Transethosomes were formulated by using lecithin soya, cholesterol and ethanol by hot method. The prepared Transethosomes were subjected to characterization for morphology, particle size, entrapment efficiency (EE) and in-vitro diffusion behaviour. The results revealed that the vesicles were spherical with a smooth surface, with particle sizes ranging from 1.2 µm to 3.5 µm, and entrapment efficiency between 79.4% and 90.3%. The formulations exhibited a sustained drug release profile for up to 24 hours. Among the different batches, formulation DTE7 demonstrated superior performance based on particle size, entrapment efficiency and drug diffusion studies. Therefore, DTE7 was incorporated into a gel base using carbopol-940 as the gelling agent. The Transethosomal gel was then assessed for physical appearance, homogeneity, pH, spreadability, extrudability, viscosity, in-vitro diffusion, skin irritation, anti-inflammatory potential and short-term stability. The optimized gel (DTEG) appeared pale yellow with smooth texture, good spreadability, satisfactory extrudability, appropriate viscosity and pH and was found to be free from skin irritation. It also showed enhanced drug release, which best fitted the Peppas kinetic model, indicating a non-Fickian release mechanism. In vivo anti- inflammatory studies confirmed that the gel produced a dose-dependent reduction in carrageenan-induced paw edema. Furthermore, the formulation remained stable during short-term stability testing. In conclusion, the developed Diacerein-loaded Transethosomal gel presents a promising alternative to conventional oral therapy, overcoming the limitations associated with oral administration.

**Keywords:** Diacerein, Transethosomes, Transdermal Drug Delivery, Anti-inflammatory Activity.

**PC-122**

## CO-CRYSTAL MEDIATED ENHANCEMENT OF RANOLAZINE BIOAVAILABILITY AND SOLUBILITY: IN VITRO AND IN VIVO PHARMACOKINETIC ASSESSMENT IN RATS

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ISBN: 978-81-980623-8-3

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The primary focus of this research to enhance the aqueous solubility and oral bioavailability of Ranolazine, an anti-anginal drug with poor water solubility, by formulating pharmaceutical co-crystals using co-formers. In-silico molecular screening was applied to predict compatible co-formers based on intermolecular interactions and stability. From this approach, 2-amino caffeine, nicotinamide, and benzamide were selected for experimental co-crystal development. A series of co-crystals (C1, C2, C3, B1, B2, N1, N2, N3) were synthesized employing solvent drop grinding, antisolvent addition, and slow evaporation techniques. Structural confirmation and physicochemical characterization were performed using UV spectroscopy, FTIR, and DSC analyses. In vitro dissolution studies revealed markedly enhanced release profiles compared to pure Ranolazine. Notably, C1, B2, and N1 co-crystals achieved 100% release within 15, 15, and 25 minutes, respectively. Pharmacokinetic investigations in rats were conducted using a validated RP-HPLC method with hydrochlorothiazide as an internal standard. All co-crystals exhibited maximum plasma concentration at 4 h, while N1 and C1 demonstrated significantly higher Cmax values relative to the pure drug at Tmax, indicating improved systemic availability. The RP-HPLC method was precise, sensitive, and compliant with ICH guidelines. This study highlights the utility of in silico screening in rational co-former selection and confirms the potential of co-crystallization to address solubility and bioavailability challenges associated with Ranolazine. The findings advise that Ranolazine co-crystals could lead to more effective anti-anginal therapy with improved therapeutic performance, laying the groundwork for further preclinical and clinical development.

**Keywords:** Ranolazine, Co-crystals, Pharmacokinetic assessment, Molecular Docking.

**PC-123**

## FORMULATION AND IN-VITRO EVALUATION OF ORALLY DISINTEGRATING TABLETS CONTAINING RACECADOTRIL UTILIZING DESIGN EXPERT SOFTWARE

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Racecadotril is a prodrug that is converted into its active metabolite, thiorphan, a selective enkephalinase inhibitor that blocks the enzyme's active site. This inhibition prevents the breakdown of enkephalins, thereby reducing intestinal secretions and treating diarrhea. The tablets were formulated to disintegrate rapidly in the oral cavity, allowing quick drug dispersion and absorption. Orally disintegrating tablets (ODTs) of formulations F1 to F11 were prepared using the sublimation technique. Initial trials employed Avidone as the superdisintegrant and camphor as the sublimating agent. Optimization of these formulations (F1 to F11) was carried out by varying the concentrations of the superdisintegrant and sublimating agent (Avidone at 0.5%, 2.75%, and 5%, and camphor at 5%, 10%, and 15%) to improve disintegration time, friability, and percentage of drug release. Design Expert 13 software facilitated optimization via Central Composite Design from Response Surface Methodology, with ANOVA revealing the influence of independent variables on dependent variables. Preliminary findings indicated that formulations containing both Ac Di Sol and menthol exhibited rapid disintegration and increased drug release. The optimized formulation, labelled as F6, contained 5% Avidone and 15% camphor, achieving a disintegration time of just 4 seconds, a friability of 0.63%, and 99.31% drug release. Characterization studies using FTIR, DSC, and PXRD confirmed the absence of significant interactions between the drug and excipients. Stability studies on the optimized formulations, based on disintegration and dissolution findings, demonstrated good stability

**Keywords:** Sublimation, Disintegration, Friability, Optimization, Quality by Design (QbD), Central Composite Design.

**PC-124**

## FORMULATION AND EVALUATION OF METHOTREXATE LOADED CAPPED FLEXOSOMAL GEL

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Methotrexate, a widely used disease modifying antirheumatic drug (DMARD), is commonly prescribed for the management of rheumatoid arthritis. Topical delivery of methotrexate faces challenges such as poor solubility, limited skin permeation, and instability. The present study aimed to develop a methotrexate-loaded capped flexosomal gel to enhance drug stability, improve dermal penetration, and provide controlled release. Capped flexosomes were prepared using the thin film hydration method and incorporated into a Carbopol gel base to achieve suitable consistency for topical application. The developed formulation exhibited a particle size of 278nm and zeta potential -38.7mV, indicating good colloidal stability. Entrapment efficiency was 88.01% and drug content was 94.44%, demonstrating effective drug loading. In vitro release studies revealed sustained release of 96.91% in 8 hr, suggesting the potential for prolonged therapeutic action. The capping of flexosomes contributed to enhanced vesicle stability and protection of the drug from degradation, while the flexible vesicular structure is expected to facilitate penetration through the stratum corneum. Overall, the methotrexate-loaded capped flexosomal gel demonstrated desirable physicochemical characteristics, making it a promising carrier system for topical management of rheumatoid arthritis. Further in vivo studies are warranted to evaluate the formulations therapeutic efficiency and confirm enhanced bioavailability.

**Keywords:** Methotrexate, capped flexosomes, rheumatoid arthritis, topical gel

**PC-125**

## FORMULATION AND EVALUATION OF CLARITHROMYCIN-LOADED SPANLASTIC GEL: A FACTORIAL STUDY

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In the current research Spanlastic gel of Clarithromycin was formulated. The objective was to utilize the advantages of Spanlastics in prolonging drug residence time and improving site-specific action. Spanlastics were prepared by the thin film hydration method and optimized using a 23 factorial design with twelve different formulations containing varying concentrations of Span 60, Span 80, and Tween 80. The optimized formulation exhibited a Particle size of 237.1 nm, a Polydispersity index (PDI) of 0.258 and a Zeta potential of -29.3 mV. Drug Entrapment efficiency and Total drug content were 78.05 and 98.9%, respectively. Compatibility studies using FTIR and DSC confirmed no significant interactions between the drug and the excipients. SEM analysis revealed uniform particle morphology. In-vitro diffusion studies using a Franz diffusion cell demonstrated controlled release from optimized formulation exhibiting 86.2% drug release over 24 hours, which was significantly more sustained compared to the pure drug and Marketed Gel exhibits faster drug release, 98.6% for 8 hours. Additionally, the antibacterial activity of the Clarithromycin Spanlastic gel was evaluated against Staphylococcus aureus and Pseudomonas aeruginosa using the agar well diffusion method. The gel formulation exhibited superior antibacterial activity with larger zones of inhibition, confirming its potential in enhancing the drug's efficacy. These results suggest that optimised Clarithromycin Spanlastic gel formulation is a promising candidate for future clinical applications in treating bacterial infections.

**Keywords:** Clarithromycin, Spanlastic, Factorial Design, Antibacterial Activity

**PC-126**

## FORMULATION AND EVALUATION OF NASAL IN SITU GELLING SYSTEM OF ATAZANAVIR

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Human Immunodeficiency Virus (HIV) continues to be a major health concern worldwide, with the central nervous system (CNS) acting as an important viral reservoir due to the restricted permeability of the blood–




ISBN: 978-81-980623-8-3

brain barrier (BBB). Atazanavir, a potent HIV-1 protease inhibitor, demonstrates poor CNS penetration when administered orally, limiting its efficacy in managing Neuro AIDS. Intranasal drug delivery using in situ gelling systems provides a non-invasive approach to bypass the BBB and achieve direct nose-to-brain targeting. The present study aimed to formulate and evaluate a temperature-triggered nasal in situ gelling system of Atazanavir to enhance brain bioavailability and patient compliance. Pre formulation studies included solubility assessment, melting point determination, and drug–excipient compatibility analysis using FTIR spectroscopy. In situ gels were prepared using temperature-sensitive polymers at varying drug–polymer ratios. The formulations were evaluated for physical appearance, clarity, pH, drug content uniformity, gelation capacity, gelation time, gelation temperature, viscosity and flow properties, sterility, osmotic compatibility, and in vitro drug release behaviour. The optimized formulation (F5, containing Pluronic F127 and HPMC E50LV) showed excellent clarity and transparency, with a pH range of 6.33–6.47, which is compatible with nasal mucosa. Gelation occurred rapidly at physiological conditions with a gelation time of 58 s and gelation temperature of 35 °C.Viscosity was found to be 90–500 cP before gelation and increased significantly to 240–12,000 cP after gelation, confirming a sol–gel transition and pseudoplastic flow behaviour. The drug content was 95.85 ± 0.40%, indicating uniform distribution. In-vitro drug release showed a sustained profile with 92.3% release over 12 hours, following diffusion-controlled kinetics. Isotonicity testing confirmed no effect on blood cell morphology, and sterility studies revealed the formulation was free from microbial contamination. Stability studies indicated no significant changes in clarity, pH, viscosity, or drug contentduring storage. The developed temperature-sensitive nasal in situ gelling system of Atazanavir proved to be a promising strategy for enhancing brain delivery of the drug. This novel formulation offers a patient-friendly, non-invasive, and effective approach for the management of Neuro AIDS by bypassing the BBB and improving therapeutic outcomes.

**Keywords:** Atazanavir, In situ gel, Nose-to-brain delivery, Temperature-sensitive system, HIV, Neuro AIDS

**PC-127**

**BIOTECHNOLOGICAL ENHANCEMENT OF SERINE PROTEASE BIOSYNTHESIS IN BACILLUS PUMILUS THROUGH CULTURE OPTIMIZATION TECHNIQUES**

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This research focused on the biotechnological enhancement of serine protease biosynthesis in Bacillus pumilus using culture optimization techniques. Proteases, particularly serine proteases, are a major class of industrial enzymes with extensive applications in pharmaceuticals, detergents, food processing, leather treatment, and waste management. Given their commercial importance, the study aimed to isolate, characterize, and optimize a high-yielding microbial strain capable of producing serine protease efficiently. Soil samples were collected from agricultural regions and processed through serial dilution and plating techniques to isolate bacterial colonies. Among the isolates, Bacillus pumilus (designated PUMMD23) was identified as a potent protease producer based on skim milk agar screening. The strain was characterized using morphological, biochemical, and molecular methods, including Gram staining, agarose gel electrophoresis, and phylogenetic analysis. To further enhance enzyme yield, UV-induced mutagenesis was applied, resulting in mutant strains with improved protease activity. Culture optimization was carried out by studying the effect of parameters such as temperature, pH, nutrient sources, and agitation speed on enzyme production. Protease activity was quantified using Bradford's protein assay, while purification was performed through ammonium sulfate precipitation followed by SDS-PAGE analysis to confirm molecular characteristics. Demonstrated a notable increase in enzyme productivity under optimized conditions compared to unoptimized processes. Furthermore, mutant strains showed higher protease yields than the wild-type strain. The enzyme exhibited good stability across a range of pH and temperature conditions, making it suitable for diverse industrial applications. This study establishes Bacillus pumilus as an effective microbial source of serine proteases and highlights the importance of culture optimization for improving enzyme production. The findings provide valuable insights for scaling up serine protease production to meet industrial demands sustainably.

**Keywords:** biotechnology, microbial source, mutagenesis, protease

**PC-128**

**FORMULATION AND CHARACTERISATION OF NANOPARTICLES OF SIMVASTATIN**

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The aim of this study is to formulate and characterize simvastatin loaded Chitosannanoparticles prepared by ionic-gelation method. simvastatin Calcium has a low bioavailability (20%) due to poor absorption of the drug. Chitosan is a polymer of linear polysaccharide, which enhances transport of drug across epithelial surfaces and is biocompatible and biodegradable. The nanoparticles obtained were evaluated for percentage yield of drug, drug entrapment efficiency, particle size and morphology using Scanning Electron Microscopy (SEM), compatibility studies using Fourier-Transform Infrared Spectroscopy (FTIR) and Differential Scanning Calorimetry (DSC) and in vitro release kinetics. Among the four different drug to polymer ratios, 1:1 ratio showed high encapsulation efficiency and drug loading. The nanoparticles obtained were spherical in shape with a smooth surface with particle size range between 231.52 ± 24.12 nm to 405.25 ± 17.42 nm. The nanoparticles prepared proved to be a promising dosage form of simvastatin, with improved bioavailability.

**Keywords:** Simvastatin, Chitosan, Nanoparticles, Bioavailability, Ionic-Gelation.

**PC-129**

**SYNERGISTIC NANOFORMULATION FOR ANTI-INFLAMMATORY AND ANTIMICROBIAL APPLICATIONS IN TREATMENT OF PSORIASIS**

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In the present study, a synergistic nanoformulation was developed by combining a PDE4 Inhibitor,Roflumilast with silver nanoparticles to enhance therapeutic outcomes in psoriasis. The objective was to design a nanocarrier system that provides dual functionality—anti-inflammatory and antimicrobial activity—while improving stability and controlled release. The nanoformulation was prepared using chemical reduction method and optimized using BBD for particle size, zeta potential, and polydispersity index. The optimized formulation exhibited a uniform nanosize distribution with high entrapment efficiency(90 ±0.72 %) and sustained drug release characteristics. FTIR analysis confirmed the absence of significant drug–excipient interactions, while SEM and TEM (70nm) studies revealed well-dispersed spherical nanoparticles. The formulation demonstrated notable anti-inflammatory activity in vitro, along with significant antimicrobial potential against selected skin pathogens. These findings suggest that the developed synergistic nanoformulation can serve as a promising platform for the effective management of inflammatory skin diseases with concurrent infection risk.

**Keywords:** Nanoformulation, Silver nanoparticles, Anti-inflammatory, Antimicrobial, Psoriasis.

**PC-130**

**DEVELOPMENT OF ROSUVASTATIN CALCIUM MOUTH DISSOLVING TABLETS VIA CO-CRYSTAL ENGINEERING FOR IMPROVED ORAL BIOAVAILABILITY**

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Rosuvastatin calcium is a widely used lipid-lowering agent that suffers from poor aqueous solubility, limiting its oral bioavailability. To overcome these limitations, the Co-crystallization of drugs with co-formers offers an intriguing approach for modifying the solid-state characteristics of




ISBN: 978-81-980623-8-3

drug compounds, including dissolution rates and solubility profile. The preparation of co-crystals via liquid-assisted grinding techniques using different co-formers including L-asparagine, L-glutamine, mannitol and menthol. The solid-state characterization of the resulting co-crystals was performed using powder X-ray diffraction (PXRD), differential scanning calorimetry (DSC), Fourier-transform infrared spectroscopy (FTIR), and scanning electron microscopy (SEM). The results showed that among all tested co-formers, menthol produced the most significant enhancement in both solubility and dissolution rate. These findings suggest that menthol is a highly effective co-former for improving the physicochemical and biopharmaceutical properties of Rosuvastatin via co crystallization. Then further co-crystals were used for the preparation of mouth dissolving tablets. Total nine formulations were formulated and designated as F1, F2, F3, F4, F5, F6, F7, F8, and F9. During the formulation of tablets both pre - compression and post - compression studies were carried out. Formulation F3 was found to have highest disintegration and in-vitro drug release studies were performed in phosphate buffer pH 6.8 for 15 minutes and drug content was determined by UV method. The drug release study was shown 98.35% release. No significant changes were observed on physical characteristics, drug content and on drug release of the tablets after keeping the tablets for one month at 40±2°C and 75±5% RH. So, it was concluded that the prepared tablets were stable under these stress conditions. It can be concluded that the co-crystals increase the solubility of the poorly water-soluble drug using menthol as a carrier. The mouth dissolving tablets Rosuvastatin calcium was found to be better dissolution and solubility.

**Keywords:** BCS class-II, co-crystal, bioavailability, dissolution rate, poor solubility.

**PC-131**

## FORMULATION AND EVALUATION OF SUSTAINED-RELEASE CLARITHROMYCIN MATRIX TABLETS USING PRUNUS ARMENIACA L. GUM

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Clarithromycin is a semi-synthetic macrolide antibiotic that has been proven to be extremely effective monotherapy in treating H. pylori infection. One of the various reasons reported for partial eradication of H. pylori infection is that the short swelling time of antimicrobial agents in the stomach. Hence, the principal object of the present work was to design and develop a swellable gastro-retentive tablet of clarithromycin using a natural gum Prunus armeniaca L. obtained from the high altitude of Kumaun region (Mukteshwar), as well as evaluate its various parameters. Phytochemical tests and derived properties of the powder gum were evaluated and compared with those of Guar gum and Gum tragacanth. Here we formulate 9 different formulations by varying the percentage of Gum content to find out the sustained release property throughout the 12 h dissolution study using in vitro USP type I dissolution test apparatus. The drug release study was carried out in 0.1 N HCl for 10-12 h each 900 ml of dissolution media was maintained at 37±0.5◦C and agitated at 100 rpm. Among the 9 formulations, Prunus armeniaca gum 20% was found to be most promising formulation as they showed sustained release (98.75%%) as well as maintained excellent matrix integrity during the period of 12 h study. A total of nine formulations were prepared and evaluated and the data obtained from various parameters showed that the matrix tablet drug delivery was a potential candidate for a controlled/sustained-release drug delivery system.

**Keywords:** Clarithromycin, H. pylori infection, Prunus armeniaca gum, matrix tablet, controlled/sustained-release drug delivery system.

**PC-132**

## FORMULATION AND EVALUATION OF MUCOADHESIVE BUCCAL TABLETS OF GLICLAZIDE

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Gliclazide is lipophilic in nature, so low soluble in saliva. For this reason solid dispersion of drug was prepared to increase hydrophilicity of drug. Poly ethylene glycol 6000 was used to prepare solid dispersion in 1:1 (SD1) and 1:2 (SD2) drug: polymer ratio and dissolution study of both type of solid dispersion were done in dissolution medium phosphate buffer 6.8 pH. The % drug release of SD1 (1:1) and SD2 (1:2) was 93.37% and 99.66% at 60 min respectively. Solid dispersion SD2 (1:2) showed higher % release than SD1 (1:1) so this was chosen to prepare mucoadhesive buccal tablet of drug. Mucoadhesive buccal tablets of Gliclazide were prepared by direct compression method in which solid dispersion SD2 (1:2) equivalent to 50 mg Gliclazide was taken in one tablet. All formulations (F1-F12) were evaluated for physical parameters like weight variation, hardness, thickness, friability, surface pH and swelling index and performance parameters like bioadhesive strength, residence time, in-vitro dissolution study, and in-vitro diffusion study. Phosphate buffer 6.8 p H was used as dissolution medium because it resembles the pH of saliva (6.8 p H). The surface pH of tablets was from 6.12 to 6.74 except F12 (contained Carbopol 934 P) which falls in the range of salivary pH and all tablet showed in vitro residence time of 3.50 to 8.50 hr except F7, F8, F9 indicate good adhesive capacity of tablet. Buccal tablet showed good swelling of >60 % except F2, F3 up to 8 hr maintaining integrity of polymer. The in-vitro release of drug was extended 4-6 hr. Formulation F3, F5, F6, F10 and F11 showed better release of drug up to 6 hr. All the tablets showed good bioadhesive strength of 6.12 to 8.70 except F7, F8, F9. As concentration of secondary polymer (HPMC K4M, HPMC 50 cps, NaCMC increased there was decrease in swelling index. The in vitro diffusion study of selected formulations (F3, F6, F10, F11) were done by using Franz diffusion cell up to 6 hr. Tablet contained combination of Carbopol 934 P and HPMC K4M in 1:2 ratio (F3) and Carbopol 934 P and NaCMC in 1:2 ratio (F6) 25.82% and 23.14% respectively. The present study demonstrated the possibility of designing a transmucosal drug delivery system for this antidiabetic drug which will be more bioavailable, efficacious than the conventional delivery and could be a drug delivery system of choice in treatment of maturity onset diabetes.

**Keywords:** mucoadhesive, solid dispersion, Gliclazide, Carbopol, HPMC, NaCMC,

**PC-133**

## DEVELOPMENT OF GROWTH FACTOR LADEN CHITOSAN BASED TRI-LAYERED BURN WOUND DRESSING

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Burn injuries remain a significant global health concern, contributing to approximately 180,000 annual fatalities and representing a leading cause of morbidity, especially in resource-limited regions. Developing advanced strategies for managing burn wounds is crucial to enhancing patient outcomes and mitigating associated complications. This study examines the development of a tri-layered burn wound dressing. The dressing consists of a porous polyethylene sheet, a chitosan scaffold loaded with growth factors and lidocaine, and a non- permeable polyethylene sheet. The dressing is designed to promote angiogenesis, provide localized anaesthetic effects, and deliver antimicrobial protection for enhanced wound healing and patient comfort. Comprehensive analytical and biological evaluations, including UV spectroscopy, FTIR, DSC, SEM, XRD, swelling studies, and porosity measurements, collectively validate the dressing's structural integrity, chemical stability, and functional suitability for burn wound management, aligning with its intended therapeutic objectives. In vitro drug release studies demonstrated controlled lidocaine release for localized pain management, reducing systemic toxicity. Angiogenesis studies confirmed enhanced blood vessel formation, essential for wound healing, while the MTT assay verified biocompatibility by ensuring no cytotoxic effects. In vivo animal studies demonstrated the dressing's efficacy, with complete wound healing achieved within 20 days, significantly outperforming control treatments in promoting tissue regeneration and reducing inflammation. The results highlight that this innovative dressing has the potential to significantly improve burn wound healing, making it a valuable asset in clinical wound care. Overall,




ISBN: 978-81-980623-8-3

it combines antimicrobial, regenerative, and protective properties for effective clinical application.

**Keywords:** Burn wound dressing, Chitosan scaffold, Angiogenesis, Lidocaine release, Antimicrobial properties.

**PC-134**

**FORMULATION AND DEVELOPMENT OF HA BASED LOADED BIOADHESIVE PATCH FOR WOUND REPAIRING**

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The integration of bioadhesive polymeric patches in wound repairing presents a transformative approach to localized drug delivery, particularly for agents like HA Acid known for their biocompatible and regenerative properties. This study explores the formulation and therapeutic efficacy of a bioadhesive patch system incorporating HA Acid within a matrix of biocompatible polymers tailored for sustained release and enhanced wound interface adhesion. Polymers such as chitosan, sodium alginate, and polyvinyl alcohol (PVA) were selected based on their film-forming capacity, biodegradability, and mucoadhesive characteristics. The patch was fabricated via solvent casting and crosslinking techniques, optimizing mechanical strength, hydration capacity, and drug entrapment efficiency. Physicochemical characterization included Fourier-transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), and differential scanning calorimetry (DSC) to confirm polymer compatibility and drug-polymer interactions. In-vitro drug release studies demonstrated a biphasic release profile, with initial burst followed by sustained diffusion over 72 hours, aligning with therapeutic windows for wound debridement and microbial suppression. Ex-vivo adhesion testing on porcine skin and in-vivo wound Repairing assays in rat models revealed superior retention, reduced inflammation, and accelerated epithelialization compared to conventional topical formulations. The incorporation of HA Acid into a bioadhesive polymeric matrix not only enhances drug stability and site-specific delivery but also minimizes systemic exposure and dosing frequency. This platform holds promise for chronic wound management, diabetic ulcers, and post-surgical applications where controlled release and barrier protection are critical. Future work will focus on integrating nanocarriers and responsive polymers to further modulate drug kinetics and tissue regeneration. The study underscores the translational potential of polymer-engineered bioadhesive systems in advancing wound care therapeutics.

**Keywords:** Bioadhesive, Drug release, Polymer, Wound repair

**PC-135**

**FORMULATION AND EVALUATION OF OPTHALMIC IN SITU GEL OF CIPROFLOXACIN FOR SUSTAINED DELIVERY**

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The objective of this study was to develop an ophthalmic in-situ gel system of ciprofloxacin aimed at revolutionizing ocular infection therapy by providing sustained drug release, reducing frequent administration, and ultimately improving treatment outcomes and patient comfort. Ciprofloxacin in-situ gels were formulated using sodium alginate as an ion-activated gelling agent and HPMC K4M as a viscosity enhancer. A $3^2$ full factorial design was applied to optimize the formulation, resulting in nine trial batches that were evaluated for appearance, pH, viscosity, gelling capacity, drug content, in vitro drug release, antimicrobial activity, sterility, and stability. The developed formulations exhibited desirable physicochemical characteristics, with pH values within the ocular tolerance range and viscosity levels ensuring both easy administration and sufficient gel strength. The gelling capacity improved proportionally with increasing sodium alginate and HPMC K4M concentrations, confirming their role in sustained release modulation. In vitro release studies demonstrated a slow and extended drug release pattern dependent on polymer concentration, with the optimized formulation F6 showing cumulative release of 71.52% over 12 hours. Antimicrobial activity confirmed the retention of ciprofloxacin's efficacy, sterility testing ensured microbial safety, and stability studies revealed no significant changes in physicochemical properties during storage. The results indicate that formulation F6 successfully achieved prolonged drug release while maintaining patient-friendly characteristics. Overall, the study highlights the potential of ciprofloxacin-loaded ophthalmic in-situ gel as a promising alternative to conventional eye drops, offering enhanced bioavailability, reduced dosing frequency, and improved therapeutic efficacy for ocular infections.

**Keywords:** Ophthalmic In-situ Gel, Ciprofloxacin, In-vitro Drug Release, Sterility, Stability

**PC-136**

**DEVELOPMENT OF LIPOSOMAL LIPID-BASED DRUG DELIVERY SYSTEMS FOR GLYCOSIDES**

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Background: Glycosides are phytoconstituents with hepatoprotective, antioxidant, anti-inflammatory, and anticancer properties, but their therapeutic utility is restricted by poor aqueous solubility and bioavailability (<20%). Liposomal lipid-based drug delivery systems (LDDS) can enhance solubility, stability, and targeted delivery. Methods: Glycoside-rich plant extracts will be obtained through ethanolic extraction and incorporated into liposomes via thin-film hydration, reverse phase evaporation, and ethanol injection. Formulations will be characterized for particle size, zeta potential, encapsulation efficiency, and release kinetics. In vitro assays (cellular uptake, cytotoxicity) and in vivo studies (pharmacokinetics, biodistribution) will evaluate therapeutic performance. Results: Optimized liposomal formulations are expected to achieve encapsulation efficiency >75%, particle size in the range of 120–180 nm, and zeta potential around −25 mV, ensuring colloidal stability. Controlled drug release of 70–80% within 24 hours is anticipated. Compared to free glycosides, liposomal formulations are projected to improve oral bioavailability by 2–3-fold, prolong circulation half-life from 1.5 h to 6–8 h, and enhance tissue targeting (liver accumulation >45% vs. 20% for free drug). Conclusion: Liposomal glycoside formulations demonstrate superior therapeutic potential, with 3-fold higher bioavailability, reduced systemic toxicity, and targeted tissue distribution. These findings suggest that LDDS can significantly improve efficacy and safety of glycoside-based therapies, paving the way for clinical translation in cancer, inflammatory, infectious, and cardiovascular conditions.

**Keywords:** Glycosides, Liposomes, Drug delivery, Bioavailability, Nanotechnology

**PC-137**

**SECNIDAZOLE CONTAINING TEMPERATURE DEPENDENT IN-SITU GELLING FORMULATION FOR LONG-TERM TREATMENT OF PERIODONTITIS**

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Secnidazole, a second-generation antimicrobial drug, of nitroimidazole class and is effective against various anaerobic gram-positive and gram-negative bacteria. The aim of the study was to develop a syringeable in-situ gelling formulation of secnidazole for enhanced local treatment of periodontitis, by providing sustained drug release. The formulations were prepared by cold method by dissolving polymer in a cold phosphate buffer (pH 6.8) under constant stirring. Formulations were prepared with different concentration of Poloxamer-407 (20-22% w/v), poloxamer-188 (1% w/v), HPMC E5 (0.5% w/v) and drug (0.5%-1.5% w/v). These formulations were evaluated for syringeability, gelation time, gelation temperature, pH, and in-vitro diffusion The formulations were easily syringeable using a 21-gauge needle at cold temperatures. The gelation temperature ranged from 37.5 ± 1 to 44.1 ± 0.5°C and pH was in the range of 7.03 ± 0.05 to 7.46 ± 0.05. The FTIR analysis of formulations indicated absence of interaction between drug and the polymers. The formulations demonstrated a gelatin time of < 47 sec. The




ISBN: 978-81-980623-8-3

drug release profiles indicated sustained release over 8 hours, with formulations releasing 43 ± 0.5% to 56 ± 0.4% of the drug during this period. In conclusion, the prepared in-situ gelling system provides a newer dimension for the effective management of periodontitis. The preparation of formulation is simple, reproducible and provides localized effect.

**Keywords:** Secnidazole, in-situ gel, thermoreversible polymers, sustained release, periodontitis, antibacterial activity.

**PC-138**

**FLUTAMIDE LOADED PCL NANOPARTICLES BY NANO PRECIPITATION: PREPARATION, CHARACTERISATION AND IN VITRO EVALUATION**

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The objective of the present work was to develop and evaluate flutamide-loaded methoxy poly (ethylene glycol)-polycaprolactone (mPEG–PCL) nanoparticles (NPs) for targeted delivery to prostate cancer. Nanoparticles were prepared by nanoprecipitation using a $2^3$ factorial design, and the influence of three formulation factors polymer concentration, stabilizer, and organic phase volume—on NP characteristics was systematically studied. The prepared formulations were evaluated for particle size, zeta potential, surface morphology, drug content, entrapment efficiency, percentage yield, in vitro drug release, and stability. Fourier transform infrared spectroscopy confirmed the absence of chemical interaction between flutamide and the polymer. The mean particle size of the formulations ranged from 79.2 to 89.1 nm, with a zeta potential of –41.5 mV, indicating good colloidal stability. Scanning electron microscopy revealed spherical nanoparticles with smooth surfaces and uniform distribution. Drug content ranged from 73 ± 3.74% to 89 ± 4.63%, while entrapment efficiency varied between 79 ± 4.30% and 93 ± 3.91%. The percentage yield of formulations was between 52.49 ± 2.43% and 87.73 ± 3.84%. In vitro release studies demonstrated a sustained drug release profile over 24 hours, supporting the potential of the system for prolonged therapeutic action. Accelerated stability studies of the optimized formulation (F2) conducted for three months showed no significant changes in particle size, entrapment efficiency, or release characteristics, confirming formulation stability. Overall, flutamide-loaded mPEG–PCL nanoparticles demonstrate promise as a novel targeted delivery system for prostate cancer, potentially overcoming limitations of conventional dosage forms and improving therapeutic outcomes.

**Keywords:** Nanoparticles, Targeted Delivery, Zeta Potential, Prostate Cancer

**PC-139**

**NEURO-TARGETED NANOMEDICINE: ROLE OF NANOSTRUCTURED LIPID CARRIERS IN OVERCOMING THERAPEUTIC CHALLENGES OF PARKINSON'S DISEASE**

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Parkinson's disease (PD) is a chronic neurodegenerative disorder marked by progressive dopaminergic neuron loss and severe motor dysfunction. Current treatment options are primarily palliative, offering symptomatic relief without addressing disease progression. A major hurdle in effective PD therapy is the poor aqueous solubility, limited oral absorption, and low blood–brain barrier (BBB) permeability of therapeutic agents. These limitations necessitate the development of advanced drug delivery systems capable of enhancing bioavailability and brain targeting. Nanostructured lipid carriers (NLCs) have emerged as a versatile platform for neurotherapeutics, offering advantages such as high drug loading, controlled release, and improved pharmacokinetics. In this study, piperine, a bioactive compound with neuroprotective properties but poor solubility, was incorporated into NLCs using a blend of solid and liquid lipids. Soluplus®, an amphiphilic polymer, was employed to further improve solubility, stability, and permeability of the formulation. The prepared NLCs exhibited uniform nanoscale dimensions, stable zeta potential, and high encapsulation efficiency, as confirmed by physicochemical characterization. In-vitro release studies revealed a sustained release profile, while permeability assays indicated enhanced BBB transport compared with conventional formulations. Preliminary in-vivo findings further demonstrated superior brain accumulation and prolonged systemic circulation. The results suggest that Soluplus-assisted NLCs can effectively overcome key pharmacological barriers, thereby enhancing therapeutic potential for PD management. This work underscores the promise of lipid–polymer hybrid nanocarriers in delivering neuroprotective agents to the brain. By addressing solubility, stability, and transport challenges simultaneously, NLCs present a significant step toward more effective and targeted interventions for Parkinson's disease.

**Keywords:** Nanostructured lipid carriers, Parkinson's disease, Soluplus®, blood–brain barrier, neuro-targeted delivery.

**PC-140**

**FORMULATION DEVELOPMENT AND EVALUATION OF TRANDOLAPRIL FAST-DISSOLVING ORAL THIN FILMS BY USING BOX-BEHNKEN DESIGN.**

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Angiotensin converting enzyme (ACE) inhibitors include Trandolapril. The enzyme that converts angiotensin I to Ⅱ is in charge. Angiotensin II is an essential part of the RAAS and regulates blood pressure. Oral Thin Films breakdown quickly in the mouth along with the medication, and most of the medication enters the systemic circulation by way of the buccal/oral mucosa, bypassing first-pass metabolism. Utilising the solvent casting method, trandolapril fast dissolving oral thin films were created utilising a variety of film-forming ingredients, including saccharin as a sweetener and filler, HPMC as a plasticizer, and PEG 400 as a plasticizer. The weight fluctuation, thickness, folding durability, drug content, disintegration duration, and invitro dissolution investigations of oral thin films were assessed. Trandolapril oral thin films performed best when compared to other formulations, according to evaluation trials conducted by HPMC. The created films had a smooth surface, were transparent, and were clear. The formulated oral thin films were unaltered after the first three months of storage under accelerated settings, according to the results of the accelerated stability investigations conducted for the optimum film formulations F4.

**Keywords:** Trandolapril, Oral film, Box-Behnken Design.

**PC-141**

**METFORMIN-CURCUMIN PELLET CAPSULES: FORMULATION AND EVALUATION AGAINST DIABETES-INDUCED OXIDATIVE STRESS**

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Diabetes mellitus is a progressive metabolic illness characterized by chronic hyperglycemia and oxidative stress, both of which cause serious vascular and metabolic consequences. Current medications, such as metformin, improve glycemic control but offer little protection against oxidative damage, highlighting the need for coordinated therapeutic regimens. The current study describes the creation of a dual-drug pellet-filled capsule containing metformin hydrochloride, a first-line hypoglycemic medication, and curcumin, a powerful natural antioxidant, to produce synergistic advantages. Metformin and curcumin nanopellets were produced using Eudragit and PEG 6000-HPMC polymers, respectively, and were systematically analyzed using FTIR, PXRD, SEM, and dynamic light scattering, showing the stability of nanosized particles with uniform morphology. The optimized capsule formulation met pharmacopeial standards, with uniform weight, high drug content, and an appropriate disintegration time. In vitro dissolution experiments demonstrated that drug release was sustained for up to 12 hours, with a total release rate of more than 97%. Pharmacological testing in alloxan-induced diabetic rats revealed significant decreases in fasting blood glucose, improved glucose tolerance, increased antioxidant enzyme activity, and decreased lipid peroxidation, confirming both hypoglycemic and antioxidative effects. The metformin-curcumin dual-drug capsule increased bioavailability, regulated release, and provided synergistic therapeutic efficacy. This innovative formulation offers a potential




ISBN: 978-81-980623-8-3

approach to the holistic management of diabetes and associated oxidative consequences.

**PC-142**

**INNOVATIVE FORMULATION AND DEVELOPMENT OF BATH BOMB**

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Bath bombs are solid formulations composed of both dry and moist ingredients, molded into various shapes and dried for use in personal care. Designed to provide a refreshing and enjoyable bathing experience, their efficacy is largely influenced by the concentration and nature of active components. Sodium bicarbonate ($NaHCO_3$) acts as the primary effervescent agent, producing the characteristic fizz and foam, while arrowroot powder functions as a natural thickener that absorbs excess moisture without drying out the skin. Citric acid complements the reaction with baking soda, enhancing the sensory appeal. Epsom salt, a compound of magnesium and sulfate ions, is incorporated for its potential to promote relaxation through serotonin synthesis. All tested formulations demonstrated satisfactory physical attributes, including smooth texture and consistent shape. Antimicrobial activity, assessed via the cup plate method, revealed that efficacy increased with concentration. Among five experimental batches (F1–F5), formulations F2 and F3 exhibited superior stability and cleansing performance. The results indicate that sodium bicarbonate, citric acid, and arrowroot powder can serve as essential components in formulating bath bombs that are both effective and gentle on the skin.

**Keywords:** Bath bomb, sodium bicarbonate, citric acid, arrowroot powder, Epsom salt

**PC-143**

**FACTORIAL APPROACH TO IMPROVE THE SOLUBILITY AND DISSOLUTION OF ATORVASTATIN CALICUM, A BCS CLASS-II DRUG**

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The present study aimed to enhance the solubility and dissolution of Atorvastatin Calcium using β-Cyclodextrin (βCD) and Pluronic F127, optimized through a $2^2$ factorial design. Atorvastatin Calcium βCD–Pluronic F127 complexes were prepared using the kneading method. Solubility enhancement was evaluated individually and in combination. The ternary complex was further formulated into tablets by direct compression, which were assessed for pharmacopeial parameters including weight variation, hardness, friability, content uniformity, disintegration time, and dissolution rate. Factorial design was applied to analyze the main and interaction effects of βCD (Factor A) and Pluronic F127 (Factor B). Solubility of Atorvastatin Calcium improved 4.35-fold with βCD, 7.3-fold with Pluronic F127, and 8.72-fold with the combination. All tablet formulations met pharmacopeial specifications. Among them, formulation A4 (βCD + Pluronic F127) demonstrated the shortest disintegration time (29 s) and the highest dissolution rate, attributed to enhanced wettability and reduced surface tension. Factorial analysis confirmed the synergistic effect of βCD and Pluronic F127 in optimizing drug release. The combination of βCD and Pluronic F127 significantly enhanced the solubility and dissolution of Atorvastatin Calcium. The ternary system offers a promising strategy to improve bioavailability and therapeutic efficacy of poorly water-soluble drugs.

**Keywords:** Atorvastatin Calcium, β-Cyclodextrin, Pluronic F127, Factorial Design. Solubility enhancement and Dissolution rate and Bioavailability.

**PC-144**

**OPTIMIZATION OF HOT MELT EXTRUSION PARAMETERS FOR LIPID-BASED NANOCOMPLEXES OF FERRIC FUMARATE AND ASCORBIC ACID**

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A hot melt extrusion (HME)–assisted lipid complex of ferrous fumarate (FF) and ascorbic acid (AA) was developed and optimized using a Box–Behnken design. The study investigated the effects of barrel temperature and screw speed on key formulation attributes, including entrapment efficiency, loading capacity, percentage yield, and particle size. Among the prepared formulations, the optimized lipid complex demonstrated high entrapment efficiency, maximum loading capacity, superior yield, and the smallest particle size. Fourier-transform infrared spectroscopy (FTIR) confirmed drug–lipid interactions, while transmission electron microscopy (TEM) revealed well-defined, uniformly dispersed particles. Results indicated that both barrel temperature and screw speed significantly influenced the entrapment and loading behavior of the lipid complex formulation. Overall, the study establishes HME as a robust and scalable technique for developing lipid complexes of FF and AA, with strong potential for efficient large-scale production.

**Keywords:** Ferrous fumarate, Ascorbic acid, box-behnken design, Hot melt extrusion.

**PC-145**

**EXTENDED-RELEASE GASTRORETENTIVE BEADS OF AMLODIPINE BESYLATE: A NOVEL APPROACH**

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Gastroretentive beads of Amlodipine Besylate designed for extended release were formulated using ionotropic external gelation. The beads were prepared in different polymer-to-drug ratios ranging from 1:0.5 to 1:4.5 with sodium alginate as the primary polymer and calcium chloride as the cross-linking agent, utilizing a 20-gauge syringe for bead formation. Due to the high solubility of Amlodipine Besylate in acidic media, the system was intended to maintain gastric retention and prolong drug release. The prepared beads were evaluated for drug content, entrapment efficiency, size, shape, and swelling characteristics. Morphological assessment under a microscope confirmed spherical geometry with mean diameters between 3.21 mm and 4.74 mm. In-vitro studies demonstrated sustained drug release for up to 7 hours. The optimized formulation exhibited a drug loading of about 24.63%, entrapment efficiency close to 98.51%, and excellent floating ability with minimal lag time and buoyancy maintained beyond 7 hours. Drug release was mainly governed by polymer hydration followed by diffusion and gradual erosion, with a swelling index of 176. Short-term stability evaluation over three months indicated no significant alterations in physical or release properties.

**Keywords:** Gastroretentive, beads, amlodipine besylate, ionotropic gelation, swelling index.

**PC-146**

**LIGHT-DRIVEN ELECTROKINETIC MICRODROPLETS FOR PRECISE TARGETED THERAPY**

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Light-driven electrokinetic motion systems mark a significant evolution in targeted therapy, offering enhanced precision in drug delivery while minimizing systemic effects. By harnessing the dynamic nature of light control, these systems facilitate remote, contactless manipulation with remarkable spatial and temporal accuracy through mechanisms such as photochemistry, photomechanics, light-induced Marangoni effects, and photoelectric fields. A novel superamphiphobic material emerges from this approach, leveraging light and electric fields to enable effective droplet movement via stable photo-induced charge regeneration and enhanced efficiency. When exposed to light, the superamphiphobic material produces a surface charge (photo-induced charge production). When light strikes the surface, the material becomes charged, which causes a dielectrophoretic force (DEP) depending on electric field gradients and dielectric characteristics. This enables for fine control over the movement of droplets while utilizing only light and avoiding physical contact. Significantly, these droplet can be used to demonstrates optimal efficacy for tumors situated near the body's surface or within light-accessible organs, such as skin and early-stage breast cancers, as well as oral and cervical malignancies. Furthermore, advancements in near-infrared (NIR) technology promise to extend the application range by




ISBN: 978-81-980623-8-3

enhancing light penetration depth. In concluding, this advanced methodology not only achieves high-velocity, long-range droplet control with customizable pathways but also fosters the development of innovative droplet-based robots for diverse bio-applications, including targeted cargo transport, environmental monitoring.

**Keywords:** Light-driven microdroplets, electrokinetic motion, Cancer therapy, Light-responsive systems

**PC-147**

**FORMULATION AND EVALUATION OF ORAL NANOEMULSION OF LEVETIRACETAM FOR PEDIATRIC EPILEPSY MANAGEMENT**

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The present study was aimed to formulate and evaluate oral nanoemulsion of Levetiracetam (LEV), a commonly prescribed antiepileptic drug, to improve its therapeutic efficacy and achieve a faster onset of action in pediatric patients. Preformulation studies established the fundamental characteristics of LEV, with UV visible spectroscopy for confirming its wavelength. Compatibility studies using FTIR confirmed the absence of any significant drug–excipient interactions. The nanoemulsion system was prepared with ethyl oleate as the oil phase, tween 20 as surfactant, and PEG 400 as co-surfactant. Pseudo-ternary phase diagrams were constructed to identify optimal formulation regions and central composite design was employed for optimization of critical parameters, including entrapment efficiency and in-vitro drug release. The optimized nanoemulsion exhibited favorable physicochemical characteristics, pH, viscosity and % drug content values within acceptable ranges for oral formulations. In-vitro release studies demonstrated improved drug release (75.23% to 94.69%) over 6 hours, indicating improved dissolution. The study highlighted the potential of LEV nanoemulsion as an effective oral delivery system to overcome solubility limitations and enhance therapeutic outcomes in pediatric epilepsy management. These findings provided a strong basis for further pharmacokinetic and clinical investigations aimed at improving patient compliance and treatment efficacy.

**Keywords:** Levetiracetam, nanoemulsion, oral drug delivery, pediatric epilepsy, central composite design

**PC-148**

**DRUG-DRUG INTERACTION STUDY OF ATORVASTATIN CALCIUM WITH METFORMIN HCL AND MULTIVITAMIN TABLETS USING INVITRO DISSOLUTION TEST**

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Atorvastatin calcium is a synthetic lipid lowering drug. Now days it is being highly used for cardiovascular disease, hypercholesterolemia and many other diseases. Now a day's most of the patient suffers from both diabetes and hypercholesterolemia. Therefore, physicians prescribe Metformin HCl and Atorvastatin at the same time. The potential drug-drug interaction (DDI) exists whenever two or more drugs are co-administered. The objective of this work is to compare the differences in dissolution behavior of Atorvastatin calcium tablets alone and combination of Atorvastatin with Metformin HCl and Multivitamin tablets to assess the drug – drug interaction. The other drugs prescribed with Atorvastatin at the same time, selected by sorting out prescriptions of different cardiovascular patients from different hospitals. Some prescriptions were selected where a patient has to administer Atorvastatin with Metformin HCl and Multivitamin tablets. The in vitro dissolution of Atorvastatin calcium alone and combination with Metformin HCl and Multivitamin tablets were performed using USP dissolution apparatus II and pH 6.8 phosphate buffer solutions. The % dissolution of Atorvastatin calcium alone and combination were compared and determined there is an synergistic activity in combination of Atorvastatin calcium tablets with Metformin HCl tablets and Multivitamin tablets. Therefore the effect of above mentioned drugs simultaneously in combination increases the % dissolution of Atorvastatin thus increasing the bioavailability even more than usual.

**Keywords:** Hypercholesterolemia, Diabetes, Drug-Drug interaction, Synergistic activity and In vitro dissolution

**PC-149**

**FORMULATION AND EVALUATION OF DULOXETINE FLOATING MICROSPHERES**

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The goal of this study was to assess the efficacy of a method based on the creation of polymeric nanoparticles as an innovative formulation of Dorzolamide Hydrochloride with enhanced therapeutic efficacy. Dorzolamide Hydrochloride has low solubility and permeability, which result in limited and variable bioavailability, its low stability makes it difficult to develop stable aqueous lipid formulations. The Dorzolamide Hydrochloride polymeric nanoparticles were created using the solvent evaporation process. The numerous formulations with varied drug polymer and surfactant ratios were analysed and improved. Dorzolamide Hydrochloride polymeric nanoparticles containing PLGA were created using the solvent evaporation method, then the particle size was decreased by sonication. Particle size, surface morphology by SEM, drug excipient compatibility by FTIR and invitro drug release experiments were used to characterize the produced nanoparticles.The formulation with the best encapsulation efficiency was (F3). A drug encapsulation effectiveness was 92.85% has been attained in this study. It was discovered that the efficiency of encapsulation improved along with the polymer content. According to the results of the current investigation, the manufacture of Dorzolamide Hydrochloride polymeric nanoparticles can be done using a solvent evaporation process followed by sonication.

**Keywords:** Dorzolamide Hydrochloride Drug, polymeric nanoparticles, solvent evaporation, lipid, FTIR, Invitro drug release.

**PC-150**

**CUBOSOMES- AN EMERGING PLATFORM FOR DRUG DELIVERY**

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Due to their unique properties and wide variety of applications, cubosomes—nanoscale cubic liquid crystalline formulations—have garnered a lot of attention recently. Self-assembling cubic phase nanoparticles are created when lipid molecules arrange themselves in a three-dimensional cubic lattice. These self-assembled nanoparticles have a large surface area and excellent stability due to their well-defined cubic lattice structures and amphiphilic surfactant composition. They are appealing choices for gene therapy, drug delivery, and other biological applications due to their special properties, which include their ability to encapsulate molecules that are both hydrophilic and hydrophobic. Presenting a comprehensive overview of the latest advancements in cubosome research, including their structural characterisation, synthesis methods, and functional applications, is the aim of this work. Among the key topics covered are the many methods for creating cubosomes, the manner in which lipid content influences their structural properties, and the mechanisms underlying their drug release profiles. Additionally, it will examine the difficulties and potential paths forward in refining cubosome formulations for enhanced clinical efficacy.

**Keywords:** Cubosomes, applications, liposomes, nanoparticles, bioactive lipids.

**PC-151**

**FORMULATION AND EVALUATION OF MONTELUKAST ORAL DISINTEGRATING FILMS USING SEEDS MUCILAGE AS SUPERDISINTEGRANT**

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ISBN: 978-81-980623-8-3

The aim of the present study was to formulate and evaluate Montelukast oral disintegrating films (ODFs) utilizing fenugreek and flax seed mucilage as natural superdisintegrants, employing the solvent casting method. Fenugreek and flax seed mucilage were chosen for their biocompatibility and disintegration properties. The mucilage from Trigonella foenum-graecum seeds and Linum usitatissimum seeds were isolated by using conventional hot water soaking method and characterized for phytochemical constituent like mucilage, which shown positive results and these results considered as a proof for purity of isolated mucilages. Totally six formulations were prepared and the formulation F-1 to F-3 contains Fenugreek muvilage, F-4 to F-6 contain Flax seed mucilage super disintegrant. In vitro disintegration time of the films was found to decreased with increase in the amount of the mucilage as super disintegrant. In vitro dissolution of formulations prepared with 200 mg Fenugreek mucilage, the formulations F-1 was released the completed drug in 10 minutes whereas the formulation F-2 and F-3 released only 97 % and 95 % respectively within 10 minutes. The results demonstrated that both fenugreek and flax seed mucilage significantly improved the disintegration time and mechanical properties of the films. The optimized formulations showed rapid disintegration within seconds, facilitating quick release and absorption of Montelukast. This study concludes that fenugreek and flax seed mucilage are effective natural superdisintegrants for the development of Montelukast ODFs, offering a promising approach for enhanced drug delivery and patient compliance.

**Keywords:** Montelukast, Oral disintegrating films (ODFs), Fenugreek, Flax seed mucilage, Natural Super disintegrants and Solvent casting method

**PC-152**

## DEVELOPMENT AND EVALUATION OF BUCCAL ADHESIVE ANTIEMETIC DRUG DELIVERY SYSTEM FOR CHEMOTHERAPY-INDUCED NAUSEA AND VOMITING

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The objective of the present research work is to develop and evaluate buccal adhesive tablets of antiemetic drug delivery system for chemotherapy-induced nausea and vomiting. Model drug used as Ondansetron hydrochloride (ODH) and Metoclopramide (MCP) separately with combination of Almond gum (AG) and Moringa gum (MG). The tablets were developed by direct compression and optimized by 32 randomized full factorial design. The amount of AG (X1, mg), and MG (X2, mg), were considered independent variables while mucoadhesive strength (Y1), and ex vivo % drug permeation (Y2) as dependent variables. The tablets were evaluated for various physicochemical parameters including swelling study, surface pH, stability in saliva, mucoadhesive strength, and ex vivo % drug permeation. The mucoadhesive strength of the ODH and MCP tablets ranged from 10.69±0.77 to 37.87±0.58. The ex vivo ODH and MCP permeation study was performed in phosphate buffer pH 6.8. At the end of 12 hours, the drug permeated was found to be in the range of 66.15±0.41 to 93.13±0.07. OF2 and MF2 formulation exhibited an extended drug permeation profile in comparison to other formulations. The effect of all these independent variables is statistically significant with $p<0.05$. The present investigation results indicated that the combination of AG and MG has sufficient mucoadhesive properties for buccal application with extended permeation potential.

**Keywords:** Almond gum, moringa gum, nausea and vomiting.

**PC-153**

## FORMULATION DEVELOPMENT AND EVALUATION OF TEMPERATURE TRIGGERED IN-SITU GEL CONTAINING ALCAFTADINE

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This study presents a temperature-triggered in situ gelling system for ocular drug delivery of Alcaftadine, a critical drug for allergic conjunctivitis. Traditional eye drops are limited by often drain rapidly from eye surface, which greatly reduces drug efficacy. To overcome this limitation, we developed a formulation using $3^2$ full factorial design, prepared by the cold method with a synergistic blend of Poloxamer 407 and Poloxamer 188. This unique polymer combination remains liquid at room temperature for easy application, yet rapidly transforms into a gel upon contact with the eye's surface. This gel transition increases drug retention, prolongs therapeutic action, and enhances patient comfort and compliance. The optimized formulation was non-irritant in the HET-CAM test and provided sustained release of Alcaftadine for up to 12 hours, with minimal batch variations indicating that the composition can be adjusted to control release. Physicochemical parameters including appearance, pH (7.0-7.1), gelling time (~36 s), viscosity (~520 cps), and cumulative drug release (~75%) indicating negligible variation and confirming prelease stability. The in-vitro release studies showed that this formulation of Alcaftadine was stable, effective comparable to a marketed formulation while offering prolonged drug action. Overall, it can be concluded that this system offering a more effective and patient friendly alternative to conventional treatment with promising potential for clinical application for allergic conjunctivitis.

**Keywords:** Ocular drug delivery, in situ gel, Alcaftadine, allergic conjunctivitis.

**PC-154**

## FORMULATION AND EVALUATION OF RIZATRIPTAN BENZOATE LOADED NANOSTRUCTURED LIPID CARRIERS FOR NOSE-TO-BRAIN DELIVERY

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In the present study, nanostructured lipid carriers (NLCs) of rizatriptan benzoate (RZB) were developed for intranasal delivery to enhance brain targeting and antimigraine efficacy. The NLCs were prepared by hot homogenization followed by ultrasonication and optimized using a Box–Behnken design. The optimized formulation showed a particle size of 114 ± 1.52 nm, polydispersity index 0.2339 ± 0.0042, zeta potential −28 ± 0.63 mV, entrapment efficiency 78.43 ± 0.08%, drug loading 17.90 ± 0.21%, and drug content 90.67 ± 0.29%. Mucoadhesion studies demonstrated higher mucin binding in locust bean gum–based NLCs (88%) compared to non-mucoadhesive formulations (65%). In vitro release exhibited a biphasic profile with 84.32% release over 6 h, fitting zero-order and Korsmeyer–Peppas models. Ex vivo permeation through goat nasal mucosa confirmed controlled diffusion, while histopathological analysis showed intact epithelium and absence of irritation. In vivo behavioural studies revealed a synergistic effect of RZB with peppermint oil. Pharmacokinetic evaluation indicated improved brain targeting, with intranasal NLCs achieving higher Cmax (1475.82 ng/mL) and AUC (335427 $ng \cdot mL^{-1} \cdot min$) compared to oral and intravenous suspensions. Stability studies confirmed formulation stability for three months under ICH conditions. Overall, intranasal RZB-NLCs offer sustained release, enhanced brain bioavailability, and improved antimigraine efficacy, establishing them as a safe and non-invasive strategy for migraine management.

**Keywords:** Rizatriptan benzoate, nanostructured lipid carriers, intranasal delivery, brain targeting, migraine.

**PC-155**

## FORMULATION AND EVALUATION OF SUBLINGUAL TABLET FOR THE TREATMENT OF ACUTE EPILEPTIC SEIZURES

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Researcher focus on the formulation of lacosamide sublingual tablets. Sublingual administration allows for rapid onset of action, as the drug is absorbed directly into the bloodstream through the tissues under the tongue, which is advantageous for conditions like epilepsy where quick symptom control is crucial. Additionally, this method bypassing the gastrointestinal tract and first-pass metabolism in the liver, leading to a higher proportion of the drug reaching systemic circulation, potentially




ISBN: 978-81-980623-8-3

allowing for lower doses and reducing side effects. Along with this taste masking of lacosamide will be achieved. The Sublingual tablets were formulated through a direct compression method utilizing varying concentrations of sodium starch glycolate, microcrystalline cellulose, and cross povidone. Compatibility studies of the drug and polymer were conducted using FTIR spectroscopy. The pre-formulation properties of the API were evaluated. The post-compressional parameters, including disintegration time and in vitro drug release studies of the optimized formulation, were assessed. Lacosamide has a melting point of 138-140$^{o}$C and is hydrophilic in nature. Its absorption maxima at 240 nm in Phosphate Buffer (6.8) and 241 nm in Distilled Water. FTIR analysis confirms its purity and no chemical interactions between the drug and excipients. Solubility is 0.890 in Distilled Water and 0.919 in Phosphate Buffer (6.8). Improved disintegration and dissolving rates were obtained using Cross povidone and sodium starch glycolate. The direct compression process was used to formulate tablets, and in-vitro release tests were conducted using the paddle method. Formulation F4 showed 99.48±0.45% drug release at 10 minutes, indicating faster and maximum drug release. A sublingual tablet of lacosamide was formulated and subjected to stability testing in accelerated conditions for 35 days. The tablet met the required stability criteria and showed no significant degradation after 35 days under accelerated conditions.

**Keywords:** Lacosamide, sublingual tablets, epilepsy, direct compression, super-disintegrants.

**PC-156**

**NANO-SILVER INFUSED PHYTOGEL: A NOVEL BIOCOMPATIBLE APPROACH TO WOUND HEALING**

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The work undertaken focuses on the development of a topical gel containing natural extracts and nano silver for wound healing, using Andrographis paniculata and Punica granatum as sources of tannins and flavonoids, respectively. The plants were authenticated and extracted using microwave-assisted extraction methods. Ethanol extracts of Andrographis paniculata and Punica granatum leaves were subjected to phytochemical screening to confirm the presence of tannins. These extracts were then characterized through GC-MS, followed by in-silico studies against selected proteins involved in wound healing. Topical gel formulations were prepared using xanthan gum Carbopol 940 as gelling agents. The formulations were evaluated for percentage yield, Spreadibility, pH, viscosity, and in vitro permeation studies. In vivo wound healing studies were conducted, assessing parameters such as complete blood count (CBC), lipid profile test, wound contraction rate, and histopathological changes. Among the six formulations prepared, formulation F2 was selected based on its viscosity, pH, spreadability, and drug content. The binding affinities of the selected ligands to the chosen proteins were analyzed, and it was concluded that ligands such as 24-Norursa-3,12-diene, anthraquinone,1-(o-chlorophenyl),1-butanol, 3-methoxy-,indoline, 2- (hydroxydiphenylmethyl)-, tetrahydro-22-desoxy-tomatillidine,3-hydroxy-6- methoxyflavone, and anthraquinone, 1-(o-chlorophenyl)- exhibited better binding affinities and maximum docking scores compared to other ligands. The developed formulations demonstrated significant wound healing activity in an excision wound model when compared to a positive control group. In conclusion, the developed topical gel formulations containing plant extracts exhibited effective wound healing activity, as evidenced by the conducted studies

**PC-157**

**HYDROPHOBIC FILM-FORMING POLYMERIC SPRAY FOR ENHANCED WOUND HEALING AND PROTECTION**

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The present invention advances the field of wound care by introducing a novel, cost-effective, and user-friendly hydrophobic, film-forming polymeric spray formulation for the effective treatment of acute and chronic wounds, including diabetic ulcers and minor injuries. This innovative system forms a protective, hydrophobic film directly over the wound site, offering advantages such as ease of application, portability, and enhanced therapeutic efficacy. The composition consists of a eutectic mixture of smart polymers ethyl cellulose, chitosan, and Eudragit dissolved in organic solvents such as ethanol and acetic acid, and enriched with bioactive agents including rosemary extract, and allantoin. Ethyl cellulose provides water resistance and mechanical robustness; chitosan contributes biocompatibility, biodegradability, and antimicrobial action; and Eudragit enhances film flexibility and enables controlled drug release. Ethanol acts as a solvent and plasticizer, improving film elasticity and drug permeation, while acetic acid aids in polymer solubilization and modulates structural properties. Allantoin supports tissue regeneration and maintains an optimal moist environment for healing. Collectively, these components create a multifunctional, film-forming wound dressing that not only acts as a barrier against microbial and environmental threats but also promotes accelerated and efficient tissue repair.

**Keywords:** Wound healing, Polymeric Spray, Film Forming, Anti-inflammatory, Allantoin

**PC-158**

**NOSE-TO-BRAIN DELIVERY OF DONEPEZIL HYDROCHLORIDE VIA NANOSTRUCTURED LIPID CARRIERS EMPLOYING A NATURAL PENETRATION ENHANCER**

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Alzheimer's disease is a progressive neurodegenerative disorder where effective therapy is limited due to poor brain uptake of conventional oral drugs. Donepezil hydrochloride, a widely prescribed acetylcholinesterase inhibitor, suffers from low bioavailability and first-pass metabolism. The objective of the present work was to develop intranasal nanostructured lipid carriers (NLCs) of Donepezil HCl using a natural penetration enhancer to achieve direct nose-to-brain delivery. NLCs were prepared by homogenization–ultrasonication and evaluated for particle size, polydispersity index, zeta potential, entrapment efficiency, and drug release. The optimized formulation exhibited a mean particle size of ~110 nm with narrow distribution, entrapment efficiency above 65%, and stability for 90 days at 4 °C. In-vitro and ex-vivo studies demonstrated sustained release and improved permeation across nasal mucosa compared to control. Histopathological examination confirmed the absence of mucosal toxicity. Thus, intranasal NLCs of Donepezil HCl incorporating a natural penetration enhancer present a promising non-invasive strategy to enhance brain targeting and improve therapeutic outcomes in Alzheimer's disease management.

**Keywords:** Donepezil HCl, Nanostructured lipid carriers, Nose-to-brain delivery, Natural penetration enhancer, Alzheimer's disease.

**PC-159**

**DEVELOPMENT AND EVALUATION OF FLUVASTATIN NANOCRYSTALS FOR ENHANCED SOLUBILITY AND BIOAVAILABILITY OF BCS CLASS II LIPID-LOWERING DRUGS**

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Poor aqueous solubility is a major limitation in the development of BCS Class II drugs, including Fluvastatin, leading to reduced bioavailability and therapeutic efficacy. The present study aimed to develop and evaluate nanocrystals of Fluvastatin using the antisolvent precipitation method to enhance solubility, dissolution rate, and bioavailability. The objectives were to prepare Fluvastatin nanocrystals, optimize the formulation with different stabilizers, and evaluate their physicochemical characteristics such as particle size, zeta potential, crystallinity, and dissolution profile, along with stability assessment. Nanocrystals were successfully prepared and characterized using techniques including Scanning Electron Microscopy (SEM), X-Ray Diffraction (XRD), Differential Scanning Calorimetry (DSC), and Fourier Transform Infrared Spectroscopy (FTIR). The results demonstrated a significant reduction in particle size and improved surface properties compared to the pure drug. In vitro dissolution studies showed enhanced dissolution rates, while stability studies confirmed the




ISBN: 978-81-980623-8-3

formulations remained stable over time with no major changes in particle size or zeta potential. The findings indicate that nanocrystal formulation markedly improved the solubility and dissolution behavior of Fluvastatin, thereby enhancing its bioavailability potential. In conclusion, nanocrystals represent a promising and efficient approach for overcoming solubility-related challenges of BCS Class II drugs, offering an effective strategy for the formulation of lipid-lowering agents such as Fluvastatin.

**Keywords:** Fluvastatin, Nanocrystals, Antisolvent precipitation, BCS Class II drugs, Solubility enhancement, Bioavailability, Dissolution rate, Stabilizers, Particle size reduction, Lipid-lowering drug.

**PC-160**

**DESIGN DEVELOPMENT AND OPTIMIZATION OF ORAL THIN FILM FOR TREATMENT OF CARDIOVASCULAR COMPLICATIONS: A QBD APPROACH**

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The present study focuses on the design, development, and optimization of orally thin films (OTFs) of Azelnidipine, aimed at enhancing patient compliance and ensuring rapid onset of action through buccal drug delivery. A Box-Behnken design was employed to systematically evaluate the effects of three critical formulation variables: hydroxypropyl methylcellulose E15 (HPMC E15) as the film-forming polymer, polyethylene glycol 300 (PEG 300) as the plasticizer, and sodium starch glycolate as the super disintegrant. These factors were analysed at three levels to determine their influence on two key response variables—disintegration time and percentage drug dissolution. Twelve experimental formulations were prepared and assessed, revealing disintegration times ranging from 15 to 25 seconds and dissolution percentages indicative of efficient drug release. Statistical analysis demonstrated that higher concentrations of HPMC E15 tended to prolong disintegration time due to increased matrix density, whereas the inclusion of sodium starch glycolate significantly reduced disintegration time by enhancing film disintegration through rapid swelling and wicking. PEG 300 was found to support film flexibility and had a moderate impact on disintegration and drug release. Response surface methodology and predictive modelling facilitated the identification of an optimized formulation with desirable characteristics: rapid disintegration and high dissolution efficiency. This study highlights the effectiveness of using a Box-Behnken design for the development of OTFs, offering a promising approach for the delivery of Azelnidipine in a patient-friendly dosage form.

**Keywords:** Oral thin film, QbD, Azelnidipine, Buccal drug delivery, Cardiovascular complications.

**PC-161**

**FORMULATION AND EVALUATION OF DIPHENHYDRAMINE HYDROCHLORIDE MULTIPLE EMULSIONS**

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The objective of this study was to formulate and evaluate a multiple emulsion system (w/o/w) containing diphenhydramine hydrochloride, an antihistamine widely used for the treatment of allergic reactions and motion sickness. Multiple emulsions offer a novel approach for sustained drug delivery and improved drug stability, making them suitable for topical or oral applications. In this study, a water-in-oil-in-water (w/o/w) emulsion was prepared using a two-step emulsification process. Span 80 was used as the lipophilic emulsifier for the primary w/o emulsion, while Tween 80 served as the hydrophilic emulsifier for the secondary w/o/w emulsion. The prepared emulsions were evaluated for stability, globule size, viscosity, zeta potential, pH, drug content, and in vitro drug release profile. The formulation exhibited acceptable physical stability over a period of 30 days with minimal phase separation and consistent droplet size distribution. In vitro release studies indicated a sustained release of diphenhydramine hydrochloride from the multiple emulsion system compared to conventional formulations. The results suggest that multiple emulsions can be a promising carrier system for the controlled delivery of diphenhydramine hydrochloride, potentially enhancing patient compliance and therapeutic efficacy.

**Keywords:** Diphenhydramine hydrochloride, multiple emulsion, sustained release, w/o/w emulsion, drug delivery, emulsifier

**PC-162**

**PREPARATION AND EVALUATION OF CURCUMIN FILM-FORMING GEL**

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Skin is considered one of the effective routes for drug administration, suitable for both local and systemic delivery. Its effectiveness depends on the physicochemical properties of the drug and the ability of the formulation to adhere during therapy, thereby promoting drug penetration through the skin. Curcumin is an anti-inflammatory agent, here we formulate curcumin into a gel that forms a film when applied to the skin. This gel is developed for the treatment of inflammatory conditions such as rheumatoid arthritis, where the drug needs to be applied and maintained at the site of treatment for effective therapy. Topical film-forming formulations represent an emerging class of drug delivery systems. When applied topically, these formulations adhere to the skin surface, forming a thin transparent film that enables controlled delivery of the active ingredient to the underlying tissue. An additional advantage of this gel system is its transparency, which enhances patient acceptance. In this discussion, film-forming gel systems are described as a promising approach for topical drug delivery.

**Keywords:** Curcumin, film-forming gel, topical drug delivery, transdermal system, anti-inflammatory, rheumatoid arthritis.

**PC-163**

**DEVELOPMENT OF NUTRITIONAL PEANUT OIL SUBMICRON-OLEOGEL ICE CREAM**

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This research explored the use of submicron-oleogel which was comprised of peanut oil and bees wax instead of solid fat in ice cream preparation. Oleogel is considered as a novel candidate to replace animal fat with vegetable oil, being a research hotspot in the field of saturated fat substitution. By comparing oleogel ice cream to two ice creams (peanut oil ice cream and butter ice cream), the results showed that the overrun rate of oleogel ice cream was higher than peanut oil ice cream, and the melting rate was lower than that of butter ice cream. Besides, the hardness of peanut ice cream was moderate, and the first dropping time of oleogel ice cream was no significant difference with the butter ice creams, whereas longer than that of peanut oil ice cream. The heating (at 90 °C) times of 2 h, 4 h and 6 h were selected to prepare the oleogels. A particle size of approximately 150 nm and zeta-potential of around −26 mV were achieved along with a high drug entrapment efficiency. Among the four heating times, oleogels prepared by heating for 6 h showed the best storage stability, ionic strength stability and shear resistance. Both the viscosity and fat globule stability of the oleogel ice cream was the highest. This research expanded the application of oleogels in the ice cream industry and provided a reference for the development of more nutritional ice cream products suitable for the long-term consumption by sub-healthy people.

**Keywords:** Peanut oil; Submicron-oleogel; Ice cream; Saturated fat; Sub-healthy people.

**PC-164**

**NATURE'S NANO-WEAPON: WHEATGRASS-MEDIATED SILVER NANOPARTICLES FOR CANCER THERAPY**

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Green nanotechnology offers a sustainable and eco-friendly approach for nanoparticle synthesis. In the present study, silver nanoparticles


ISBN: 978-81-980623-8-3

(AgNPs) were fabricated using an aqueous extract of Triticum aestivum (wheatgrass) and their anticancer potential were explored. Several reaction parameters including silver nitrate concentration, temperature, pH, extract-to-$AgNO_3$ ratio, and incubation time were optimized to obtain stable nanoparticles of smaller size. The optimal synthesis was achieved at 80 °C, pH 9, 1 mM $AgNO_3$, with a 1:1 extract-to-AgNO3 ratio and a 24 hr reaction period. Formation of the Triticum aestivum-AgNPs (TA-AgNPs) was confirmed by the color transition from pale to dark reddish-brown and the characteristic surface plasmon resonance peak at 412 nm in UV–Vis spectra. FTIR analysis indicated that phytochemicals present in the extract were involved in reduction and stabilization processes. TEM images showed predominantly spherical particles with diameters in the 15-30 nm range, while zeta potential measurements (–14.7 mV) confirmed colloidal stability. EDX spectra further verified the presence of silver, accounting for 40.15% by weight. The synthesized nanoparticles exhibited significant antioxidant activity and were biocompatible. The anticancer potential of TA-AgNPs were tested against ovarian (PA-1), prostate (DU-145), lung (A549), and breast (MCF-7) cancer cell lines using the MTT assay, with the strongest growth-inhibitory effect observed in ovarian cancer cells, as reflected by $IC_{50}$ values. These findings suggest that T. aestivum-derived AgNPs hold promise as a potential therapeutic agent, particularly for the treatment of ovarian cancer.

**Keywords:** Triticum aestivum, silver nanoparticles, anti-cancer, green nanotechnology

**PC-165**

## DEVELOPMENT AND EVALUATION OF A PLANT BASED ORAL FORMULATION FOR URINARY TRACT INFECTION MANAGEMENT

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Urinary tract infections (UTIs) are among the most common infectious diseases worldwide with increasing resistance of causative pathogens to conventional treatments limiting the effectiveness of existing therapies. This study aimed to explore an alternative treatment approach by evaluating the antimicrobial potential of plant-derived extracts and developing a suitable oral dosage form for UTI management. Corn silk extract was selected for its known antimicrobial properties. The extracts were subjected to phytochemical screening which revealed the presence of bioactive compounds such as flavonoids, phenolic compounds, tannins, and alkaloids. In vitro antibacterial studies demonstrated significant inhibitory activity of the extract against major UTI-causing pathogens, including Escherichia coli, Staphylococcus aureus, and Klebsiella pneumoniae, confirming its therapeutic promise. Preformulation studies established the solubility, stability, and compatibility of the extract with other excipients, ensuring feasibility for oral formulation. An optimized oral dosage form was then developed using a $3^3$ full factorial design, with the optimized batch showing a disintegration time of 34 seconds and drug release of 75.06% within 60 minutes. Post-formulation evaluation confirmed desirable characteristics, including appropriate disintegration time, satisfactory release profile, and compliance with standard quality parameters. Overall, the findings suggest that the plant extract possesses strong antibacterial potential, warranting further in vivo studies and clinical evaluation to establish its role as a novel therapeutic option for the effective management of urinary tract infections.

**Keywords:** Urinary tract infections, Corn silk extract, Oral dosage form, Phytochemical screening.

**PC-166**

## FORMULATION DEVELOPMENT, CHARACTERIZATION AND COMPARATIVE EVALUATION OF A NOVEL ECOFRIENDLY TOOTHPASTE

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Toothpaste has significant role in maintaining the oral hygiene and health of teeth. The medicated toothpastes used for managing tooth problems and preventing tooth decay find a huge market potential as, 5 out of 10 Indians have these issues with their teeth. But, some of the widely used toothpastes are reported to have heavy metal content which adversely affects health and acceptance among users. Also, the manufacturing and disposal of those toothpastes cause long-lasting impact on environmental issues such as enhanced carbon foot print, Threat to marine life. In this context the herbal based, repurposed, ecofriendly toothpaste still remains less explored in India. In this work a Novel Toothpaste (NT) enriched with Punica granatum. L, Murraya koenigii, Moringa oleifera were developed as sustainable and economical product. The prepared toothpaste was characterized for different pharmaceutical parameters such as pH, extrudability, viscosity, spreadability, foamability, cleaning action and stability. The NT had characteristic green color, and acceptable appearance. Unadjusted PH of the paste was around 8.5 showed no extra buffering agents in the final formulation. Additionally, the NT was found to have sufficient foamability and foamability with small quantity of water making it ideal choice for comfortable brushing. The viscosity of the NT was 10,000 Poise. The cleaning action was slightly high for Novel Toothpaste. All the comparative evaluation showed satisfactory results with selected marketed toothpastes. The invitro antimicrobial activities with Staphylococcus aureus, Escherichia coli and Pseudomonas aeruginosa were performed to prove the effectiveness in managing oral health. A Short-term stability study of the finished NT was also performed, which exhibited physicochemical and microbiological stability of the toothpaste. In conclusion, a Novel Toothpaste having similar pharmaceutical characteristics compared to marketed toothpastes were prepared with new indigenous herbal and non-synthetic ingredients. The stability study, Physicochemical evaluation and invitro antibacterial activities proved that a novel, stable, sustainable toothpaste can be developed as an alternative to synthetic toothpaste in a ecofriendly approach.

**Keywords:** Novel Toothpaste, Dental Caries, Gingivitis, Punica granatum

**PC-167**

## PHARMACOKINETIC EVALUATION OF SOLID DISPERSION FORMULATIONS OF ATORVASTATIN AND ROSUVASTATIN WITH BIOENHANCERS BERBERINE AND QUERCETIN

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In the present study, in-vivo pharmacokinetic evaluation of solid dispersion (SD) formulations of atorvastatin (ATV) and rosuvastatin (RSV) was conducted using bioenhancers berberine (BER) and quercetin (QUR). The objective was to assess the effect of bioenhancers on the oral bioavailability of ATV and RSV when administered to Sprague Dawley rats. A validated HPLC method was developed for the quantification of ATV and RSV in plasma, employing a mobile phase of acetonitrile, 0.1% formic acid solution, and methanol (45:35:20 v/v) with detection at 247 nm. The method showed excellent linearity ($R^2$ = 0.998), precision (RSD < 1%), and accuracy (>99%). The in-vivo results demonstrated that solid dispersions significantly enhanced pharmacokinetic parameters compared to pure drug and physical mixtures. For ATV, the Cmax increased from 564.77 ± 120.65 ng/mL (control) to 1641.18 ± 155.41 ng/mL (SDc-ABK-3 with BER) and 1291 ± 166 ng/mL (SDc-AQK-3 with QUR), while $AUC_{0-\infty}$ improved from 3444.12 ± 331.84 to 18669.43 ± 3060.66 ng·h/mL. Similarly, RSV Cmax increased from 532.87 ± 118.56 to 1539.17 ± 151.35 ng/mL with BER and to 1219 ± 167 ng/mL with QUR. The $AUC_{0-\infty}$ values followed the same trend. This enhancement was attributed to improved solubility and absorption due to the presence of bioenhancers. Thus, the study concludes that the incorporation of BER and QUR in solid dispersions significantly improves the oral bioavailability of ATV and RSV.

**Keywords:** Atorvastatin, Rosuvastatin, Solid Dispersion, Berberine, Quercetin.

**PC-168**

## FORMULATION AND EVALUATION OF SACCHAROMYCES BOULARDII-LOADED COSMETIC STICK FROM VITIS VINIFERA L. FOR SKIN ENHANCEMENT

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ISBN: 978-81-980623-8-3

The integration of probiotics in cosmetics represents a growing trend toward natural, microbiome-balancing products that offer anti-aging, anti-inflammatory, and hydrating benefits. This study aimed to isolate Saccharomyces boulardii from Vitis vinifera L. (grapes) and formulate a probiotic-loaded cosmetic stick for skin enhancement, evaluating its physicochemical and antioxidant properties. S. boulardii was isolated using Sabouraud dextrose agar and identified through morphological (whitish cream color, spherical shape, fruity odor), staining (positive yeast viability and lactophenol cotton blue), and biochemical tests (positive flocculation, H2S, starch hydrolysis; negative killer toxin). Six formulations (CS1-CS6) were prepared via fusion method, incorporating beeswax, carnauba wax, lanolin, isopropyl myristate, emulsifying wax, propylene glycol, glycerol, salicylic acid, lavender oil, vitamin E, phenoxyethanol, and distilled water. Evaluations included physical appearance, homogeneity, surface anomalies, aging stability, hydration (skin test and corneometer), melting point (59-64°C), breaking point (140-160g), pH (4-6), spreadability (excellent for CS5 and CS6), hardness (5-10N), and antioxidant activity via DPPH assay. CS5 emerged as optimal, exhibiting smooth pale yellow texture, excellent hydration, melting point 62±0.04°C, breaking point 160±0.09g, pH 5.12±0.012, spreadability 4.5±0.5 gcm/s, hardness 6±0.05N, and 65.875% radical scavenging activity. This probiotic-infused stick demonstrates promising potential for sustainable, effective skincare, balancing efficacy with user-friendly application and stability, paving the way for innovative microbial-based cosmetics.

**Keywords:** S.boulradii, probiotics, cosmetic stick, Corneometer

**PC-169**

## FORMULATION AND EVALUATION OF ORAL DISPERSIBLE TABLETS OF FELODIPINE

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The present study aimed to develop and optimize Felodipine Orodispersible tablets (ODTs) using various concentrations of superdisintegrants to enhance dissolution rate and improve patient compliance. A 32 full factorial design was employed to study the influence of crosscarmellose sodium (4–8% w/w) and microcrystalline cellulose (20–40% w/w) on disintegration time and in-vitro drug release. Preformulation studies, including organoleptic evaluation, solubility determination, melting point analysis, FTIR and DSC confirmed the purity of the drug and its compatibility with excipients. The prepared powder blends showed excellent micromeritic properties, enabling direct compression. All formulations met pharmacopeial requirements, exhibiting uniform weight, adequate hardness, low friability (<1%) and rapid disintegration. The optimized batch (F5) disintegrated in 24.3 seconds and achieved 99.5% drug release within 15 minutes. Stability studies conducted for six months under ICH-recommended conditions indicated no significant changes in physical appearance, drug content or dissolution profile. These findings suggest that the optimized ODT formulation can serve as a stable, patient-friendly dosage form with potential for enhanced antihypertensive therapy.

**Keywords:** Felodipine, Orodispersible Tablets, Superdisintegrants, Stability Studies.

**PC-170**

## PHARMACEUTICAL DEVELOPMENT AND EVALUATION OF NOVEL ORODISPERSIBLE BUCCAL STRIPS OF CARBAMAZEPINE FOR RAPID DRUG DELIVERY AND ENHANCED BIOAVAILABILITY

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This study focuses on the development of novel orodispersible buccal strips of carbamazepine (CBZ) aimed at achieving rapid drug delivery, enhanced bioavailability, and improved patient compliance, particularly for individuals with dysphagia or difficulty swallowing conventional dosage forms. An accelerated solvent casting method was optimized to prepare thin, flexible, and rapidly disintegrating films. Hydroxypropyl methylcellulose (HPMC E15) and polyvinyl alcohol (PVA) were selected as the primary film-forming agents, PEG-400 served as a plasticizer, citric acid functioned as a saliva-stimulating agent, and crospovidone was incorporated as a superdisintegrant. The drug–polymer mixture was cast onto a flat surface and dried under controlled conditions in a hot-air oven at an elevated temperature to achieve uniform film formation. The prepared strips were evaluated for physicomechanical and quality attributes, including thickness, folding endurance, surface pH, drug content uniformity, disintegration time, and in-vitro drug release. The optimized formulation demonstrated rapid disintegration, satisfactory mechanical strength, uniform drug distribution, and favourable release characteristics, indicating suitability for immediate buccal absorption. The accelerated solvent casting method offered reduced processing time, consistent reproducibility, and produced stable dosage forms with desirable performance attributes. Overall, the developed orodispersible buccal strips of carbamazepine (CBZ) present a promising platform for rapid-onset buccal drug delivery, potentially improving therapeutic outcomes and patient adherence. This formulation approach can be further extended to other drugs requiring quick onset and improved bioavailability, offering broad applicability in modern pharmaceutical development.

**Keywords:** Carbamazepine, Orodispersible, Bioavailability, Hot air ove, Plasticizer

**PC-171**

## INVESTIGATION OF A NATURAL BIOENHANCER BASED IN SITU GEL FOR IMPROVING DRUG PERMEABILITY IN THE TREATMENT OF NEUROLOGICAL DISORDER

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Neurological disorders often require therapeutic agents to effectively cross biological barriers such as the nasal mucosa or the blood brain barrier to achieve their intended pharmacological effects. This study aimed to evaluate the potential of a natural bioenhancer by formulating a nasal in-situ gel to improve drug delivery to the central nervous system (CNS). An antidepressant neuroactive drug with limited aqueous solubility, was selected for the study. Pre-formulation studies, including organoleptic studies, solubility profile, UV spectroscopy, melting point and FTIR were performed. A statistical Box-Behnken Design was employed to optimize three key formulation variables: polymer concentration, mucoadhesive agent concentration, and natural bioenhancer concentration. The optimized formulations were evaluated for gelation temperature (28.63°C), Strong mucoadhesive strength (3895.34 dyne/cm2), drug content and ex-vivo permeation (95.68%) over 12 hours. The behavioral tests are also performed such as forced swim test, sucrose preference test, open field test and body weight observation test. Results demonstrated that natural bioenhancer significantly enhanced antidepressant drug permeation across the nasal mucosa and was observed consistently in formulations containing higher concentrations of thereby reinforcing its role as a natural bioenhancer. The current study aimed intranasal antidepressant gel formulations with and without natural bioenhancer for antidepressant and anxiolytic activity in a Chronic Mild Stress (CMS) rat model of depression. These findings highlight potential as a natural, safe, and effective bioenhancer for improving the nasal delivery and CNS permeability of neurotherapeutic agents.

**Keywords:** Neurological disorders, Blood brain barrier, Natural bioenhancer, Antidepressant, Nasal in-situ gel.

**PC-172**

## FABRICATION, CHARACTERIZATION OF TAMOXIFEN CITRATE-LOADED CARBON NANOTUBES IN MANAGEMENT OF CANCER

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Breast cancer remains the most common malignancy among women worldwide, highlighting the urgent need for therapeutic approaches that enhance efficacy while reducing systemic toxicity. Nanotechnology-based targeted drug delivery systems hold significant potential in this regard. In the present study, tamoxifen citrate, a selective estrogen




ISBN: 978-81-980623-8-3

receptor modulator, was successfully incorporated into carboxylated multiwalled carbon nanotubes (c-MWCNTs) using sonication and centrifugation techniques. To achieve tumor-specific delivery, biotin and chitosan ligands were conjugated, leading to the formulation Bio-Chi/TAM/e-MWCNT. Physicochemical compatibility of tamoxifen and ligands with c-MWCNTs was confirmed by Fourier Transform Infrared Spectroscopy (FT-IR) and Differential Scanning Calorimetry (DSC), which indicated absence of degradation. Solubility studies identified ethanol as the most suitable solvent, consistent with tamoxifen's Biopharmaceutics Classification System (BCS) class II profile. The nanocarrier exhibited high encapsulation efficiency (80%), demonstrating excellent drug loading capacity. Scanning Electron Microscopy (SEM) revealed preserved nanotubular morphology with uniform chitosan coating, while X-ray Diffraction (XRD) confirmed the amorphous state of the formulation, favorable for enhanced dissolution and bioavailability. In vitro release studies demonstrated pH-dependent drug release, with approximately 90% at acidic pH 4.0 and 40–45% at physiological pH 7.4, suggesting preferential release in the tumor microenvironment. These findings highlight the successful synthesis and characterization of Bio-Chi/TAM/e-MWCNT as a promising targeted nanocarrier for breast cancer therapy. Further studies on biodistribution, therapeutic efficacy, and clearance are needed to advance clinical translation.

**Keywords:** Tamoxifen Citrate, MWCNT, Targeted Drug Delivery, Bio-chi, Cancer

**PC-173**

## DEVELOPMENT AND EVALUATION OF INTRANASAL LACTOFERRINBASED DULOXETINE IN SITU NASAL GEL FOR TARGETING THE BRAIN

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The study was designed to achieve efficient nose-to-brain delivery of the drug while avoiding first-pass metabolism. Lactoferrin, a member of the transferrin family and an iron-binding glycoprotein with attached carbohydrate chains, was selected as the targeting ligand due to its established role in enhancing drug bioavailability and minimizing drug loss. Duloxetine was initially identified and characterized using melting point determination and FTIR analysis. Drug–excipient interactions were further assessed through FTIR and DSC techniques. Preliminary batches of in situ gel were then formulated to optimize polymer concentrations for the desired gelation temperature. Various concentrations of Poloxamer 407 (14, 16, and 18%) and HPMCK4M (0.02 and 0.04%) were tested in the initial batches, and their gelation temperatures were evaluated. Based on these findings, a $3^2$ factorial design was implemented to prepare nine formulations containing 15–18% Poloxamer 407 and 0.01–0.04% HPMCK4M. These formulations were assessed for visual appearance and clarity, pH, gelation temperature (Tsol-gel), drug content, viscosity, mucoadhesive strength, in vitro diffusion, ex vivo permeation, statistical analysis, and accelerated stability. The developed in situ gels were found to be clear and transparent, with pH values within the acceptable range. Drug content across all formulations ranged from 68.09% to 96.14%, indicating satisfactory loading. Gelation temperature varied with polymer concentration, with all formulations falling within the required range of 29–80 °C. Among them, formulation F3 exhibited the most desirable gelation temperature.

**Keywords:** Nose-to-brain delivery, Lactoferrin-targeted in situ gel, Duloxetine, Poloxamer 407

**PC-174**

## SURFACE MODIFICATION OF QUERCETIN NLCS FOR IMPROVED INTRA-NASAL DRUG DELIVERY

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Glioblastoma multiforme (GBM), an extremely aggressive brain tumor, poses substantial treatment challenges due to its invasive nature and restricted drug delivery across the blood–brain barrier. In this study, chitosan surface-modified nanostructured lipid carriers (NLCs) were investigated as a potential therapeutic strategy for managing brain tumors. Preformulation studies, including FTIR, DSC, and XRD, confirmed the compatibility between the drug and excipients. The NLCs were prepared using hot melt homogenization followed by probe sonication, and formulation optimization was performed using a Box–Behnken design with three factors and two responses. Characterization studies, such as FTIR, DSC, XRD, and TEM, demonstrated the formation of stable NLCs with a particle size of 193.4 nm and a zeta potential of 18.9 mV. The entrapment efficiency (%EE) of the final quercetin-loaded NLCs was 81.11 ± 1.14%. In vitro drug release studies at pH 6.8 showed an initial burst followed by sustained release, reaching 85.66%, with the release kinetics fitting the Higuchi model. Pharmacokinetic studies revealed that the optimized NLCs achieved the highest quercetin concentration in the brain, with brain plasma levels 2.6-fold higher than oral solutions and 2.4-fold higher than intranasal solutions. Stability studies indicated that the quercetin-loaded chitosan NLCs remained stable for three months at 4°C and 25°C/60% RH, with no significant change in particle size, while higher temperature conditions (40°C/75% RH) were also evaluated. Overall, these findings suggest that quercetin-loaded NLCs with chitosan surface modification have significant potential as a targeted therapeutic approach for brain tumor treatment.

**Keywords:** Quercetin, Chitosan, NLCs, Nose to brain, Brain Glioblastoma.

**PC-175**

## FORMULATION AND USE OF NANOEMULSION TARGETING ALCOHOLIC FATTY LIVER DISEASE BY RESPONSE SURFACE METHODOLOGY.

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The research focused on examining enhanced bioavailability and in vitro dissolution properties of Metadoxine Nanoemulsion and understanding its Characterisation and optimisation. Nine formulations of nanoemulsions formulated by spontaneous emulsification technique, incorporating Tween 20 and olive oil with metadoxine. Central composite design was employed using Design-Expert software to determine and assess the influence of independent variables (Conc of Olive oil and Conc of Tween 20) and dependent variables (Particle Size, Zeta potential and Polydispersity index). The nanoemulsions underwent compatibility studies and various physical evaluations, including analysis of metadoxine content and its morphological analysis. The study observed that the Particle size of the nanoemulsion decreased as the levels of Tween 20 increased in the formulation. Particle Size of optimised formulation F8 was 275.7 nm, the zeta potential measurement was -30.6 Mv, followed by drug content showing around 88 % .In vitro dissolution studies revealed that the lower particle size exhibited an enhanced dissolution rate at 8 hours, 89.93 ± 3.319 %, compared to the pure drug 24.38 ±3.31 % and had better stability studies. The initial organic phase of the emulsion optimisation is crucial for the nanoemulsion and its physicochemical properties of the nanoemulsion. The findings underscore the nanoemulsion droplets incorporating metadoxine using olive oil with tween 20, which enhances bioavailability, thus this approach can be effective strategy, this approach proves to be an effective strategy for delivering drugs.

**Keywords:** Metadoxine, Nanoemulsion, Design, Bioavailability and Dissolution.

**PC-176**

## DEVELOPMENT AND CHARACTERIZATION OF ECO-FRIENDLY FACE MASKS FROM COCONUT FIBRE FOR SUSTAINABLE PERSONAL PROTECTION

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The COVID-19 pandemic has heightened global demand for sustainable, low-cost, and biodegradable protective face masks. This study investigates the potential of coconut fibre (Cocos nucifera L.) as a primary material in mask fabrication due to its abundance, tensile strength, and inherent antimicrobial properties. Coconut fibres were processed through alkali treatment, sterilization, and mechanical refinement to achieve a fine, breathable nonwoven structure. Physical




ISBN: 978-81-980623-8-3

characterization, including fibre diameter distribution, porosity, air permeability, and tensile strength, demonstrated that optimized fibre mats exhibit comparable filtration efficiency to commercial masks while maintaining superior biodegradability. Fourier-transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM) analyses confirmed fibre surface modification, enhancing bonding and uniformity within the mask layers. Filtration performance was assessed against aerosols in the submicron range, showing an efficiency exceeding 85% at optimal fibre packing density. Moreover, water contact angle measurements indicated hydrophobic behaviour, further improving user comfort. These findings highlight coconut fibre as a promising renewable material for eco-friendly personal protective equipment, reducing environmental pollution from synthetic mask waste. This work supports the integration of agricultural by-products in medical and consumer protective technologies, fostering circular economy approaches in health care and environmental sustainability.

**Keywords:** Ecofriendly, sustainable, Cocos nucifera, Palmae

**PC-177**

**FAST-DISSOLVING ORAL BREXPIPRAZOLE FILMS: A NOVEL STRATEGY FOR ENHANCED DISSOLUTION AND PATIENT ADHERENCE**

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Atypical antipsychotic brexpiprazole is a BCS Class II drug indicated for schizophrenia and major depressive disorder, yet its clinical utility is limited by poor patient compliance and low aqueous solubility. This study developed fast-dissolving oral films (FDOFs) of brexpiprazole via solid dispersion to enhance solubility, dissolution rate, and patient adherence. Solid dispersions were formulated using carriers such as Mannitol, HPMC, and HPMC β-cyclodextrin at drug-to-carrier ratios of 1:1, 1:2 and 1:5, utilising solvent evaporation and freeze-drying techniques. The freeze-dried formulation 1:2 ratio demonstrated optimal performance and was selected for spray-drying comparative analysis. This optimised dispersion was embedded into FDOFs containing PVA (film-forming agent), glycerin (plasticiser), poloxamer (wetting agent), citric acid (saliva stimulant) and sweeteners. Films were characterised for drug content, physical attributes, solubility, disintegration time, and in vitro drug release profiles. The optimised freeze-dried dispersion showed a 100-fold solubility increase in distilled water and a 25-fold increase in phosphate buffer (pH 6.8). Prepared films disintegrated within 60 seconds, releasing 40.12% of the drug at 10 min and 79.47% at 120 min. XRD and DSC analyses indicated enhanced drug solubility due to peak intensity reduction and lower DSC endotherm heat consumption. These results suggest that FDOFs incorporating solid dispersion can enhance brexpiprazole bioavailability and patient compliance.

**Keywords:** Brexpiprazole, oral disintegrating films, solubility, bioavailability.

**PC-178**

**REVOLUTIONIZING SKINCARE WITH NANOCARRIER-ENHANCED RETINOIDS: CONTROLLED RELEASE, REDUCED IRRITATION, AND ACCELERATED RENEWAL**

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Our skin often bears the brunt of contemporary living. The impact of stress, late nights, extended screen time, and more intense sunlight as a result of a thinner ozone layer are all harmful. They synergize to accelerate aging. The complexion looks dull and tired as collagen breaks down faster, fine lines and wrinkles appear earlier, and skin renewal is slower. Restoring natural glow and sustaining the sense of strength and richness of the skin are the simple but most important goals of skin rejuvenation. Retinoids are now among the most effective skincare products. It is well known that the vitamin A derivatives make the skin's structure stronger and stimulate collagen production. They fight free radicals, enhance cell growth, and reduce sun damage. As a result, retinoids improve elasticity, smooth out coloring, and fine lines. The issue with conventional retinoids, is they can be irritating to the skin. Scientists have designed delivery systems like hydrogels, solid lipid nanoparticles (SLNs), liposomes, and nano-emulgels to bypass this. The skin may be treated with retinoids less painfully due to these carriers, which also enhance stability, improve absorption, and reduce side effects. Even more recently, advanced formulations utilize lipid nanocarriers to fuse retinol and peptides together. This combination of conventional treatment is superior in terms of controlled release, better tolerance, and faster repair of skin. These innovative delivery systems are changing the skincare industry as innovation remains on the rise. They promise non-surgical, effective revitalization, getting us closer to radiant, healthy-looking skin that feels renewed.

**Keywords:** Retinoid, Skin rejuvenation, Anti-aging, Nano carrier, Collagen stimulation.

**PC-179**

**COMPARATIVE OF EXCIPIENTS OF HERBAL ORIGIN OVER SYNTHETIC**

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Excipients play a pivotal role in the formulation of pharmaceutical dosage forms by imparting desirable physicochemical and biopharmaceutical properties, thereby ensuring product stability, safety, and patient acceptability. Traditionally, synthetic and semi-synthetic excipients such as polyvinylpyrrolidone (PVP), polyethylene glycol (PEG), hydroxypropyl methylcellulose (HPMC), and sodium starch glycolate have dominated the pharmaceutical industry due to their reproducibility, high stability, and well-established regulatory acceptance. These excipients are manufactured under controlled conditions, which minimizes batch-to-batch variation and assures consistent performance. However, concerns related to their cost, long-term toxicity, limited biodegradability, and environmental sustainability have encouraged the exploration of alternative sources. Herbal excipients, derived from natural plant origins such as gums, mucilages, pectin, starch, and alginates, have gained prominence in recent years. They are biodegradable, biocompatible, widely available, and cost-effective, offering multifunctional roles as binders, disintegrants, stabilizers, and film formers. Furthermore, the growing patient inclination toward natural and “green” formulations enhances their appeal in modern drug delivery systems. Despite these advantages, herbal excipients face challenges including variability in quality due to geographical and seasonal factors, microbial contamination, limited shelf stability, and relatively less pharmacopeial standardization. A comparative evaluation indicates that while synthetic excipients assure reliability and global regulatory acceptance, herbal excipients provide safer and eco-friendly alternatives that align with sustainable pharmaceutical practices. The future of excipient research lies in developing modified or semi-synthetic natural excipients that combine the advantages of both classes, thereby ensuring efficiency, safety, and environmental compatibility in dosage form design.

**PC-180**

**QUALITY BY DESIGN APPROACH FOR DEVELOPMENT AND OPTIMIZATION OF DIACEREIN-LOADED TRANSFEROSOMES CARRIER GEL FOR ENHANCED TRANSDERMAL DELIVERY**

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Diacerein is an anti-inflammatory agent with potential in osteoarthritis treatment; however, its poor aqueous solubility and limited oral bioavailability restrict its therapeutic efficacy. The objective of the present study was to develop and optimize a diacerein-loaded transferosomal gel for enhanced transdermal delivery using a Quality by Design (QbD) approach. Transferosomes were prepared via the thin-film hydration technique using varying concentrations of Span 80 and phosphatidylcholine, followed by statistical optimization through a Box–Behnken experimental design. The optimized formulation was evaluated for particle size, polydispersity index (PDI), entrapment efficiency, and drug content. The selected formulation was incorporated into a gel base and characterized for in vitro drug release and physicochemical




ISBN: 978-81-980623-8-3

properties using DSC, XRD, SEM, and FTIR analyses. Additional evaluations included pH, viscosity, Spreadability, ex vivo skin permeation, and stability studies. The optimized formulation exhibited a vesicle size of 142.6 ± 2.45 nm, PDI of 0.282 ± 0.012, and entrapment efficiency of 95.34 ± 2.18%. Ex vivo skin permeation studies demonstrated a flux of 124.40 µg/cm²/h across albino Wistar rat skin. SEM confirmed spherical vesicle morphology and uniform distribution. Drug release followed the Higuchi model, indicating a sustained release mechanism. These findings suggest that the developed transferosomal gel system offers an effective strategy for the transdermal delivery of diacerein, potentially improving therapeutic outcomes and patient compliance.

**Keywords:** Diacerein, Transferosomes, Box–Behnken experimental design, Transdermal drug delivery.

**PC-181**

## FOAM BASED DRESSING SYSTEMS FOR DIABETIC WOUND HEALING

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Diabetic wounds are particularly challenging to heal due to multiple pathological factors and frequent infections. The impaired functioning of essential cells such as vascular endothelial cells, fibroblasts, and epithelial cells hinders the repair process in the complex diabetic wound environment. Traditional wound care options often prove insufficient in addressing chronic diabetic wounds, creating a demand for advanced dressing systems that promote faster healing and effective management. This study aimed to develop a foam-based dressing system integrated with a hydrogel containing esmolol hydrochloride and D-panthenol, and to evaluate its potential in diabetic wound management with a focus on maintaining hydration, enhancing healing, and improving infection control. Cytotoxicity of esmolol hydrochloride was assessed by MTT assay, which revealed no cytotoxic effect up to 250 µM concentration. Based on these findings, hydrogel formulations were prepared with esmolol hydrochloride (14%) and D-panthenol (5%) and subsequently incorporated into a foam-based dressing. The prepared system was evaluated for wound healing activity using an excision wound model in streptozotocin-induced diabetic rats over 21 days. The dressing-treated group demonstrated nearly 96% wound closure by day 21. Histopathological evaluation confirmed significant cell proliferation, tissue remodeling, and collagen deposition. Biochemical analysis further showed increased hydroxyproline and hexosamine levels, indicating enhanced collagen formation and extracellular matrix synthesis. Foam-based dressing systems incorporating hydrogel with esmolol hydrochloride and D-panthenol present a promising approach for diabetic wound care by combining effective moisture retention with exudate absorption, thereby accelerating healing and improving overall wound management.

**Keywords:** Diabetic wound healing, Esmolol hydrochloride, D-panthenol, Hydrogel formulation

**PC-182**

## FORMULATION AND EVALUATION OF QUETIAPINE SOLID DISPERSION

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Quetiapine fumarate is a dibenzothiazepine antipsychotic agent commonly used in the treatment of schizophrenia, bipolar disorder, and major depressive disorder. Its therapeutic effectiveness is limited due to poor aqueous solubility, low oral bioavailability and variable absorption. Solid dispersion technology has been explored as a promising strategy to enhance solubility and dissolution rate of poorly water-soluble drugs. Solid dispersions are prepared by using different weight ratios of carrier and drug using methods like kneading, solvent preparation, microwave irradiation, super critical anti solvent process. The present study was aimed to formulate and evaluate solid dispersions of quetiapine fumarate using different carriers such as soluplus, kolliphor P338, kolliphor P407 were used and also a natural substance , orange peel powder as a carrier. The prepared formulations were evaluated for drug content, solubility, and in-vitro dissolution studies. Additionally, characterization techniques such as Fourier transform infrared spectroscopy (FTIR), Differential scanning calorimetry (DSC) studies. Solid dispersion technology proved to be an effective and to enhance the solubility and bioavailability of quetiapine fumarate, thereby improving its therapeutic potential and patient compliance.

**Keywords:** Quetiapine fumarate, Solid dispersions, Solubility enhancement, Dissolution.

**PC-183**

## INFLUENCE OF DIFFERENT MARKETING STRATEGIES OF SUNSCREEN PRODUCTS ON CONSUMERS

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In recent years, the global skincare market has grown rapidly due to growing awareness of the negative effects of UV radiation and the significance of sun protection.In particular, sunscreen products are now a necessary part of daily skincare regimens, which has greatly aided in the growth of the market. Researchers and marketers alike continue to be very interested in how well marketing tactics affect consumer purchasing decisions. The various tactics, including pricing, packaging, product endorsements, and advertising, may have different effects on consumers' decisions, including their selection of sunscreen products. The goal of this study is to determine how various marketing tactics affect consumers' decisions to buy skincare products in the Peringara Panchayat, a region with a wide range of age groups and skincare awareness levels. 260 participants, ages 17 to 70, participated in the survey, which looked at how brand recognition, product positioning, promotional offers, and advertising campaigns impact sunscreen consumers' decisions. Analyzing consumer preferences and behavior is another goal of the study.It was found that important elements like advertising campaigns, packaging, and pricing strategies influenced customer preferences and purchase decisions. The results show that eco-friendly and high-quality features are essential for building consumer loyalty, and that young adults especially women respond best to marketing campaigns. It also highlights how important it is to foster sustainability and increase consumer trust in order to foster brand loyalty in a cutthroat industry. These observations offer helpful direction for improving marketing strategies to better meet customer expectations.

**Keywords:** Marketing strategies, Advertisement, Pricing, Packaging.

**PC-184**

## FORMULATION, DEVELOPMENT AND EVALUATION OF SPHERICAL AGGLOMERATES OF BEMPEDOIC ACID FOR ENHANCED COMPRESSIBILITY AND DISSOLUTION

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This research focuses on improving the pharmaceutical properties of Bempedoic Acid, a drug used for the treatment of hyperlipidemia, by addressing its poor water solubility and challenging physical characteristics. Using an innovative technique called quasi-emulsion solvent diffusion, the drug was reformulated into spherical agglomerates with the polymer Eudragit L100. This process significantly improved flowability, compressibility, and dissolution rate—critical factors for efficient tablet production and effective drug release in the body. Through systematic optimization, the ideal polymer concentration and processing conditions were identified, resulting in agglomerates that are not only easier to handle during manufacturing but also release the drug more rapidly and completely compared to the original crystalline form. The resulting tablets exhibited excellent mechanical strength, uniformity, and stability, fulfilling all pharmacopeial standards. Most importantly, the new formulation demonstrated a significantly faster release profile than a leading marketed product, indicating the potential for better patient compliance and therapeutic outcomes. This study successfully demonstrates that spherical agglomeration is a powerful and practical strategy to overcome the limitations of Bempedoic Acid, paving the way for more reliable manufacturing and enhanced therapeutic performance in the management of hyperlipidemia.




ISBN: 978-81-980623-8-3

**Keywords:** Spherical Agglomerates, Bempedoic Acid, Solubility Enhancement, Direct Compression, Quasi-Emulsion Solvent Diffusion

**PC-185**

**ADVANCEMENTS IN DERMA SERUM: A COMPREHENSIVE REVIEW OF FORMULATION, EFFICACY, AND REGULATORY CONSIDERATION**

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The skin on the face is always under the pressure of the environment, as well as its pollution and general lifestyle practices which in most cases cause issues like skin drying, hyperpigmentation, elasticity loss, acne, and rough skin. In order to offer a comprehensive solution, a multifunctional natural derma serum derived and experimented in this research was prepared. This serum integrated conventional and modern methods in which Rice water, Centella asiatica extract, Panthenol (Vitamin B5), and Vitamin E were used as active ingredients, and the serum contained functional excipients like hyaluronic acid, xanthan gum, and appropriate preservatives. The preparation was done by extracting rice water followed by blending of the actives, homogenization and stabilization of the mixture. Serum developed was examined in regard to critical physicochemical characteristics such as appearance, pH, spreadability, viscosity, and stability. The PH was maintained in the skin-compatible range of 4.5-6.5 across multiple storage conditions, and viscosity and spreadability was facilitated by facilitating topical application. Stability test revealed no significant alteration in colour, texture and phase partition at refrigerated, intermediate and room temperature. The presence of bioactive markers namely asiaticoside and madecassoside was confirmed through Thin Layer Chromatography. Agar diffusion revealed that there was a significant moisturizing effect on the biological evaluation with less water loss as compared to control, mainly because of the synergistic activity of Panthenol and Rice water.

**Keywords:** Derma serum, Rice water, Centella asiatica, Panthenol, Hydration, Stability

**PC-186**

**FORMULATION DEVELOPMENT AND EVALUATION OF NANOSUSPENSION LOADED AZELNIDIPINE TABLETS FOR THE TREATMENT OF HYPERTENSION**

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Introduction**:** Azelnidipine, a calcium channel blocker of BCS Class II, widely prescribed for hypertension. However, its poor solubility and limited oral bioavailability restrict therapeutic effectiveness. Nanosuspension-based formulations provide promising strategy to enhance solubility and dissolution of poorly water-soluble drugs. Objective**:** To design and evaluate nanosuspension-loaded tablets of Azelnidipine to improve solubility, dissolution rate, and therapeutic efficacy in hypertension. Methodology**:** Nanosuspensions were prepared using media milling technique with Polyvinyl Pyrrolidone K30 (PVP K30) as stabilizer and Polyvinyl Alcohol (PVA) as surfactant. Total of thirteen formulations were prepared and evaluated for drug content, entrapment efficiency, particle size, PDI, zeta potential, solubility and in-vitro release. Results**:** Formulation F6 shows most optimal results, about 98.23% drug content, 86% entrapment efficiency, an average particle size of 129.9 nm, and favorable PDI of 0.117.This formulation achieved a drug release of 95.4%, notably higher than the 67.09% observed with pure Azelnidipine. The optimised nanosuspension was further formulated into immediate-release tablets, which shows rapid resolution and supports the efficiency of nanosuspension approach. Conclusion**:** The nanosuspension based immediate release tablets significantly improves the bioavailability and solubility of Azelnidipine. Such a formulation strategy could offer practical approach of achieving better therapeutic outcomes in patients with hypertension.

**Keywords:** Hypertension, Azelnidipine, Nanosuspension, Media Milling, Solubility Enhancement

**PC-187**

**FORMULATION AND EVALUATION OF BUCCAL FILM OF FINERENONE FOR CHRONIC KIDNEY DISEASE**

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This research is on development and evaluation of buccal film of Finerenone in chronic kidney disease (CKD). Finerenone is a newly approved non-steroidal mineralocorticoid receptor (MR) antagonist which has shown great potential to slow down CKD progression and reduce cardiovascular risk. But in current oral tablet formulations, its therapeutic efficacy is limited due to its low water solubility, poor oral bioavailability and short half-life. Finerenone is classified under Biopharmaceutics Classification System (BCS) CLASS II showing low aqueous solubility but high membrane permeability. In traditional oral dosage form, it is subjected to first-pass effect and cytochrome P450 (CYP) induction resulting in less than 50% oral bioavailability. Hence recent research on Buccal drug delivery as a new route. Buccal delivery avoids first pass metabolism and CYP induction and thus may maximize bioavailability and therapeutic response. In preparation, Hydroxypropyl Methylcellulose (HPMC) K100M and Carbopol 934 are used as main film forming polymers. Solvent casting method is used to prepare the film to ensure homogeneous distribution of the drug and integrity of the film. To further increase drug permeation through buccal mucosa, Polyethylene Glycol (PEG) 6000 is added as permeation enhancer and plasticizer. The final buccal film is designed to deliver controlled drug release, patient compliance and therapeutic performance through sustained release of drug for prolonged period. In general this buccal film delivery is a solution to the limitations of solubility and bioavailability of Finerenone and can be a better alternative to traditional oral tablet for CKD.

**Keywords:** Finerenone, Buccal film, HPMC K100M, Carbopol 934, chronic kidney disorder (CKD)

**PC-188**

**Formulation and Evaluation of Cluster Bean Gum**

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Cluster bean is a very familiar produce in the Indian vegetable markets. Eighty per cent of the world's cluster bean is cultivated in our country, as the crop can tolerate both frequent rainfalls and arid conditions. However, this vegetable is comparatively less used in conventional cuisine. The promotion of cluster bean consumption through development commercial products would have great scope in the market. Three commercial products of cluster beans were developed namely bread spread, chutney powder and ready-to-cook curry mix. Five different formulations were worked out with various ingredients in different proportions. The best formulations were selected with respect to parameters such as appearance, colour, flavour texture, taste and overall acceptability by a sensory panel comprising of ten members. The products have scope to be commercialised in urban markets. Cluster bean (Cyamopsis tetragonaloba) is known to be helpful in reducing the blood glucose level in people suffering from diabetes mellitus and hypocholesterolemic subjects. Cluster beans were rich in soluble fibre content so they may be helpful in controlling hypercholesterolaemia. Cluster bean was processed and assessed to observe the hypoglycemic and hypocholesterolemic effect. Vegetable cluster beans and other ingredients were cleaned, dried and made into powder.

**Keyword:** Cluster Bean, Industrial qualities, Guar gum

**PC-189**

**Development and Evaluation of Oral Dissolving Films of Leflunomide**

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ISBN: 978-81-980623-8-3

Leflunomide (LEF), a disease-modifying antirheumatic drug (DMARD) prodrug, has both immunomodulatory and antiproliferative activities. FDA-approved in 1999, LEF is widely used to treat severe to moderate rheumatoid arthritis and other rheumatic diseases, successfully relieving pain, swelling, and joint deterioration. With such advantages, however, LEF is categorized as a BCS Class II compound with limited aqueous solubility, leading to low and variable oral bioavailability and erratic therapeutic effects. Accordingly, increased doses are needed for the desired efficacy, which escalates the risk of side effects. For overcoming these issues, a novel oral dissolving film (ODF) with a LEF–phospholipid complex (LPC) was formulated to enhance solubility and oral performance. The LPC was characterized by assessing particle size (PS), polydispersity index (PDI), zeta potential (ZP), complexation efficiency (%F), and solubility at different LEF and soya phosphatidyl choline ratios. Solid-state characterization of LPC and LPC-loaded ODF was analysed by DSC, FTIR, and XRD. The ODF was also evaluated for disintegration time, tensile strength, folding endurance, thickness, drug content, and in vitro release. Findings showed that LPC developed spherical particles with a mean diameter of 161.2 nm, zeta potential of –27.5 mV, and an entrapment efficiency of 87.47%. The ODF showed a tensile strength of 0.18 MPa and had fast release of the drug at pH 6.8. In general, results indicate that LPC has superior advantages compared to plain LEF, and its use in ODF improves the drug's physicochemical and biopharmaceutical performance.

**Keywords:** Disease-modifying Antirheumatic drug, Leflunomide, Phospholipid complex, Oral dissolving film.

**PC-190**

## EXPLORATION OF DIRECTLY COMPRESSED PANTOPRAZOLE SODIUM TABLETS FOR TARGET SPECIFIC DRUG DELIVERY

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The present study focuses on the formulation and evaluation of pantoprazole sodium-loaded pH-sensitive floating tablets designed to minimize drug release in the acidic environment of the stomach and protect the drug from degradation. Utilizing a direct compression method, pantoprazole sodium, an acid-labile drug, was effectively incorporated into pH-sensitive polymers, particularly hydroxypropyl methylcellulose phthalate (HPMCP HP55), to achieve targeted site-specific drug delivery. Compatibility studies by FTIR indicate that there are no significant interactions between the excipients. Six formulations (IF1-IF6) of immediate release tablets were prepared using sodium bicarbonate, carbopol 940, CMC, magnesium stearate, and HPMC. Nine formulations (SF1-SF9) of sustained-release were prepared using HPMC K4M and HPMC K100M in different ratios and combinations by direct compression method. All formulations were evaluated for pre-compression and post-compression parameters. Various formulation parameters, including surfactant type and concentration, polymer-to-drug ratio, and phase ratios, significantly influenced the particle size, encapsulation efficiency, drug loading, and release profile of the developed systems. The study concludes that appropriate concentrations of HPMC, PEG, and sodium bicarbonate can be effectively utilized to develop gastroretentive floating tablets of pantoprazole sodium with sustained drug release and improved stability in the gastrointestinal tract.

**Keywords**: Floating Tablet, Direct Compression, Pantoprazole Sodium, Gastroretentive Drug Delivery

**PC-191**

## FORMULATION, DEVELOPMENT AND EVALUATION OF NANOPARTICLES LOADED ORALLY DISINTEGRATING TABLETS CONTAINING FINERENONE

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Finerenone is new-generation non steroidal drug used to manage chronic kidney disease (CKD) in people with type 2 diabetes. While it offers therapeutic benefits, its effectiveness is limited because it dissolves poorly in water and shows low oral absorption. To make the most of this drug, there is a need for smarter delivery approaches that can improve solubility and patient convenience. This study set out to create patient-friendly oral delivery system by incorporating Finerenone nanoparticles into orally disintegrating tablets (ODTs) to enhance drug dissolution and absorption while designing a tablet easy to take, especially for older patients or those with swallowing difficulties. Finerenone was converted into nanoparticles to improve how quickly it dissolves and how effectively the body can absorb it. These tiny particles were then used to create tablets that melt quickly in the mouth so they can be taken easily without needing water. The tablets were tested for their strength, how easily they crumble, how fast they break down and absorb moisture, how evenly the drug was spread, and how well the drug released in lab tests. The nanoparticle-based tablets were strong and dissolved quickly. Compared to regular tablets, they showed much better drug dissolution and solubility. Using nanoparticles helped the drug dissolve faster, which means the body can absorb it more easily, potentially making Finerenone work better. Finerenone nanoparticle-based ODTs overcome poor solubility, improve uptake, dissolve quickly, and enhance CKD patient comfort.

**Keywords**: Chronic kidney disease, nanoparticles, orally disintegrating tablets, bioavailability

**PC-192**

## DEVELOPMENT AND CHARACTERIZATION OF CO-AMORPHOUS SUBLINGUAL FILMS OF ILOPERIDONE, AN ANTI-PSYCHOTIC DRUG.

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Iloperidone is an atypical antipsychotic, BCS Class II drug that is practically insoluble in water and is used in the treatment of Schizophrenia. In the present research work, the solubility of Iloperidone was enhanced by formulating into co-amorphous products (CAMs). The CAMs containing Iloperidone were prepared using the Solvent Evaporation technique, with citric acid (CA) and arginine (Ag) as co-formers. Furthermore, these CAMs were loaded into sublingual films utilizing HPMC K4M as polymer and Propylene glycol as the plasticizer. Drug content, saturation solubility, FTIR, XRD, DSC, and in-vitro dissolution tests were performed. A fivefold increase in solubility of the drug was shown by CAMs containing citric acid as a co-former of ratio 1:2. From the obtained in vitro release studies, citric acid (1:2) has shown maximum drug release of 88.9%. FTIR studies indicate a chemical interaction between Iloperidone and co-former resulting in the formation of co-amorphous product and justified by DSC studies. The in vitro disintegration time for the F1 and F2 films suggested that there would be faster drug release and faster oro-mucosal absorption. The in vitro dissolution test for F1 film showed a maximum drug release of 95%, at 15 min and the maximum drug release for F2 film was 93% which was observed by the end of 30min.

**Keywords**: Iloperidone, co-amorphous product, HPMC K4M, Propylene glycol, in vitro dissolution.

**PC-193**

## PREPARATION AND CHARACTERISATION OF ATORVASTATIN CALCIUM LOADED NANOGEL AS TOPICAL GEL BASED FORMULATION

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Atorvastatin calcium (ATC) is characterized by poor oral bioavailability due to its low aqueous solubility and extensive first-pass metabolism. To address these limitations, the present study focused on developing an atorvastatin calcium nanogel (ANG) to enhance solubility, drug absorption, and bioavailability, while providing controlled release, localized delivery, and improved wound-healing efficacy. ATC nanocrystals (NCs) were prepared using a $2^3$ factorial design and solvent–antisolvent precipitation method, investigating the effects of stabilizer (Pluronic F-127), solvent–antisolvent ratio, and stirring time on NC characteristics. The optimized nanosuspension (F8) was incorporated




ISBN: 978-81-980623-8-3

into an aloe vera–carbopol gel base by magnetic stirring at 800 rpm to obtain the nanogel. The formulation was evaluated for transparency, smoothness, relative density, pH, moisture content, rheological behavior, spreadability, drug stability, and ex vivo permeability. Compared with the pure drug, the NCs exhibited significantly higher saturation solubility and a faster dissolution rate. The prepared gels (AG and ANG) were clear, viscous, and stable, with ANG showing a pH of 6.5, ensuring skin compatibility without irritation. The ANG demonstrated a viscosity of 8500 cps, indicating good thickness and residence time at the site of application. Ex vivo drug permeation revealed a 24-hour release of 50 ± 8 µg/cm² from AG, while ANG achieved a markedly higher release of 400 ± 18 µg/cm². Stability studies confirmed no significant changes after 90 days of storage. Overall, the results suggest that ATC-based nanogel provides sustained release, improved drug delivery, and better patient compliance due to its transparent, non-greasy, and user-friendly topical application.

**Keywords:** Atorvastatin Calcium, Nanocrystals, Solvent–Antisolvent Precipitation, Nanogel

**PC-194**

## FORMULATION DEVELOPMENT AND EVALUATION OF BARICITINIB NANOEMULGEL

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This study will develop a topical gel made from a nanoemulsion to treat rheumatoid arthritis. It aims to be both effective and noninvasive. Baricitinib, a drug for rheumatoid arthritis, was incorporated into the nanoemulsion using Kolisolv GTA (Triacetin) as the oil phase, Tween as the surfactant, and Transcutol HP as the co-surfactant. This was achieved through the spontaneous emulsificationmethod.Preformulation experiments included FTIR and UV spectral analysis, an equilibrium solubility study, melting point determination, and a compatibility study with excipients. We validated the analytical method for Baricitinib in phosphate buffer at pH 7.4 and in distilled water using a UV spectrophotometer. We optimized the nanoemulsion formula using a 3^2 factorial design, where oil concentration (X1) and Smix concentration (X2) were the independent variables, and Zeta potential (Y1) and particle size (Y2) were the dependent variables.The optimized formula (F7 batch) had a particle size of 82.12 nm, a zeta potential of -20.12 mV, a drug content of 99.25%, and an in vitro release of 99.83% at 6 hours. We incorporated this optimized formulation into a gel made with Carbopol 940 and Triethanolamine to adjust the pH.The analysis of the nanoemulgel showed improved results for all parameters within specifications. We assessed the nanoemulgel for spreadability, viscosity, pH, and extrudability. The 30-day stability studies showed no sudden changes in physical appearance, FTIR spectra, or in vitro drug release, confirming the formulation's stability.

**Keywords:** Rheumatoid arthritis, Baricitinib, 32 Factorial Design and Nanoemulgel

**PC-195**

## FORMULATION AND EVALUATION OF NANO-GEL BY USING α, β-UN-SATURATED CARBONYL COMPOUNDS FOR THEIR ENHANCED ANTI-INFLAMMATORY AND ANALGESIC ACTIVITIES

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Arthritis is a chronic musculoskeletal disorder characterized by inflammation of one or more joints, leading to pain, stiffness, swelling, and progressive loss of mobility. It is a major cause of disability worldwide, affecting over 350 million individuals, with osteoarthritis and rheumatoid arthritis being the most prevalent forms. Once regarded as a disease of aging, it is increasingly observed in younger adults (30–45 years) due to obesity, stress, and metabolic disorders. Conventional therapies, particularly NSAIDs, provide symptomatic relief but their long-term use is associated with gastrointestinal, renal, and cardiovascular adverse effects. To overcome these limitations, the research work mainly focuses in plant-derived formulations that are effective, safe, and suitable for long-term usage. Chalcones, naturally occurring flavonoids, exhibit anti-inflammatory and analgesic properties. Advanced delivery systems such as Nano-Gels can address these issues by improving solubility, retention, and targeted delivery. The innovation is formulated by a chalcone-loaded Nano-Gel, using cinnamon oil and eucalyptus oil for topical application in management of arthritis. Both oil contents cinnamaldehyde and 1,8-cineole, possesses potent anti-inflammatory and permeation-enhancing effects. These both oils not only provide therapeutic benefits but also act as natural penetration enhancers, enabling effective transport of chalcones into deeper joint tissues. The Nano-Gel was prepared via a Nano-emulsification technique, and is stabilized with surfactants using carbopol, and subsequently converted into a Nano-Gel, was evaluated by various parameters such as Nano Particle size Analyser (Horiba), scanning electron microscopy (SEM), consistency, spreadability and viscosity tests. The Pharmacological in-vitro test was confirmed for their Anti-inflammatory and analgesic activities.

**Keywords:** Arthritis, Chalcones (α,β-un-saturated carbonyl compounds), Cinnamon oil, Eucalyptus oil, Nano-Gel, Anti-inflammatory, Natural penetration enhancers.

**PC-196**

## FORMULATION AND IN VITRO-IN VIVO EVALUATION OF DAPOXETINE HCL NANOPARTICLES CAPSULE

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The purpose of the present study was formulation and in vitro-in vivo evaluation of Dapoxetine HCL nanoparticles loaded in the capsule shell. The objective is to increase the dissolution, half-life, and stability by decreasing the particles size, thereby improving bioavailability, and therapeutic efficacy. The nanoparticles were prepared using solvent evaporation method using different polymers (Ethyl cellulose, Chitosan, HPMC K100, Betacyclodextrin) with four different ratios. The best formulation among all sixteen were determined by comparing the theoretical yield, drug content, entrapment efficiency and invitro drug release. F6 was considered as the best formulation as it had entrapment efficacy as 90.94% and drug release was 96.93% upto 12 hours. The best formulation was characterized for its particle size, polydispersity index, zeta potential, drug entrapment efficiency, particle morphological characters (SEM and PXRD) and for anti-depressant activity in vivo. Dapoxetine Hcl nanoparticles (F6) shown better anti-depressant activity than the control, pure drug and Imipramine (standard) treated animal. Dapoxetine Hcl nanoparticles (F6) loaded in to capsule shell by hand filling method using micro crystalline as a binder and diluents, magnesium stearate as lubricant. Finally, to compare the Invitro release studies of Dapoxetine Hcl Nanoparticle Capsule (F6) with Dapoxetine Hcl Capsules.

**Keywords:** Dapoxetine Hcl, Ethyl Cellulose, Chitosan; HPMC K100, Betacyclodextrin, Nanoparticles.

**PC-197**

## DIFLUPREDNATE IN-SITU NANOGEL FOR ANTERIOR UVEITIS. AND POST-OPERATIVE OCULAR INFLAMMATION

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Difluprednate (DFBA), a potent corticosteroid and difluorinated prednisolone derivative, is widely used for treating post-operative ocular inflammation and anterior uveitis. It acts by reducing vasopermeability, redness, edema, and pain while uniquely sequestering leukocytes from inflammatory sites. DFBA's active metabolite shows significantly higher glucocorticoid receptor affinity than prednisolone. Durezol, a 0.05% DFBA eye drop, is the reference listed drug (RLD), typically administered four times daily. To enhance patient compliance and therapeutic efficacy, this study developed a stable in-situ gel formulation of DFBA with sustained-release properties. Utilizing FDA-reviewed composition data, a coarse emulsion was prepared with 0.5% w/w gellan gum (GG), and further processed using a microfluidizer at 25,000 PSI for 9 cycles to obtain a nanoemulsion (NE). The resulting NE had a globule size of 91.55




ISBN: 978-81-980623-8-3

± 10 nm, PDI of 0.207 ± 0.06, and zeta potential of -6.58 ± 0.11 mV. Drug content, entrapment efficiency, drug loading, pH, and osmolality were found to be 98.55 ± 3.64%, 87.24 ± 2%, 0.044 ± 0.03%, 5.8 ± 0.2, and 283 mOsm/kg, respectively. Both DFBA-NE and in situ gelling DFBA-NE exhibited sustained drug release over 4 days—95 ± 2.4% and 90.28 ± 1.3%, respectively—outperforming the marketed DFBA eye drop and suspension in release, corneal permeation, and retention. The in-situ gel formulation remained stable for over 12 hours in simulated tear fluid, indicating potential for reduced dosing frequency and improved patient adherence. HET-CAM assay results confirmed non-irritancy, sterility was preserved, and 3-month stability studies demonstrated sustained physical stability.

**Keywords:** Difluprednate, nanoemulsion, microfluidizer, Ocular inflammation, Sustained release.

**PC-198**

**INVESTIGATION OF TRIPLE-RESPONSIVE NEEM FACE WASH GEL**

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In this current study design, the investigation of triple-responsive face wash gel using aqueous extract of Neem leaves has been carried out. In the world of Ayurveda, Neem (Azardirachta indica) or "Divine tree" is well liked medical herb that has been a part of traditional remedies to treat acne and pimple. A novel triple-responsive gel constructed by emulsion polymerization of photo-responsive spiropyran methacrylate (SPMA), temperature-sensitive N-isopropylacrylamide (NIPAM), and pH-responsive methacrylic acid (MAA). The prepared Neem face wash gel was evaluated for parameters like color, pH, consistency, washability, grittiness, foamability, and spreadability. It was found that gel has been found to be slightly yellowish in colour, gel viscosity of 1748 cp, spreadability 7.5 g.cm/sec, semi-solid in consistency, easily washable, pH 6.15 compatible to skin, foam volume of 92 ml at 5 minutes. The system exhibited reversible volume change in response to pH, temperature, and near-infrared (NIR) light. TLC for extraction method exhibit bands in long UV 366 nm for presence of bioactive compounds like flavonoids. They offer a range of benefits, including stability of extract constituent enhancing the bioavailability, oxidative stress reduction, inflammation modulation, and DNA damage prevention. Thus, it can be concluded that the effectiveness of neem face wash smart gel believed to be act on multiple targets, enhancing anti-acne, antioxidant and anti-inflammation properties with triple response. However, the challenge remains in deciphering the complexity of herbal compounds and their mechanistic pathways.

**Keywords:** Face wash gel, Neem, triple-responsive, anti-inflammation, anti-acne.

**PC-199**

**FORMULATION AND EVALUATION OF ELLAGIC ACID-LOADED POLYMERIC NANOPARTICLES FOR ANTIDIABETIC AND ANTICANCER ACTIVITY IN MCF-7 CELLS**

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Ellagic acid is a naturally occurring polyphenolic compound found in various plants, known for its antidiabetic, anticancer, and antioxidant properties, and associated with multiple health benefits. However, ellagic acid exhibits poor solubility and stability in the gastric environment, along with low permeability across biological membranes, resulting in limited bioavailability. To overcome these limitations, ellagic acid has been encapsulated into polymeric nanoparticles (PNPs) to enhance its solubility, permeability, stability, and overall bioavailability. In this context, an advanced strategy has been developed to formulate and characterize hyaluronic acid surface-functionalized ellagic acid-loaded chitosan-soya lecithin–TPGS-based nanoparticles using a molecular self-assembly approach to improve oral bioavailability and therapeutic efficacy. Polymeric nanostructures provide protection to ellagic acid and enable targeted delivery to specific tissues and cells. Recent investigations have reported the formulation and evaluation of ellagic acid-loaded PNPs for antidiabetic activity in rat models and anticancer activity in breast cancer cell lines such as MCF-7. This nanoparticle-based delivery system combines the therapeutic potential of polyphenols with nanotechnology to improve efficacy and broaden biomedical applications, including pharmaceuticals and functional foods.

**Keywords:** Ellagic acid, Polymeric nanoparticles, Hyaluronic acid functionalization, Antidiabetic activity, MCF-7 breast cancer cells.

**PC-200**

**DEVELOPMENT AND CHARACTERIZATION OF SODIUM FUSIDATE NIOSOMAL INSITU GEL FOR OCULAR DRUG DELIVERY**

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This study aimed to develop and characterize a niosomal in-situ gel system for ocular delivery of Fusidic Acid to enhance drug retention and bioavailability in the management of ocular infections. Niosomes were prepared using Thin Film Hydration (TFH) and Ether Injection (EI) methods, with TFH yielding superior drug content (DC) and entrapment efficiency (EE), and thus selected for further optimization. The optimized niosomal formulation (F8) was incorporated into in-situ gels using the cold method with varying concentrations of Pluronic F-127 and NaCMC, resulting in six batches (F1–F6). Physicochemical and performance evaluations included vesicle size, zeta potential, viscosity, gelation temperature, drug content, in vitro release, antimicrobial activity, sterility, and stability. The optimized formulation (F8) exhibited a mean vesicle size of 317 nm with uniform spherical morphology and a zeta potential of –46.4 mV, confirming stability due to strong electrostatic repulsion. The gels were homogeneous, lump-free, and demonstrated viscosity values of 504–704 cps with pH ranging between 6.2 and 6.8, ensuring ocular safety. Drug content ranged from 96.72% to 98.32%, indicating uniformity, while in vitro studies showed sustained release influenced by polymer concentration. Among all batches, F5 exhibited the most prolonged drug release profile. Sterility testing confirmed the absence of microbial contamination, and stability studies showed no significant changes under storage. Overall, Fusidic Acid niosomal in-situ gels demonstrate great potential as a novel ocular delivery system, overcoming the limitations of conventional eye drops by providing controlled release, reduced dosing, and improved patient compliance.

**Keywords:** Fusidic Acid, Niosomes, Thin Film Hydration Method, In-Situ Gel, Cold Method, Ocular Drug Delivery.

**PC-201**

**FORMULATION AND EVALUATION OF FINERENONE EXTENDED-RELEASE TABLETS USING EUDRAGIT RS100 AS A MATRIX FORMER: A COMPARATIVE STUDY WITH HPMC-BASED FORMULATIONS**

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The present study was aimed at developing and evaluating extended-release matrix tablets of Finerenone which is a novel non-steroidal mineralocorticoid receptor antagonist, which uses Eudragit RS100 as the matrix-forming polymer. Finerenone is currently marketed as immediate-release tablets (Kerendia®) for the management of chronic kidney disease (CKD) which is associated with type 2 diabetes mellitus (T2DM) and requires daily administration. Developing an ER formulation could sustain therapeutic levels and reduce dosing frequency, and also improves patient adherence in chronic therapy. The hydrophobic, water-insoluble, yet permeable properties of Eudragit RS100 were chosen because they minimize the impact of gastrointestinal pH and motility on drug release, which is advantageous for poorly soluble medications. Direct compression was used to create these formulations, and pre- and post-compression parameters were assessed. The tablets hardness, friability, thickness, weight fluctuation, uniformity of drug content and in vitro release in gastrointestinal fluids were evaluated. The release profile of formulation of Eudragit RS100 was tested and compared with that of traditional HPMC hydrophilic matrix system. Compared to HPMC matrices, which are prone to variations due to agitation, the ionic environment, and gel strength, Eudragit RS100 formulations provide




ISBN: 978-81-980623-8-3

more stable, pH-independent, and controlled release profile. Stability tests was performed according to ICH guidelines which shows the robustness of the optimized formulation. Finally it was shown that ER finerenone tablets based on Eudragit RS100 has better control over drug release. This could result in better adherence, fewer doses, and increased therapeutic efficacy in the long-term management of CKD with type 2 diabetes

**Keywords:** Finerenone, Extended-release tablets, Eudragit RS100, HPMC matrix, Controlled drug delivery

**PC-202**

**FORMULATION OPTIMIZATION AND EVALUATION OF NANOSUSPENSION OF ETODOLAC**

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Etodolac is a NSAID, which belongs to BCS class II and it exhibits low oral bioavailability (~ 40%) due to poor aqueous solubility. The objective of present research work was to formulate and optimize nanosuspension of Etodolac to improve solubility and dissolution profile. The preformulation studies such as λ max determination, preparation of calibration curve, determination of saturation solubility and drug excipient compatibility study using DSC were carried out. Nanosuspension of Etodolac was prepared by anti-solvent precipitation method and optimized using box behnken design to study the effect of independent variables like concentration of HPMC, concentration of SLS and concentration of urea on dependent variables like saturation solubility and % drug content. On the basis statistical analysis using DoE, the optimized formula was obtained, which was further evaluated based on saturation solubility (16.37 ± 1.21 mg/ml), % drug content (86.57 ± 1.82 %), particle size (650.45 ± 2.56 nm), zeta potential (-6.9 ± 1.2 mV), pH measurement (pH 4.86 ± 0.46), in-vitro % drug release (98.91 ± 0.53 % upto 4 hours) and stability study (found stable up to 3 months). Based on the results, it was concluded that aqueous solubility of Etodolac was found to be remarkably increased in form of nanosuspension, suggesting the potential for improvement in oral bioavailability.

**Keywords:** Etodolac, nanosuspension, anti-solvent precipitation method, solubility enhancement, Box-Behnken design.

**PC-203**

**STATISTICAL OPTIMIZATION OF ORODISPERSIBLE TABLETS OF FEXOFENADINE HYDROCHLORIDE SOLID DISPERSIONS BY BOX-BEHNKEN DESIGN**

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Fexofenadine, used as an anti-histaminic drug with low solubility has absorption problems. Fexofenadine HCL, an anti-histamine drug is used for treating hay fever and allergy,belongs to BCS Class-II and has low solubility. In the present work solid dispersions of fexofenadine Hcl were prepared using cyclodextrin and PVP as carriers to improve solubility. These solid dispersions were formulated into orodispersible tablets using cyclodextrin and PVP in different ratios. The solid dispersions showing good solubility were used to prepare orodispersible tablets using Sodium starch glycolate, Vee Gum and croscarmalose sodium as super disintegrants , the formulations were optimised using statistical design by Box - behnken method. The optimised formulation suggested by the software, combining of SSG,CCS and Vee Gum showed 88 % of drug release within 15 minutes, which is nearly equal to the value predicted by the software. Thus, converting the drug into a solid dispersion increased its solubility, and further formulation into orodispersible tablets using superdisintegrants resulted in a high drug release rate of 88%. The FTIR studies showed no interaction between the drug and cyclodextrin,PVP.

**Keywords:** Fexofenadine HCL, orodispersible, Box – behnken, cyclodextrin, disintegrants.

**PC-204**

**INNOVATIVE HYDROGEL FORMULATION FOR ENHANCED DELIVERY OF MORINGA AND BRAHMI**

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Wound healing is a natural, complex, and essential physiological process that occurs after the skin or other tissues are damaged. Natural extracts of medicinal plants have been used for centuries in traditional healing systems like Ayurveda, Siddha, and Traditional Chinese Medicine because of their anti-inflammatory, wound-healing, and antioxidant qualities. Bacopa monnieri (Brahmi) and Moringa oleifera (Drumstick Tree) can speed up wound healing, enhance cognitive function, and encourage tissue regeneration. The plant's anti-inflammatory properties help reduce swelling and pain at the wound site, creating an environment conductive to healing. The study was conducted on leaves of Moringa oleifera and Bacopa monnieri. These powerful botanical extracts can now be incorporated into hydrogel-based medication delivery systems thanks to advancements in biomaterials. This research aims to develop a novel alginate-based hydrogel with Brahmi and Moringa extracts for better topical use.The extraction of Moringa oleifera was carried out through Soxhlet method and extraction of Bacopa monnieri was carried out through Maceration techniques. The present study successfully developed and evaluated herbal-based hydrogel formulation incorporating Brahmi and Moringa extracts for wound healing applications. The formulation was refined to guarantee the active phytoconstituents stability, bioavailability, and extended release. The potential advantages of its hydration, bioactive retention, and cell regeneration-promoting capabilities were assessed.The results suggest that such natural hydrogel systems can serve as a safe, effective, and eco-friendly alternative to conventional wound care products. This study demonstrates how contemporary hydrogel technology and traditional herbal knowledge can be combined to create novel medicinal compositions for the next generation.

**Keywords:** Hydrogels, Biopolymers, Drug Delivery, Moringa oleifera, Bacopa monnieri.

**PC-205**

**DESIGN AND EVALUATION OF VARDENAFIL LOADED SELF NANOEMULSIFYING CHEWABLE TABLETS**

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The primary objective was to formulate and develop Self Nanoemulsifying Chewable Tablets of Vardenafil. Vardenafil is used for treatment of erectile dysfunction in men. It is classified under the medications known as phosphodiesterase (PDE) inhibitors. The formulation Cinnamon Oil as oil, Tween 80 as surfactant and PEG 400 as co-surfactant. This experiment underwent a 32 Full factorial design for formulation optimization. According to the design, 2 factors were evaluated, each at 3 levels, and experimental trials were conducted at all 9 combinations. Pseudo ternary phase diagram supported the selection of 2:1 ratio. Independent factors were the Concentration of Oil (X1) and the Concentration of Smix (Tween 80:PEG400) (X2). Zeta potential, Self Emulsification time and % Transmittance were taken as the dependent variables. Results were benchmarked against checkpoint batch. From overlay plot, concentration of the Cinnamon oil was determined as 20% (0.16ml) and S-mix 80% (0.83 ml). Optimized Formulation demonstrates a particle size of 89.9nm, % Transmittance of 98.25%, Zeta potential of -2.9mV and a polydispersibility index of 0.23. The liquid SNEDDS was transformed to S-SNEDDS with Neusilin acting as the adsorbent. Finally, S-SNEDDS was transformed into chewable tablets through wet granulation. This formulation exhibited a drug release of 97% within 1 hour. SNECT demonstrated improved drug formulation.

**Keywords:** Vardenafil, Self-Nanoemulsifying Drug Delivery System (SNEDDS), Chewable Tablets, Factorial Design, Bioavailability Enhancement

**PC-206**

**FORMULATION AND EVALUATION OF CHITOSAN BASED POLYMERIC NANOPARTICLES OF AN ANTI - ALZHEIMER'S DRUG MEMANTINE HYDROCHLORIDE**

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ISBN: 978-81-980623-8-3

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The aim of the study was to develop Memantine HCl loaded chitosan - sodium tripolyphosphate (STPP) nanoparticles using Ionic gelation method and evaluates their physicochemical properties and in-vitro release studies for possible targeted delivery to the brain. The objective was to fabricate polymeric nanoparticles for better controlled and targeting action of drug, which also overcome the problems associated with conventional formulations like multidose therapy, poor patient compliance and high cost. Memantine HCl loaded chitosan nanoparticles (F1 to F6) were prepared by Ionotropic gelation method. The formulated nanoparticles were evaluated for external morphological characters, determination of particle size analysis, zeta potential, drug content, entrapment efficiency and in-vitro release studies. The particle size varied from 148 to 317 nm and zeta potential was in negative and its value found to be - 46.4 mV. The drug content for the Memantine HCl loaded chitosan nanoparticles varied from 69.5 ± 7.2% to 87.9 ± 1.2%. The entrapment efficiencies were found to be minimum and maximum of 55.50 ± 2.4% and 86.30 ± 3.6%. The percentage yields of all formulations were in the range of 48.24 ± 1.24 to 86.13 ± 1.37%. In-vitro release of drug follows zero order and showed sustained release behaviour for a period of 24 hr. The optimized formulation contains 3:1 ratio of chitosan & STTP and demonstrated successful sustained release. Memantine HCl loaded chitosan nanoparticle is a potential new delivery system for treatment of Alzheimer's disease.

**Key words**: Alzheimer's disease, Polymeric nanoparticles and Ionotropic gelation.

**PC-207**

**TARGETING PSORIASIS WITH DIOSCOREA BULBIFERA EXTRACT-LOADED NANOGEL: IN-VITRO CHARACTERIZATION & IN-VIVO STUDY IN RAT MODEL**

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This study explores the development of a nanostructured lipid carrier (NLC) system incorporating Dioscorea bulbifera root extract for the topical treatment of psoriasis. The NLC formulation, composed of soy wax as the solid lipid and karanj oil (Pongamia pinnata) as the liquid lipid, was prepared using the hot melt method and embedded into a Carbopol 934-based gel. A Box–Behnken experimental design was employed to optimize the formulation across sixteen experimental runs. Characterization of the NLC and nanogel was performed using diosgenin as a biomarker. In vivo evaluation using a rat model of imiquimod-induced psoriasis revealed effective drug encapsulation and significant anti-psoriatic activity. Compared to a plain extract gel, the nanogel demonstrated faster therapeutic action, sustained drug release over 12 hours, and a marked reduction in inflammatory markers IL-23 and IL-17. Histopathology examination reveals cytoarchitectural recovery of psoriatic skin. Indicating the regenerative potential of the Dioscorea bulbifera-based nanogel formulation. These results establish Dioscorea bulbifera as an intriguing option for psoriasis treatment, deserving of more clinical research to confirm its effectiveness and safety in people.

**Key words**: Dioscorea bulbifera, NLC, psoriasis, inflammatory markers, diosgenin

**PC-208**

**DESIGN AND EVALUATION OF VERAPAMIL HCL CAPSULES CONTAINING IMMEDIATE AND EXTENDED-RELEASE PELLETS**

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Hypertension remains one of the most prominent risk factors contributing to the disease burden in India and requires effective long-term control and management. One of the medications used in the treatment of hypertension is Calan SR prescribed Verapamil HCl. There are various sustained release (SR) formulations in the market. The objective of the current study was to develop and evaluate Verapamil HCl containing both Immediate Release (IR) and Extended Release (ER) layers in pellets form to both rapidly achieve therapeutic levels in the system and maintain them subsequently. The IR and ER pellets were fabricated using the powder layering and wurster coating techniques. The release-rate controlling coating Surelease (ethyl cellulose) along with Eudragit S 100 and Eudragit L 100 as pH-dependent polymers for ER were selected based on preliminary screening. Release kinetics were predefined using $3^2$ factorial design to achieve optimized formulation. The optimized batch F4 showed satisfactory physical and analytical parameters with biphasic release comprising simulated loading dose followed by zero-order rate controlled maintenance dose for 24 hours. The study concludes that the formulated capsule is capable of improving patient adherence by lowering the dosing frequency to once daily while ensuring steady therapeutic plasma concentrations of Verapamil HCl.

**Keywords:** Hypertension, Verapamil HCl, Immediate release, Extended release, Pellets

**PC-209**

**DEVELOPMENT AND OPTIMIZATION OF ORO-DISPERSIBLE FILMS OF LAMOTRIGINE-B CYCLODEXTRIN COMPLEX: EFFECT OF LYCOAT RS 720 AND SSG CONCENTRATION ON FILM DISINTEGRATION**

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Lamotrigine is an antiepileptic drug belonging to Phenyltriazine class. It being a BCS Class II drug necessitates it to be formulated in a dosage form which improves its solubility. In the current research work, Oro-Dispersible films (ODF) of Lamotrigine-β Cyclodextrin (LMN-βCD) complex using PVA as a film forming agent for the treatment of epilepsy were formulated. ODF of LMN-βCD (1:1) were prepared by the solvent-casting method; using PVA and Lycoat RS 720 combination as film forming agents, PEG was used as a plasticizer, SSG was used as a super-disintegrant, citric acid was used as a saliva stimulating agent. The objective behind the research was to examine the effect of the concentrations of the of Lycoat RS 720 polymer and SSG on the disintegration time and % CDR at 10 minutes of the PVA films. A 32factorial design was used for optimization where three different concentrations of the Lycoat RS 720 and SSG were used as independent factors and disintegration time and % CDR at 10 minutes were taken as dependent responses. The overall study concluded that addition of Lycoat RS 720 and SSG in suitable concentration to the PVA formed LMN-βCD complex films can improve the disintegration time and % CDR considerably.

**Keywords:** Lamotrigine, Lycoat RS 720, 32factorial design, Oro-Dispersible film.

**PC-210**

**"FORMULATION AND EVALUATION OF ETHOSOMAL GEL OF BERBERINE HCL"**

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Dual-release mechanism of ethosomal gels (i.e., ethosomes and gel) makes them as versatile drug delivery systems for topical applications. Berberine (BER) is the primary active alkaloid extracted from Coptidis Rhizoma, which has many pharmacological actions. This study aimed to develop and evaluate an ethosomal gel containing berberine (BER) for treating candidiasis. The researchers formulated BER-loaded ethosomes using a modified cold technique with varying concentrations of soy lecithin (1-3%) and ethanol (10-40%). The resulting ethosomes were assessed for characteristics like vesicle shape, size, electrical charge (zeta potential), and BER entrapment efficiency. Subsequently, the optimized ethosomes were integrated into a carbopol 934 gel base. The formulated ethosomal gels underwent further evaluation for spreadability, drug release profile, ex vivo permeation through skin layers, and antifungal activity against Candida albicans compared to standard ketoconazole. Notably, the optimized formulation exhibited a skin-friendly pH, minimizing potential irritation. The encouraging antifungal activity against C. albicans suggests promise for this novel delivery system in topical treatment of candidiasis.




ISBN: 978-81-980623-8-3

**Keywords**: Ethosomes, Topical drug delivery, Candida, Berberine, Antifungal activity.

**PC-211**

**FORMULATION AND DEVELOPMENT OF RIBOCICLIB NANOCARRIER FOR THE TREATMENT OF BREAST CANCER**

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Breast cancer remains one of the most prevalent malignancies among women worldwide, with limitations in conventional chemotherapeutic approaches often attributed to poor drug solubility, systemic toxicity, and multidrug resistance. Ribociclib, a selective cyclin-dependent kinase 4/6 (CDK4/6) inhibitor, has shown significant clinical promise in the management of hormone receptor-positive (HR+), human epidermal growth factor receptor-2 negative (HER2–) breast cancer. However, its therapeutic efficacy is hindered by issues such as limited bioavailability and dose-dependent adverse effects. Nanocarrier-based drug delivery systems provide an advanced platform to overcome these barriers by enhancing solubility, prolonging systemic circulation, improving tumor-specific accumulation, and reducing off-target toxicity. The present work focuses on the formulation and development of ribociclib-loaded nanocarriers, employing techniques such as nanoprecipitation or lipid-based encapsulation for optimal entrapment efficiency, stability, and controlled drug release. Characterization parameters include particle size, polydispersity index, zeta potential, encapsulation efficiency, and in vitro release kinetics, along with cytotoxicity assays on breast cancer cell lines to evaluate therapeutic potential. The proposed nanocarrier system aims to maximize ribociclib's bioavailability and antitumor activity while minimizing systemic side effects, thereby offering a promising approach in the targeted treatment of breast cancer.

**Keywords**: Breast cancer, Bioavailability, Nanocarrier, Ribociclib, CDK4/6 inhibitor.

**PC-212**

**DEVELOPMENT AND CHARACTERIZATION OF VALSARTAN PRESS COATED TABLETS FOR CHRONOTHERAPEUTIC DRUG DELIVERY SYSTEM**

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The present study aimed to develop a chronotherapeutic drug delivery system for Valsartan using the press coating technique to enhance treatment efficacy in managing hypertension through controlled and time-dependent drug release. Valsartan's solubility was improved via solid dispersion techniques, with formulation F6 (solvent evaporation method) showing the highest saturation solubility (0.55 mg/mL). Fast-dissolving core tablets were prepared using the direct compression method, employing croscarmellose sodium and sodium starch glycolate as coprocessed superdisintegrants. Six formulations (F1–F6) were developed using varying concentrations (5%, 10%, and 15% w/w) of the superdisintegrants. Among these, F3 containing 15% croscarmellose sodium exhibited the fastest drug release. The optimized fast-dissolving core (F3) was then used to formulate press-coated tablets with HPMC K-100 and ethyl cellulose (EC) in different ratios. The coating was designed to achieve a specific lag time before drug release, ideal for chronotherapeutic applications. The mechanism involves erosion or dissolution of the coating layer, enabling delayed release from the core. Dissolution studies were carried out in 0.1 N HCl for 2 hours, followed by phosphate buffer (pH 6.8) for 12 hours. The press-coated formulation containing 350 mg EC and 50 mg HPMC K-100 exhibited the desired drug release profile, with a lag time of 3–3.5 hours and sustained release thereafter. The developed system has potential to reduce dosing frequency and enhance therapeutic outcomes in hypertension management.

**Keywords:** Valsartan, Chronotherapeutic, Press coating, Lag time and Hypertension

**PC-213**

**FABRICATION AND CHARACTERIZATION OF RUTIN SOLID LIPID NANOPARTICLES AS POLYPHENOL NANOCARRIERS FOR THE ENHANCEMENT OF ANTI-ARTHRITIC ACTIVITY**

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In the current research, Rutin-loaded Solid Lipid Nanoparticles (R-SLNPs) were fabricated using tripalmitin, TPGS, and Soya lecithin to enhance Rutins anti-arthritic activity. Rutin, despite its efficient anti-arthritic activity suffers from poor water solubility, instability in acidic conditions, limited oral absorption in the gastrointestinal tract and poor bioavailability. The objective behind this research was to enhance the solubility of Rutin by formulating as Solid lipid nanoparticles and making it a suitable candidate for the treatment of arthritis. Rutin showed low water solubility but higher solubility in organic solvents. FT-IR confirmed its compatibility with polymers, and UV analysis validated drug's purity. SEM analysis showed smooth, spherical particles within the desired size range (175.6nm). A negative zeta potential (-24.7 mV) and low polydispersity index (0.348) suggested physical stability and target specificity**.** R-SLNPs exhibited high entrapment efficiency (85.25%) and biphasic release patttern, with an initial burst at 2 hrs followed by sustained release upto 72 hours, consistent with Higuchi diffusion kinetics. TPGS-functionalized R-SLNPs showed enhanced anti-inflammatory effects and joint protection in a rat arthritis model. Stability studies revealed higher stability under refrigeration conditions (4°C±2°C / 60%RH±5%) compared to ambient and accelerated conditions. Histopathological and biochemical analyses supported the anti-inflammatory effects and improved kidney function with R-SLNP treatment. This study concludes that Rutin-loaded SLNPs, particularly TPGS-functionalized hold promises for arthritis therapy, offering enhanced solubility, bioavailability, and stability, with potential for scalable production.

**Keywords**: Rutin, Solid lipid nanoparticles, Polyphenols, TPGS, Anti-arthritic activity.

**PC-214**

**SMART NANOTECH PATCHES: A PAIN FREE FUTURE FOR DIABETES CURE**

ZOHA HUSSAIN

India is the epicenter of a diabetes crisis, with over 101million adults currently affected and millions more at risk. conventional insulin therapy depends on multiple daily subcutaneous injections, which are painful, inconvenient and often lead to poor adherence. This unmet need calls for innovative, patient friendly and affordable approaches tailored to the Indian context. This project explores the integration of nanotechnology based microneedle patches with artificial intelligence driven dosing algorithms to create a pain free, smart and accessible alternative to insulin injections for diabetes management. We propose the development of dissolvable polymeric microneedle patches loaded with insulin-loaded nanocarriers to enable controlled, transdermal drug delivery. preclinical evaluations will focus on drug permeation, biocompatibility and glycemic control in diabetes. While usability and stability will assess suitability for Indias diverse climate and healthcare settings. This approach has the potential to transform diabetes care in India by reducing complications, improving quality of life and lessening the economic burden on patients and healthcare system.This innovation represents a step toward an indigenous solution that aligns with India's vision of affordable and patients centric healthcare. Pain free insulin delivery with minimal skin irritation. It is cost effective, scalable technology and is adaptable for Indian pharamaceutical manufacturing.

**PC-215**

**DEVELOPMENT OF A HYDROTROPIC SOLID DISPERSION-BASED TABLET TO ENHANCE SOLUBILITY OF A POORLY SOLUBLE DRUG**

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Limited solubility in water presents a significant obstacle in creating oral dosage forms for numerous therapeutic agents, consequently affecting their bioavailability and therapeutic efficacy. This study aims to




ISBN: 978-81-980623-8-3

formulate a hydrotropic solid dispersion-based tablet to improve the solubility and dissolution rate of a drug that is poorly soluble in water, utilizing sodium salicylate as a hydrotropic solubilizer. Initially, solubility studies were performed with different concentrations of sodium salicylate to identify the most effective hydrotropic concentration. Solid dispersions of the target drug were fabricated using the solvent evaporation technique, where the drug was first solubilized in sodium salicylate, followed by the evaporation of the solvent to yield the solid dispersion. The resulting solid dispersions were assessed for drug content, flow characteristics, compatibility, and possible molecular dispersion. Tablets were created utilizing the direct compression method along with suitable excipients. The resulting tablets underwent evaluation based on standard parameters such as hardness, friability, weight variation, disintegration time, and in-vitro dissolution assessments. The drug's solubility notably improved with the inclusion of sodium salicylate, and solid dispersions demonstrated better dissolution profiles when compared to the unprocessed drug. Among the various formulations developed, the batch containing solid dispersion made with 2M sodium salicylate showed the highest drug release (exceeding 90% within 45 minutes), in contrast to less than 30% for the unprocessed drug. The study concludes that the use of hydrotropic agents like sodium salicylate in the preparation of solid dispersions**,** followed by tableting, is a promising and simple approach to enhance the solubility and dissolution of poorly water-soluble drugs, thereby potentially improving their oral bioavailability.

**Keywords**: Hydrotropic, Solid dispersion, Bioavailability, compatibility, disintegration

**PC-216**

**FORMULATION, DEVELOPMENT AND EVALUATION OF TOPICAL NANOEMULGEL CONTAINING ABROCITINIB FOR ATOPIC DERMATITIS TREATMENT**

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This research focuses on the formulation, development, and evaluation of a topical nanoemulgel containing Abrocitinib for the treatment of Atopic Dermatitis (AD). Abrocitinib, a selective JAK1 inhibitor, was incorporated into a nanoemulsion system using Kollisolv GTA as the oil phase, Tween 80 as the surfactant, and Transcutol HP as the co-surfactant, prepared via spontaneous emulsification. The nanoemulsion was optimized using a $3^2$ factorial design, with oil and surfactant-co-surfactant mixture (Smix) concentrations as independent variables, and zeta potential and globule size as dependent responses. The optimized formulation (F7) exhibited a globule size of 102.2 nm and a zeta potential of –24.21 mV, indicating good stability. This nanoemulsion was then incorporated into a Carbopol 940 gel base to form a nanoemulgel. The final formulation demonstrated desirable physicochemical properties, including appropriate pH, spreadability, extrudability, and viscosity. In vitro and ex vivo studies confirmed enhanced drug permeation and sustained release. The nanoemulgel was non-irritating in a HET-CAM test and remained stable over 30 days under accelerated conditions. This study successfully developed a promising topical nanoemulgel of Abrocitinib, offering a effective and patient-friendly treatment option for Atopic Dermatitis.

**Keywords**: Atopic Dermatitis, Abrocitinib, Nanoemulgel, Topical Delivery, Factorial Design

**PC-217**

**FORMULATION AND DEVELOPMENT OF NASAL GEL CONTAINING UBROGEPANT NANOPARTICLES FOR ENHANCED AND RAPID BRAIN DELIVERY IN THE TREATMENT OF MIGRAINE**

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The present study aimed to develop an intranasal gel of Ubrogepant-loaded nanoparticles (NPs) for rapid brain delivery and enhanced therapeutic efficacy in migraine treatment. Ubrogepant NPs were prepared using poly(lactic-co-glycolic acid) (PLGA), polyvinyl alcohol (PVA), and polysorbate 80, and characterized for particle size, entrapment efficiency, morphology, in vitro drug release, and pharmacokinetics using LC-MS. The optimized formulation exhibited a particle size of 183.7 ± 12.9 nm, entrapment efficiency of 80.2 ± 3.8%, polydispersity index (PDI) of 0.170 ± 0.02, and zeta potential of –11.2 ± 2.9 mV. The optimized NPs were incorporated into a thermo-reversible gel prepared by the cold technique using various polymers. The gel was evaluated for viscosity, appearance, pH, gelation, and spreadability, followed by in vitro and ex vivo studies for drug release and permeation. Pharmacokinetic and pharmacodynamic assessments were conducted in Sprague–Dawley rats. The NP-loaded intranasal gel demonstrated significantly improved permeability and drug retention in the nasal mucosa, with higher brain concentrations and faster absorption compared to intranasal NPs or oral Ubrogepant. Sustained brain levels translated into superior efficacy in the nitro-glycerine (NTG)-induced migraine model. Overall, the optimized intranasal gel formulation of Ubrogepant NPs exhibited rapid brain targeting, sustained drug delivery, and enhanced therapeutic outcomes, supporting its potential as an effective strategy for migraine management.

**Keywords**: Ubrogepant, Migraine, Nasal gel, PLGA

**PC-218**

**BRIDGING IN VITRO AND IN VIVO: A PERTURBED DISSOLUTION VESSEL APPROACH FOR ENTERIC-COATED DICLOFENAC SODIUM TABLETS**

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Dissolution testing remains a critical formulation assessment tool in pharmaceutical development, providing insights into drug release kinetics and their potential in vivo performance. Vessel design significantly influences dissolution outcomes, as hydrodynamic conditions directly affect disintegration and drug release. Although compendial dissolution vessels are standardized and widely accepted, they fail to replicate the complex gastric environment, where contractions and mucosal rugae strongly modulate dosage form behavior. This limitation often contributes to disparities between in vitro and in vivo results. In the present study, the compendial vessel of the dissolution apparatus (LABINDIA) was modified by lining its inner surface with aluminum foil engineered to mimic gastric rugae, thereby creating a perturbed hydrodynamic environment. Enteric-coated diclofenac sodium tablets(50 mg) were selected as the model formulation, and dissolution testing was conducted in both standard (DS-CV) and perturbed vessels (DS-PV) under identical conditions. Experiments were carried out at 37 °C and pH 7.5 phosphate buffer to simulate intestinal conditions. Samples were collected at 15, 30, 60, and 120 minutes, and drug release was quantified using a UV–VIS Double Beam Spectrophotometer (2202 TS). Results demonstrated distinct alterations in drug release profiles within the perturbed vessel compared to the conventional setup. Specifically, the perturbed vessel exhibited a lower absorbance rate at 274 nm than the compendial vessel, indicating reduced drug release under rugae-like hydrodynamic conditions. These findings emphasize the importance of physiologically relevant vessel modifications in enhancing the predictive power of dissolution studies. By bridging the gap between standardized in vitro methods and actual gastric physiology, such approaches provide a more accurate framework for evaluating oral drug delivery systems.

**Keywords**: Perturbed dissolution vessel, Gastric Rugae Simulation, Diclofenac Sodium

**PC-219**

**ENHANCING SOLUBILITY AND DISSOLUTION RATE: A FACTORIAL STUDY ON VALSARTAN, A BCS CLASS-II DRUG**

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The present study aimed to investigate the individual and combined effects of β-cyclodextrin (βCD) and surfactants (Kolliphor HS15 and Pluronic F127) on the solubility and dissolution of valsartan through a $2^2$




ISBN: 978-81-980623-8-3

factorial design, and to evaluate the feasibility of formulating rapidly dissolving tablets using drugCDsurfactant complexes. Solubility studies revealed that βCD (5 mM) enhanced valsartan solubility by 4.35-fold, while Kolliphor HS15 (2%) produced a remarkable 30.37-fold increase. The combination of βCD (5 mM) and Kolliphor HS15 (2%) demonstrated a synergistic effect, resulting in a 54.43-fold improvement in solubility. Similarly, dissolution studies confirmed that both individual and combined systems significantly enhanced valsartan release ($P < 0.01$). Drug–CD and DrugCDsurfactant complexes consistently showed faster and higher dissolution compared to pure valsartan, with βCD–Kolliphor HS15 and βCDPluronic F127 combinations providing maximum dissolution increases of 31.13% and 24.07%, respectively.Factorial ANOVA results confirmed that both the main and interaction effects of βCD and surfactants significantly contributed to improved dissolution ($P < 0.01$). To validate these findings in a dosage form, 40 mg valsartan tablets were prepared by wet granulation using Drug–CD, DrugKolliphor HS15, and DrugCDKolliphor HS15 systems. Among these, tablets containing DrugCDKolliphor HS15 complexes showed superior dissolution performance, which was retained during stability testing, indicating robustness of the formulation.Overall, the study demonstrates that combining βCD with Kolliphor HS15 is a promising strategy to enhance valsartan solubility, dissolution, and potentially bioavailability, enabling the development of fast-dissolving tablet formulations.

**Keywords:** Factorial experiments, β-Cyclodextrin, Surfactants, Solubility, Dissolution

**PC-220**

## DEVELOPMENT AND EVALUATION OF A NATURAL ANTIFUNGAL SOAP ENRICHED WITH MEDICINAL PLANT EXTRACTS

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The growing resistance of fungal pathogens and the adverse effects of synthetic antifungal agents highlight the need for safe, natural alternatives in personal hygiene products. This study focuses on the development of a natural antifungal soap formulated with plant extracts of Azadirachta indica (neem), Aegle marmelos (bael), Cuminum cyminum (cumin), and Foeniculum vulgare (fennel). These botanicals were selected for their well-documented antimicrobial, antifungal, antioxidant, and skin-soothing properties. The soap base was enriched with aqueous and ethanolic extracts, ensuring the preservation of phytoconstituents such as azadirachtin, marmelosin, cuminaldehyde, and anethole. Preliminary evaluations demonstrated significant antifungal activity against common dermatophytes and Candida species, along with favourable physicochemical characteristics including pH balance, stability, and lathering capacity. The synergistic action of these extracts not only inhibits fungal growth but also promotes skin health by reducing inflammation and preventing secondary infections. The formulated soap represents a sustainable, plant-based, and skin-friendly hygiene product that can serve as a natural alternative to conventional antifungal soaps.

**Keywords:** Azadirachta indica, antifungal soap, antifungal agents, antioxidant

**PC-221**

## PHARMACEUTICAL CHARACTERIZATION OF TOPICAL ERYTHROMYCIN NANOEMULGEL FOR ACNE VULGARIS

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The main objective of the investigation is to formulate nanoemulsion in gel formulation of Erythromycin in order to overcome the drawbacks associated with the other dosage forms and in order to improve the overall efficacy of the drug. The present work aimed to develop nanoemulgel of Erythromycin for improving its efficacy, stability, and permeability for the treatment of Acne Vulgaris. The aim of this work was to develop an emulgel formulation of Erythromycin, a hydrophobic drug, using Carbopol 934 as gelling agent and Olive oil as penetration enhancer. The influence of gelling agent and penetration enhancers was investigated. The rheological studies, In vitro release, stability studies, thermodynamic stability studies of the prepared nanoemulgels were also evaluated. The prepared nanoemulgels were placed in tightly closed glass vials and stored at ambient temperature. These drug-loaded formulations were subjected to accelerated, thermodynamic stability studies like centrifugation stress, heating cooling stress and freeze-thawing stress, appearance, percent transmittance, refractive index, electrical conductivity. In conclusion, nanoemulsion of Erythromycin gel was developed to a satisfactory level in terms of physical stability tests, appearance, refractive index, Electrical conductivity, lower surfactant concentration. The present study endorsed nanoemulgel of erythromycin to be a promising choice over conventional formulations for the treatment of Acne Vulgaris.

**Keywords:** Nanoemulgel, Erythromycin, Acne Vulgaris, Carbopol 934.

**PC-222**

## FORMULATION AND DEVELOPMENT OF TAPINAROF LOADED TRANSETHOSOMAL GEL FOR TREATMENT IN PLAQUE PSORIASIS

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Objective: This study aimed to develop and optimize tapinarof-loaded transethosomes using Box-Behnken design for improved drug delivery in plaque psoriasis treatment. Methods: Transethosomes were prepared using thin film hydration method followed by probe sonication. Box-Behnken design with 17 experimental runs was employed to optimize formulation parameters. Independent variables included Ceramide NP concentration (2-4% w/v), sodium deoxycholate concentration (0.5-1.5% w/v), and ethanol concentration (10-20% v/v). Dependent variables were particle size and entrapment efficiency. Formulations were characterized for particle size, polydispersity index, zeta potential, and entrapment efficiency using dynamic light scattering and UV-spectrophotometry. Results: The optimized transethosomal formulations demonstrated particle sizes ranging from 112-287 nm with polydispersity index values below 0.3, indicating uniform size distribution. Zeta potential measurements showed values between -32 to -45 mV, confirming excellent physical stability. Entrapment efficiency varied from 72.4% to 89.6% across different formulations. The Box-Behnken model revealed that ceramide NP concentration significantly influenced particle size, while ethanol concentration primarily affected entrapment efficiency. The optimized formulation achieved a particle size of 125±3.2 nm with 87.3±2.1% entrapment efficiency. Conclusion: The developed tapinarof-loaded transethosomes represent a promising delivery system for enhanced topical treatment of plaque psoriasis. The Box-Behnken design successfully optimized formulation parameters, resulting in stable nano-vesicular carriers suitable for transdermal drug delivery in psoriasis management.

**Keywords:** Tapinarof, transethosomes, Box-Behnken design, plaque psoriasis, nano-vesicles

**PC-223**

## HERBAL NANOPARTICLES FOR WOUND HEALING: ADVANCES IN DEVELOPMENT, CHARACTERIZATION, AND THERAPEUTIC APPLICATIONS

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Wound healing is a complex and dynamic process involving hemostasis, inflammation, proliferation, and tissue remodeling. Conventional therapies often face limitations such as poor bioavailability, rapid degradation of active agents, and risk of infection. Herbal medicines, enriched with phytochemicals possessing anti-inflammatory, antioxidant, antimicrobial, and angiogenic properties, have shown remarkable potential in wound management. However, their therapeutic efficacy is frequently hampered by poor solubility, instability, and limited permeability. Nanotechnology-based approaches offer promising solutions to these challenges by enabling the development of herbal nanoparticles with improved stability, controlled release, and enhanced skin penetration. This review highlights recent advances in the formulation and characterization of herbal nanoparticles for wound




ISBN: 978-81-980623-8-3

healing applications. Key aspects include preparation techniques, physicochemical characterization, and evaluation of biological activity through in vitro and in vivo studies. Furthermore, therapeutic mechanisms such as modulation of oxidative stress, stimulation of collagen synthesis, and acceleration of epithelialization are discussed. The article also outlines emerging trends, clinical translation challenges, and future perspectives in integrating herbal nanomedicine into wound care. Overall, herbal nanoparticles represent a novel and effective strategy to overcome the shortcomings of conventional wound healing therapies.

**Keywords**: Herbal Nanoparticles, Nanomedicine, Drug Delivery, Antioxidant, Skin Repair, Tissue Regeneration, Anti-Inflammatory.

**PC-224**

## SYNTHESIS, CHARACTERIZATION, AND ANTIBACTERIAL EVALUATION OF TRIMETHOPRIM ZINC OXIDE NANOPARTICLES FOR ENHANCED ACTIVITY AGAINST DRUG-RESISTANT ESCHERICHIA COLI AND BIOFILM-ASSOCIATED UTIS

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The emergence of antibiotic-resistant forms of Escherichia coli, the primary cause of urinary tract infections (UTIs), presents an increasing treatment challenge. A promising strategy to improve the effectiveness and distribution of antibiotics is nanotechnology. In order to increase medication solubility and therapeutic potential, trimethoprim-loaded zinc oxide nanoparticles (TZnONPs) were effectively created in this work employing the solvent evaporation technique. With a particle size of 418.61 ± 7.66 nm, a zeta potential of -25.47 ± 0.07 mV, a large drug content (93.67 ± 1.05 mg), and an exceptional entrapment efficiency (96.49 ± 0.81%), TZnONPs-1 stood out as the best formulation among the others. The lack of chemical interactions between the medication and excipients was confirmed by FTIR and DSC characterization, whereas XRD showed partial amorphization, which improved solubility. SEM investigation revealed spherically distributed nanoparticles.In vitro drug release experiments showed that it outperformed pure trimethoprim (29.48 ± 0.81%) by having a sustained release profile of 93.49 ± 0.81% over 360 minutes. With a greater zone of inhibition (3.3 ± 0.37 cm) against E. coli than ciprofloxacin (2.2 ± 0.47 cm), TZnONPs-1 also demonstrated improved antibacterial activity. ZnO-NPs' strong antibiofilm action on urinary catheter surfaces was further validated by biofilm inhibition tests, which showed a substantial decrease in both biofilm mass and viable bacterial count. The biocompatibility of ZnO-NPs was confirmed by the hemolysis assay, which demonstrated a protective role against e. coli-induced RBC lysis and no hemolytic effect. This study identifies TZnONPs-1 as a potential nanocarrier system for the efficient treatment of UTIs, particularly those caused by biofilm-associated infections and drug-resistant microorganisms.

**Keywords:** Urinary tract infection, Trimethoprim, Zinc oxide nanoparticles, Antibacterial activity, Escherichia coli

**PC-225**

## DEVELOPMENT AND CHARACTERIZATION OF LULICONAZOLE NANOPARTICLE LOADED NAIL LACQUER FOR TREATMENT OF ONYCHOMYCOSIS

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The focus of this work is in developing and assessing a luliconazole-containing nanoparticle embedded nail lacquer for treating onychomycosis. The Preformulation studies conducted using FTIR and UV analysis confirmed compatibility of the drug and excipients. Polymeric nanoparticles were synthesized using the solvent evaporation method and optimization was carried out using a $3^2$ factorial design where polymer and surfactant concentrations were independent factors and particle size, entrapment efficiency, and polydispersity index (PDI) were the response variables. The optimized formula provided a particle size of 120.12 nm, zeta potential 28 mV, PDI of 0.137, and an entrapment efficiency of 85%. The nanoparticles were incorporated into a lacquer and to evaluate the formulation, the following were tested: drying time, water resistance, viscosity, non-volatile content, and in vitro drug release. One month stability studies were carried out to assure the formulation was intact. The results suggest that the nanoparticulate nail lacquer is a stable and user-friendly formulation which allows for sustained transungual drug delivery and has enhanced antifungal efficacy for the treatment of onychomycosis.

**Keywords:** Onychomycosis, nanoparticles, luliconazole, transungual, nail lacquer

**PC-226**

## A COMBINATION OF TREATED EGG WASTE AND ALLANTOIN FOR MANAGEMENT OF HYPERPIGMENTATION: QBD APPROACH FOR FORMULATION DEVELOPMENT

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This study explored the formulation and evaluation of a gel-based treatment for hyperpigmentation, with a focus on inhibiting Tyrosinase (TYR) and its related proteins, TYRP1 and TYRP2, which are involved in melanin biosynthesis. In-silico docking studies were performed using the Pyrx virtual screening tool to identify potential drug candidates with high binding affinity for the target proteins. The selected compounds were analysed for their ability to inhibit melanin production, a key factor in hyperpigmentation disorders. Preformulation studies included developing calibration curves, FTIR compatibility analysis, and extracting bioactive compounds from eggshell membrane (ESM) via enzymatic hydrolysis. These results guided the formulation of a gel containing 1% Allantoin and 10% ESM, stabilized with Carbopol and other excipients. To optimize the gel's formulation, response surface methodology (RSM) based on a central composite design (CCD) was used to adjust parameters such as polymer concentration, viscosity modifier, and temperature. The optimized gel demonstrated desirable characteristics, including optimal viscosity, drug permeation, and pH. Evaluation tests, including thermodynamic stability studies, viscosity, spreadability, and in-vitro permeation using Franz diffusion cells, showed that the gel was stable under freeze-thaw cycles and exhibited favorable drug release profiles. Further characterization indicated good texture properties such as cohesiveness and adhesiveness, essential for topical application. Cell viability assays using B16-F10 murine melanoma cells showed promising effects on cell growth inhibition. Overall, the developed gel formulation shows potential as an effective treatment for hyperpigmentation, addressing conditions like melasma and age spots.

**Keywords:** Hyperpigmentation, melanin, tyrosinase inhibition, allantoin, egg shell membrane.

**PC-227**

## FORMULATION AND EVALUATION OF LINAGLIPTINE FAST DISSOLVING BUCCAL FILMS USING DESIGN EXPERT

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Linagliptin is used for treating type-II diabetes. It is a BCS-III drug that has high solubility and low permeability. The aim of the present study is to formulate and evaluate buccal films to release the drug effectively and efficiently, avoid first pass metabolism, improved absorption and improve patience compliance and optimization of Buccal films prepared by solvent casting method employing DOE approach. Design of experiments (DOE) was used, taking HPMC, SSG and CCS as independent variables, disintegration time and percentage drug released as dependent variables (responses). Seventeen runs were designed by DOE software. The films were prepared by solvent casting method. All the films were evaluated for film thickness, % drug content, moisture loss, folding endurance, disintegration time and %drug released. Eventually after inserting the response data in DOE table the software suggested an optimized formulation was given by the software which is prepared and evaluated.

**Keywords**: linagliptine, buccal films, solvent casting, disintegration time, design expert.

**PC-228**




ISBN: 978-81-980623-8-3

**PREPARATION AND CHARACTERIZATION OF DRUG-LOADED MESOPOROUS SILICA NANOPARTICLES TO TREAT CANCER-INDUCED EMESIS IN WISTAR ALBINO RATS**

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The present research focused on the preparation and characterization of mesoporous silica nanoparticles (MSNs) loaded with ondansetron hydrochloride (OND.HCl) for managing chemotherapy-induced nausea and vomiting. MSNs were prepared via the solvent immersion (Disulpho method) at varying drug-to-carrier ratios, stirring speed, and time. Preliminary studies included drug identification and solubility analysis using UV and FTIR, confirming drug compatibility with MSNs. Physicochemical characterizations involved particle size, zeta potential, SEM, and BET analysis. In vitro release was evaluated in pH 1.2 medium, while In vivo antiemetic efficacy was assessed in rats. Among formulations, MCM-41 (F1) and SBA-15 (F2) demonstrated the highest loading efficiencies (97.0±2.19% and 95.7±1.21%, respectively). The loaded MSNs showed mean particle sizes ≤ 725.5 nm with spherical morphology confirmed by SEM (≤ 450–570 nm). BET analysis revealed high surface areas (999.43–1472.22 $m^2/g$), pore volumes (1.073–1.141 cc/g), and pore sizes (2.495–4.827 nm). In vivo results confirmed superior antiemetic activity in rats treated with drug-loaded MSNs. Stability testing demonstrated satisfactory performance at 40±2°C/75±5% RH for 3 months. Overall, OND.HCl-loaded MSNs were successfully developed with high drug loading, controlled release, better stability, and enhanced antiemetic efficacy using minimal excipients.

**Keywords:** Mesoporous silica nanoparticles, Ondansetron HCl, MCM-41, SBA-15, Cancer

**PC-229**

**FORMULATION AND EVALUATION OF NANOSTRUCTURED LIPID CARRIER SYSTEM FOR BRAIN DRUG DELIVERY**

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Alzheimer's disease is a progressive, incurable neurodegenerative disorder marked by the degeneration of nerve cells including tau protein-based neurofibrillary tangles and amyloid-beta (Aβ) plaques. The prevalence is expected to reach 131.5 million by 2050, with cases steadily increasing since 2015. Although the precise cause remains unclear, multiple pathological factors contribute to its onset and progression. The present research focuses on the development of Donepezil-loaded Nano Lipid Carrier (NLC) and in vitro evaluation. NLCs were prepared by high-pressure homogenization followed by bath sonication, using varying concentrations of GMS (100–200 mg w/v), oleic acid (2–4 ml v/v), and Poloxamer (100–200 mg w/v). Preformulation studies, including FT-IR for drug–excipient compatibility, were performed. Characterization involved, particle size, PDI, zeta potential, entrapment efficiency (EE), drug loading and SEM. In vitro drug release, cell line studies, and stability assessments were also conducted. FT-IR confirmed drug–excipient compatibility. SEM revealed spherical particles with morphology. Optimized batch (F7) showed particle size 272 nm, PDI 0.493, zeta potential –25.2 mV, entrapment efficiency 72.60%, and drug loading 23.3±2.6%. In vitro studies for 48 h demonstrated and found 81.70% cumulative release, following sustained kinetics ($R^2$ = 0.9163). Cell line studies indicated higher cell viability for NLC formulation compared to plain drug solution. Donepezil-loaded NLCs demonstrated suitable particle size, stability, and sustained release, making them promising for brain delivery via the nasal route in Alzheimer's management.

**Keywords:** Alzheimer's, Nano lipid carriers, GMS, Donepezil HCl, High-pressure homogenization.

**PC-230**

**FORMULATION AND ANTIMICROBIAL INVESTIGATION OF IXORA COCCINEA PHYTOSOME-LOADED TOPICAL GEL**

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Various species of Ixora are used in Ayurveda, Folk, Siddha, and Unani systems of medicine for treating dysentery, healing ulcers, and exhibiting anti-tumor activity. The aim of the present study was to prepare a phytosome-loaded topical gel from the ethyl acetate fraction of Ixora coccinea leaves and to evaluate its in vitro antimicrobial efficacy.Phytosomes were prepared using the plant extract (ICLEA) with different ratios of phosphatidylcholine (1:0.5, 1:1.0, 1:1.5; PLE1–PLE3) by the solvent evaporation method. The phytosomes were evaluated for particle size, SEM analysis, IR, drug content, and drug entrapment efficiency. The optimized phytosome-loaded extract (PLE1) showed a particle size of 245.30 ± 0.01 nm, and vesicle formation was confirmed by SEM analysis.The optimized phytosome (PLE1) was incorporated into carbopol-based topical gel formulations (PLTG2–PLTG4). Additionally, a conventional extract-loaded topical gel (ELTG) was prepared and compared with the phytosome-loaded gels. The formulations were evaluated for parameters such as pH, homogeneity, grittiness, spreadability, viscosity, gel strength, drug content, and in vitro diffusion studies.Among the formulations, PLTG2 showed optimal evaluation parameters and superior drug release performance. Stability studies indicated that the optimized topical gel remained stable, with no significant changes in any parameter when stored at 25 °C ± 2 °C/60 % RH ± 5 % RH and 40 °C ± 2 °C/75 % RH ± 5 % RH. Antimicrobial studies demonstrated that PLTG2 produced a comparable zone of inhibition with standard drugs. The study confirms that phytosome-loaded topical gel of Ixora coccinea (PLTG2) exhibits better physicochemical properties, sustained drug release, stability, and promising antimicrobial activity compared to conventional extract-loaded gels.

**Keywords**: Phytosome,Ixora, Global Health, Health Care.

**PC-231**

**FORMULATION AND EVALUATION OF MICROSPHERES ENCAPSULATING ZIDOVUDINE BY IONIC GELATION AND SOLVENT EVAPORATION TECHNIQUES**

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The aim of the present study is an attempt to formulate and evaluate microspheres drug delivery of Zidovudine by using Chitosan and Eudragit L100 as a polymer for potentially treating HIV and AIDS related conditions. The formulation F1 to F4 which were prepared by ionic gelation and the formulation F5 to F8 were prepared by solvent evaporation methods by varying the concentration of Chitosan and Eudragit L100 polymer ratios which were significantly affected the in vitro drug release from the prepared formulations. The in vitro drug release studies were carried out by using phosphate buffer pH 7.4. Drug and physical mixture were characterised by FTIR, the result of IR study showed that no interaction between drug and polymers and other formulation parameters of formulated microspheres are evaluated which showed better results. It was concluded that the formed microspheres showed prolonged in vitro drug release. It might contribute better patient compliance while reduce frequency of dosing and by acceptable sustained-release dosage form Zidovudine microspheres promote a fast and effective against the AIDS related conditions. From the, in vitro drug release studies and release kinetics studies it can be concluded that the formulation F4 prepared by ionic gelation method has better potential of sustaining drug release.

**Keywords:** Zidovudine, microspheres, controlled drug delivery, Ionic gelation technique, solvent evaporation method.

**PC-232**

**CHRONO FLOAT: DESIGN AND DEVELOPMENT OF A FLOATING PULSATILE RELEASE SYSTEM FOR DOMPERIDONE**

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Nausea and vomiting frequently accompany gastrointestinal disorders and various treatments, detracting from patient comfort and adherence.




ISBN: 978-81-980623-8-3

Gastroretentive pulsatile drug delivery systems (GRPDDS) time-controlled release within the stomach, optimizing absorption for drugs with limited absorption windows such as domperidone. To formulate and refine a floating pulsatile release tablet (FPRT) of domperidone that remains buoyant for at least 11 hours, incorporates a 4-hour lag phase, and subsequently discharges the full dose rapidly. Domperidone cores were produced by wet granulation with crospovidone, lactose, citric acid, and sodium bicarbonate. Press-coating employed HPMC K100M, HPMC K4M, and ethyl cellulose combined with sodium bicarbonate to impart floatation and regulate pulsatile release. Five formulations (F1–F5) were optimized using a Design of Experiments framework to target specific lag and buoyancy durations. Evaluations included flow behavior, weight uniformity, hardness, friability, floating lag time, buoyancy duration, swelling index, and in vitro dissolution. FT-IR spectroscopy assessed drug–excipient compatibility, and ANOVA determined the impact of polymer ratios. All batches conformed to pharmacopeial criteria. Formulation F4 demonstrated superior performance: it floated within 4 minutes, sustained buoyancy for 11 hours, exhibited a swelling index of 90.4%, and showed a pulsatile release profile—no drug release during the 4-hour lag followed by complete release within 2 hours. Polymer composition significantly influenced release kinetics. The optimized FPRT (F4) achieved precise lag timing, prolonged gastric retention, and swift post-lag drug delivery, presenting a promising chronotherapeutic approach to enhance domperidone's efficacy and patient compliance.

**Keywords**: Domperidone; Floating pulsatile release; Gastroretentive delivery; Lag time.

**PC-233**

## FORMULATION AND EVALUATION OF METOCLOPRAMIDE CHEWING GUM TO TREAT MOTION SICKNESS

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A medicated chewing gum containing Metoclopramide hydrochloride was developed for the treatment of motion sickness to provide rapid onset of action and improve patient compliance. The formulations were prepared by the conventional method using gum base, glycerine/sorbitol, talc, sugar, colouring and flavouring agents. They were evaluated for physical appearance, weight variation, drug content, stickiness, texture, in vitro drug release, sensory evaluation, and stability. The chewing gums exhibited good organoleptic properties including chewability, taste, softness, and mouthfeel. Among the formulations, F2 showed promising results with 86.94% drug release within 15 minutes, indicating potential for enhanced bioavailability by reducing onset time. Drug release was found to be influenced by formulation factors such as gum base selection and plasticizer proportion. Stability testing conducted for three months at 40 ± 2°C and 75 ± 5% RH confirmed no significant changes in physicochemical characteristics or release profile of F2. Thus, medicated chewing gum of metoclopramide hydrochloride proved effective, stable, and patient-friendly for motion sickness management.

**Keywords:** Medicated chewing gum, Metoclopramide hydrochloride, Motion sickness, Conventional method

**PC-234**

## FORMULATION AND DEVELOPMENT OF IMMEDIATE-RELEASE MICROENCAPSULATED VITAMIN B12 LOZENGES FOR DEFICIENCY MANAGEMENT AND WELLNESS SUPPORT

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Vitamin B12 deficiency is an emerging public health issue, and evidence indicates that 50–60% of population, predominantly women of India have below optimal levels. This research involves the formulation of microencapsulated Vitamin B12 lozenges by solvent evaporation technique, each providing 250 µg of Vitamin B12. Microencapsulation is employed to safeguard the vitamin from premature breakdown and enhance its bioavailability, thus helping to maintain and sustain sufficient Vitamin B12 levels in the body. Formulation also features a natural disintegrating agent for immediate release, an antioxidant botanical source for immunological support, a phytonutrient-rich botanical that supplies necessary micronutrients, and a metabolism supporting botanical to maintain digestive health. A natural sweetener, colour and flavour, make the lozenges palatable and improve patient compliance. The product is not only vegetarian but also vegan friendly and classified as a nutraceutical. Ongoing assessment includes hardness, friability, disintegration time, rate of dissolution, and uniformity of content. Preliminary results indicate that the lozenges disintegrate rapidly in the oral cavity, enabling rapid release of Vitamin B12 for efficient absorption. Additional research, including stability testing, antioxidant retention testing, bioavailability modeling, and sensory testing, is underway to ascertain product consistency, long term safety, and user acceptability. This method offers a handy, consumer-oriented solution to Vitamin B12 deficiency. By utilizing advanced microencapsulation technology combined with well chosen botanicals, the lozenges seek to supply a stable, safe, and efficient nutraceutical that supports Vitamin B12 levels and nutritional wellbeing.

**Keywords:** Vitamin B12 deficiency, Lozenges, Microencapsulation, solvent evaporation technique, Nutraceutical.

**PC-235**

## MUCOADHESIVE GASTRORETENTIVE FLOATING MICROSPHERES OF LEVOFLOXACIN: A NOVEL APPROACH TO PROLONGED ANTIBIOTIC THERAPY

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Oral drug delivery systems face significant challenges in achieving controlled release, particularly in the gastrointestinal tract where drug absorption can be highly variable and unpredictable. Floating microspheres represent an innovative approach to enhancement of gastric retention and improve bioavailability of therapeutic agents, addressing the limitations of conventional solid oral dosage forms. This study aimed to develop and evaluate levofloxacin-loaded floating microspheres using various polymeric combinations to achieve sustained drug release and enhanced gastric retention for improved therapeutic efficacy. Floating microspheres were prepared using the solvent evaporation method with different polymer combinations including HPMC K4M, HPMC K100M, sodium alginate, and sodium carboxymethyl cellulose. Ten formulations (F1-F10) were developed and evaluated for micromeritic properties, drug entrapment efficiency, buoyancy studies, in-vitro dissolution, particle size analysis, and morphological characterization using scanning electron microscopy. Formulation F7 demonstrated optimal performance with the highest percentage yield (90.12%) and drug entrapment efficiency (88.96%). The microspheres exhibited excellent buoyancy properties with sustained drug release over 12 hours. Particle size analysis revealed an average diameter of 60±3.8µm for F7. FTIR studies confirmed drug-polymer compatibility without chemical interactions. Stability studies showed minimal variation in drug release under various storage conditions. The solvent evaporation method successfully produced levofloxacin-loaded floating microspheres with sustained release capabilities. Formulation F7 emerged as the optimal formulation, demonstrating superior pharmaceutical properties and promising potential for enhanced antibiotic therapy through improved gastric retention and controlled drug delivery.

**Keywords:** Floating microspheres, Levofloxacin, Solvent evaporation.

**PC-236**

## FORMULATION AND EVALUATION OF DICLOFENAC SODIUM LOADED TRANSDERMAL PATCH USING CHITOSAN DERIVATIVE

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Transdermal patches represent a non-invasive dosage form that delivers medication directly into the bloodstream, bypassing the significant first-pass metabolism experienced by orally administered drugs. The system was designed as a multi-layered matrix patch to provide a controlled release of the medication. Objective of study to synthesize N- palmitoyl chitosan used as permeation enhancer with controlled released for




ISBN: 978-81-980623-8-3

diclofenac transdermal patch. N-palmitoyl chitosan was prepared by using palmitoyl chloride and characterized by FTIR, DSC and XRD. Diclofenac sod was loaded in macroparticle using N- palmitoyl chitosan and TPP using ionotropic gelation method and was evaluated for drug loading (51.40%). The patches were meticulously prepared using a solvent evaporation technique. This process involved creating a backing membrane with 2% (w/v) polyvinyl alcohol (PVA), film-forming polymers such as HPMC, PVP, and ethyl cellulose, 15% dibutyl phthalate as a plasticizer with macroparticles of diclofenac sod equivalent to 15 mg. Prepared patches were demonstrated excellent physical characteristics, maintaining a uniform shape and exhibiting 100% flatness without any curling or stickiness. The patches were smooth, slightly opaque, and showed good flexibility and mechanical strength. The average drug contents were found to be 0.590 mg/cm² for patch of chitosan macroparticles 1.529 mg/cm² for patch of N-palmitoyl chitosan macroparticles. While In-vitro released study revealed plane diclofenac sod patch released 99.33%, chitosan macroparticle containing patch released 67.06% and N-palmitoyl chitosan macroparticle patch released 45.94% diclofenac within 1 hr. Permeation study revealed about 43.48% diclofenac sod able to penetrated by N-palmitoyl chitosan macroparticles patch while 29.24% by chitosan macroparticle patch. In conclusion, synthesize N-palmitoyl chitosan was evaluated as a promising material for controlled delivery also permeation enhancer for diclofenac sodium in transdermal patch.

**Keywords** - N-palmitoyl Chitosan, Diclofenac Sodium, Controlled Release, Permeation Enhancer

**PC-237**

## FORMULATION AND EVALUATION OF MESALAMINE IN-SITU GEL TABLET USING EXTRACTED STARCH AND PECTIN

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In Situ gel forming tablet represents an innovative approach in oral drug delivery, enhancing the solubility and controlled release of medications. The objectives was to extract, characterize, and evaluated of natural polymers jackfruit seed extracted starch and jackfruit core extracted pectin as In Situ gelling agents and its application in the formulation of In Situ gel of mesalamine oral tablet for targeting colonic drug delivery. These polymers were selected for their biodegradability, mucoadhesive potential, and ability to undergo sol-to-gel transition at physiological pH. Extraction of starch was carried out using aqueous method while extraction of pectin was carried out using dried powder and distilled water and filtered through muslin cloth and characterized using FTIR, confirming the presence of functional groups and pharmacognostic study reveals the presence of chemical constituents (starch and pectin), swelling index study confirms the gelling nature of extracted starch and pectin which confirmed its application as in situ gelling material. A total of four batches of mesalamine in situ gel tablets were formulated by direct compression using the extracted starch and pectin along with xanthan gum, HPMC, microcrystalline cellulose, magnesium stearate and talc. To provide enteric protection and achieve targeted drug release, the tablets were coated with Eudragit L100, ensuring that drug release occurred in response to the intestinal pH. Enteric coated mesalamine tablets were evaluated which exhibited superior characteristic including acceptable thickness(5.68mm), hardness (7.0 kg/cm2), weight variation(784.1±39.07mg), swelling index (589.85% at 120 mins) which shows effective pH-responsive gelation at pH 6.8. The disintegration studies in 0.1N HCl showed the acid uptake of 5.44% that fulfil the criteria of enteric coating. In- Vitro drug release studies were carried out using rotating paddle dissolution test apparatus at 6.8 pH phosphate buffer shows 91.91% drug release in 6hours which confirmed that the formulation resist disintegration in gastric conditions and formed a stable gel matrix in the intestinal environment, enabling sustained drug release. FTIR studies confirmed no significant chemical interactions between mesalamine and the excipients, establishing formulation stability and compatibility. In conclusion, the study successfully demonstrates the potential of jackfruit seed extracted starch and core extracted pectin as effective, eco-friendly In Situ gelling agents.

**Keywords**- Jackfruit, Starch, Pectin, In Situ, Mesalamine, Controlled Release.

**PC-238**

## DESIGN AND OPTIMIZATION OF A GASTRO-RETENTIVE MODIFIED RELEASE FORMULATION OF CIMETIDINE USING BIODEGRADABLE POLYMER

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The objective of this study was to design and optimize Cimetidine-loaded sodium alginate beads as an oral multiparticulate formulation exhibiting floating and mucoadhesive characteristics. Beads were prepared using the ionotropic gelation method with sodium alginate as the polymer and sodium bicarbonate as the gas-generating floating agent. A $3^2$ full factorial design was applied to investigate the effects of sodium alginate ($X_1$) and sodium bicarbonate ($X_2$) on formulation responses: drug entrapment efficiency ($Y_1$, %DEE), drug release at 720 min ($Y_2$, $Q_{720}$ min), floating lag time ($Y_3$, FLT), total floating time ($Y_4$, TFT), and percentage mucoadhesion ($Y_5$).The optimized batch, containing 1133 mg of sodium alginate and 217 mg of sodium bicarbonate, demonstrated high %DEE (86.81 ± 1.81%), minimal FLT (135.33 ± 2.52 sec), extended floating duration (10.31 ± 0.18 hrs), and sustained drug release (~96.79 ± 0.46% at 12 hrs). Drug release followed the Korsmeyer-Peppas model, with a release exponent n = 0.6653, indicating non-Fickian (anomalous) transport, suggestive of a mechanism involving both diffusion and polymer matrix relaxation. FTIR analysis confirmed no significant chemical interactions between Cimetidine and the formulation excipients. SEM images revealed spherical, rough-surfaced beads with localized drug crystals, potentially contributing to an initial burst release. The formulation demonstrated good short-term stability under both ambient and refrigerated conditions. Overall, the optimized formulation provides a promising platform for improved gastric retention and sustained delivery of Cimetidine, potentially reducing dosing frequency and enhancing therapeutic outcomes.

**Keywords:** Cimetidine, gastro-retentive drug delivery system (GRDDS), beads, ionotropic gelation, multiparticulate drug delivery, floating-mucoadhesive systems, $3^2$ factorial design optimization, Korsmeyer-Peppas kinetic model.

**PC-239**

## DEVELOPMENT AND EVALUATION OF CHITOSAN/SILK/CARBONATED HYDROXYAPATITE SCAFFOLDS FOR BONE REGENERATING APPLICATION

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Bone defects caused by trauma, tumors, congenital anomalies present challenges in clinical management. Traditional treatments like autografts, allografts, and xenografts face limitations, including donor site morbidity, immune rejection, and poor integration. Recent advances in bone tissue engineering offer promising alternatives by leveraging biomaterials, growth factors, and cells to create biocompatible scaffolds that mimic natural bone structures. Study focuses on development and evaluation of composite scaffolds made from chitosan, silk fibroin, and carbonated hydroxyapatite (CHA) for regenerative bone applications. Scaffolds fabricated using freeze-drying techniques and characterized for porosity, swelling, mechanical properties, degradation rates. Analytical methods, including FTIR, DSC, XRD, confirmed structural integrity and material compatibility. In vitro studies demonstrated excellent biocompatibility, with enhanced cell proliferation and angiogenesis observed in scaffolds containing growth factors. Biodegradation tests indicated controlled degradation rates suitable for tissue regeneration. The results highlight synergistic effects of chitosan, silk and CHA in creating a scaffold that supports cell growth, promotes vascularization, and facilitates bone tissue regeneration. Study provides foundation for advancing bone graft substitutes, offering scalable and effective solution for treating critical-sized bone defects.

**Key Words:** scaffolds, chitosan, silk fibroin, carbonated hydroxyapatite

**PC-240**




ISBN: 978-81-980623-8-3

**FORMULATION, CHARACTERIZATION AND IN-VITRO COMPARISON STUDIES OF CHLORZOXAZONE MICROSPHERES BY USING NATURAL AND SYNTHETIC POLYMERS**

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Formulating, analysing, and comparing chlorzoxazone microsphere in vitro dissolution data was the goal of this study. One treatment for spasticity is chlorzoxazone, a skeletal muscle relaxant. Chlorzoxazone has a half-life of one to two hours. For this kind of medicinal candidate, microspheres work well as a drug delivery mechanism. Because of the need to develop an appropriate dosage form that allows for both easy dosing and prolonged drug release, the ionic gelation process was used to make microspheres. To ensure that the FT-IR approach would not be used to detect drug-polymer interactions, pre-formulation experiments were conducted. In this investigation, sodium alginate and ethyl cellulose were used as natural and synthetic polymers, respectively. Surface morphology, micromeritics characteristics, entrapment efficiency, and in vitro drug release were evaluated for all four batches of microspheres (E1–E4 and S1–S4). The best formulation for the preparation of a novel chlorzoxazone drug delivery system was determined to be microspheres made of ethyl cellulose (E3) polymer. These microspheres exhibited the highest drug content (85.7%), entrapment efficiency (91.5%), percentage yield (77.3%), and in vitro drug release (88.55%) for 16 hours.

**Keywords:** Chlorzoxazone, Skeletal muscle relaxant, Ethyl cellulose, Sodium alginate.

**PC-241**

**DUAL-DRUG ELECTROSPUN NANOFIBER TRANSDERMAL SYSTEM FOR ENHANCED BIOAVAILABILITY IN TYPE 2 DIABETES MELLITUS**

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Type 2 Diabetes Mellitus (T2DM) is a chronic metabolic disorder often requiring combination therapy with Metformin hydrochloride (MH) and Sitagliptin phosphate (SP). However, oral administration of this combination is associated with gastrointestinal complications, poor patient compliance, and reduced bioavailability. In this study, a dual-drug electrospun nanofiber (NF)-based transdermal delivery system was developed for the first time to address these limitations. Electrospun nanofibers were fabricated using individual and blended polymers to optimize fiber morphology, mechanical strength, and drug release behavior. Characterization by scanning electron microscopy confirmed bead-free morphology with uniform distribution, while Fourier-transform infrared spectroscopy and differential scanning calorimetry verified drug–polymer compatibility and amorphous drug dispersion. The optimized nanofibers exhibited tensile strength of 2.4 ± 0.2 MPa, ensuring mechanical stability for transdermal application. In vitro diffusion studies using Franz cells showed sustained release of approximately 80% MH and 75% SP over 24 hours. Pharmacokinetic evaluation in animal models demonstrated enhanced systemic absorption, with a 1.8-fold increase in relative bioavailability compared to oral dosing ($p < 0.05$), along with prolonged plasma drug levels and reduced fluctuations. These findings indicate that the electrospun dual-drug nanofiber system enables controlled release, improves bioavailability, and minimizes gastrointestinal side effects, offering a promising strategy for long-term T2DM therapy. This innovative formulation has potential to enhance therapeutic efficacy and patient adherence through a convenient and effective transdermal drug delivery platform.

**Keywords:** Electrospun nanofibers, Transdermal delivery, Metformin hydrochloride, Sitagliptin phosphate, Type 2 Diabetes Mellitus

**PC-242**

**INTRANASAL CHITOSAN NANOPARTICLES OF VERICIGUAT FOR ENHANCED BRAIN DELIVERY IN ALZHEIMER'S DISEASE**

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Alzheimer's disease (AD) is a progressive neurodegenerative disorder associated with memory impairment and cognitive decline, with limited therapeutic options. Vericiguat, a soluble guanylate cyclase (sGC) stimulator approved for cardiovascular disorders, has shown potential to improve neuronal signaling through the cyclic guanosine monophosphate (cGMP) pathway. However, poor brain bioavailability through systemic administration restricts its therapeutic application in AD. To address this challenge, Vericiguat-loaded chitosan nanoparticles were developed for intranasal delivery to bypass the blood–brain barrier and enhance brain targeting. Nanoparticles were prepared by spray-drying and evaluated for particle size, surface charge, and encapsulation efficiency. The optimized formulation exhibited a mean particle size of 155 ± 8 nm, zeta potential of +26.4 mV, and encapsulation efficiency of 82.7%, demonstrating stability and mucoadhesive properties favorable for nasal administration. Molecular docking confirmed strong binding affinity of Vericiguat with the sGC receptor, supporting its therapeutic relevance in AD. In vivo studies in AD-induced rodent models using behavioral tests such as novel object recognition and Morris water maze showed significant improvements in learning and memory in animals treated with intranasal Vericiguat nanoparticles compared to free drug ($p < 0.01$). These findings confirmed enhanced brain uptake and superior therapeutic efficacy. Overall, intranasal chitosan nanoparticles of Vericiguat represent a promising drug delivery approach for improving cognitive outcomes in AD and highlight the potential of repurposing cardiovascular drugs for neurodegenerative disorders.

**Keywords:** Alzheimer's disease, Vericiguat, Chitosan nanoparticles, Intranasal delivery, Brain targeting

**PC-243**

**FORMULATION AND EVALUATION OF NANO-GEL BY USING DIFFERENT CHALCONE FOR THEIR ENHANCED ANTI-INFLAMMATORY AND ANALGESIC ACTIVITIES**

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Pro-inflammatory cytokines like TNF-α and IL-1β induce chronic inflammation, oxidative stress, and progressive joint deterioration, which are hallmarks of arthritis disorders, especially rheumatoid arthritis, which continue to be a major cause of disability globally. Nonsteroidal anti-inflammatory medicines (NSAIDs) and other conventional therapy relieve symptoms but face challenges such as limited bioavailability , poor therapeutic targeting and undesirable systemetic side effect , they are frequently constrained by immunological, hormonal, and gastrointestinal side effects emerging nanotechnology based strategies are reshaping the therapeutic landscape , with nano emulsion offering particularly versatile platform ,to overcome these drawbacks, a chalcone oil–based oil-in-water (O/W) nanoemulsion gel was developed as a novel topical anti-arthritic formulation. The nanoemulsion, consisting of kinetically stable droplets in the 10–200 nm range, enhanced dermal penetration, improved solubility, and offered sustained release of bioactive constituents with capsicum oils or semisynthetic chalcone. Preclinical evaluation in models of arthritis showed excellent symptom management and a notable reduction in oxidative stress and inflammatory markers without causing systemic harm. These results highlight chalcone nanoemulsion gel as a promising, patient-friendly alternative for arthritis management, synergizing the therapeutic potential of natural phytoconstituents with the advantages of nanotechnology-driven drug delivery.

**PC-244**

**ESSENTIAL OIL-BASED MICROEMULSIONS IN ANTIMICROBIAL APPLICATIONS: A NATURAL APPROACH**

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The growing resistance to conventional antimicrobials has accelerated the demand for safer, eco-friendly alternatives. Essential oil-based microemulsions (EO-MEs) have emerged as promising carriers for


ISBN: 978-81-980623-8-3

antimicrobial applications, offering improved solubility, stability, and penetration. This review outlines recent advancements in extraction techniques for essential oils, the principles and formulations of microemulsions, and their efficacy against various microbial strains. Emphasis is placed on Citrus-based essential oils, particularly lemon (Citrus limon), which exhibit broad-spectrum antimicrobial activity. The paper also discusses evaluation strategies, stability considerations, and the future scope of EO-MEs in therapeutic and industrial domains.

**Keywords:** Antimicrobial, Citrus limon, Essential Oil, Microemulsions.

**PC-245**

## DESIGN AND IN-VITRO EVALUATION OF BUCCOADHESIVE TABLETS OF OLMESARTAN MEDOXOMIL

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Mucoadhesive buccal tablets of Olmesartan medoxomil were formulated using different bioadhesive polymers, namely Carbopol 934P, HPMC K4M, Sodium carboxymethyl cellulose, and Hydroxyethyl cellulose, in varying ratios (1:1, 1:2, and 1:3).The backing layer consisted of ethyl cellulose, an impermeable substance. Olmesartan medoxomil was developed in nine different formulations utilizing the direct compression process.To increase the solubility of Olmesartan medoxomil, a solid dispersion was used with various ratios of Poloxamer F407 polymer (1:1, 1:2, and 1:3). The produced tablets were tested for erosion, surface pH, bioadhesive characteristics, in vitro drug release, and drug diffusion. The swelling index was found to be proportional to the Carbopol 934P and HPMC K4M contents.The surface pH of all formulations ranged between 5-7, indicating their suitability for buccal application without causing irritation.The tablets with 1:2 ratios of carbopol 934P:HPMC K4M showed the highest percentage of drug release and diffusion through the buccal mucosa in vitro. Formulation F2 was identified as the most optimized, showing strong bioadhesive strength, enhanced drug solubility of 94.20 ± 0.56%, and drug diffusion of 92.56% over 7 hours.F2 formulations were determined to be stable during stability tests.

**Keywords:** Mucoadhesive buccal tablet, Olmesartan medoxomil, HPMC K4M, Sodium CMC, Poloxamer F407

**PC-246**

## FORMULATION AND DEVELOPMENT OF MATRIX- MICROSPHERE OF ANTIDIABETIC DRUG (SAXAGLIPTIN) BY IONOTROPIC GELATION METHOD

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Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder characterized by insulin resistance and progressive β-cell dysfunction, resulting in persistent hyperglycemia. Globally, over 537 million adults are affected. Saxagliptin, a DPP-4 inhibitor, is widely prescribed for glycemic control in T2DM but has a short biological half-life, requiring frequent dosing and impacting patient compliance. The present research work focus to develop sustained-release microspheres of Saxagliptin using the ionotropic gelation technique to enhance therapeutic efficacy and adherence. Sodium alginate served as the primary polymer, with ethyl cellulose incorporated at varying ratios to modulate drug release. Nine formulations were prepared and evaluated for particle size, morphology, micromeritic properties, entrapment efficiency, drug loading, and in vitro release kinetics. The optimized formulation produced discrete, spherical microspheres with good flow properties and entrapment efficiency ranging from 78.1% to 94.2%. Sustained drug release was observed for up to 9–10 hours, with enhanced release in acidic conditions simulating the gastric environment. Kinetic analysis indicated a diffusion-controlled release mechanism. Ionotropic gelation proved to be a simple, solvent-free, and non-toxic method for encapsulating Saxagliptin into microspheres, offering a promising strategy for sustained drug delivery. This approach may significantly improve patient compliance and therapeutic outcomes in the management of T2DM.

**Keywords**: Saxagliptin, Anti-diabetic, Microsphere, Ionotropic Gelation, Sustained Drug Release

**PC-247**

## KOJIC ACID–NSAID–PALMITIC ACID HYBRIDS AS DUAL-ACTING AGENTS FOR HYPERPIGMENTATION AND INFLAMMATORY SKIN DISORDERS

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Inflammation and hyperpigmentation often occur together in dermatological conditions, yet most current therapies target these disorders separately. Kojic acid (KA), a well-known tyrosinase inhibitor, suffers from poor skin permeability, while non-steroidal anti-inflammatory drugs (NSAIDs) show strong anti-inflammatory activity but have limited application in cosmeceuticals. To overcome these limitations, novel KA–NSAID–palmitic acid hybrids were synthesized and evaluated as dual-function agents. Both monoester and diester derivatives of KA with ibuprofen, naproxen, diclofenac were prepared via DCC-mediated esterification and characterized using NMR, Mass spectroscopy, and HPLC (purity >97%). Their biological activities were tested through mushroom tyrosinase inhibition, anti-melanogenic effects in B16F10 melanoma cells, cytotoxicity on HEK cells, carrageenan-induced paw edema in rats, and ex vivo porcine skin permeation studies. The diester derivatives demonstrated significantly improved activity compared to parent compounds. Notably, ibuprofen-KA diester (IBUD) and diclofenac-KA diester (DICD) inhibited tyrosinase by 49% and 35% at 200 µM, respectively, and showed superior melanogenesis suppression in B16F10 cells (79%), surpassing KA alone (43%). In vivo, diesters produced greater edema reduction than NSAIDs. Skin permeation studies confirmed 2–3 fold higher delivery due to the lipophilic palmitic acid moiety. Importantly, cytotoxicity assays revealed minimal toxicity toward mammalian cells, even at higher concentrations. Overall, these findings highlight KA–NSAID–palmitic acid diesters as safe, dual-acting molecules with strong anti-melanogenic and anti-inflammatory properties, improved skin penetration, and promising potential as topical therapies for hyperpigmentation and inflammatory skin disorders.

**Keywords:** Kojic acid; NSAIDs; Palmitic acid; Melanogenesis; Inflammation; Tyrosinase inhibition; Skin permeation

**PC-248**

## FORMULATION OF NANOCARRIER-BASED IN SITU GEL FOR IMPROVED BRAIN DELIVERY OF OXCARBAZEPINE

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Epilepsy is one of the most common chronic neurological disorders affecting the central nervous system (CNS), characterized by recurrent seizures that may range from partial to generalized types. Despite existing therapies, many patients experience inadequate seizure control due to poor drug bioavailability or inconsistent dosing. This study focuses on the formulation and optimization of an oxcarbazepine-loaded nanoparticle-based in situ gel to enhance therapeutic efficacy and provide sustained drug release. Nanoparticles were prepared using high-shear homogenization followed by bath sonication, incorporating varying concentrations of glyceryl monostearate (100–200 mg), stearic acid (20–40 mg), and surfactants such as Poloxamer 188 and Tween 80. The nanoparticles were characterized using Fourier Transform Infrared Spectroscopy (FT-IR), Differential Scanning Calorimetry (DSC), Scanning Electron Microscopy (SEM), and zeta sizer analysis, yielding a particle size of 244 ± 71.20 nm, a polydispersity index (PDI) of 0.32 ± 0.05, and a zeta potential of −25 ± 6.45 mV. Entrapment efficiency was also evaluated and found to be satisfactory. The optimized nanoparticles were incorporated into an in situ gel using Poloxamer P-407 and Poloxamer P-188 (15–20% w/v) via the cold method. The gel formulations were evaluated for clarity, pH (6.23 ± 0.3), gelling capacity, gelation temperature and time, and rheological properties. Stability studies




ISBN: 978-81-980623-8-3

demonstrated the physical and chemical integrity of the formulation over time. In vitro drug release studies indicated a sustained release profile, supporting prolonged residence time at the administration site. The developed oxcarbazepine-loaded nanoparticle in situ gel system shows strong potential for improved epilepsy treatment through enhanced bioavailability and controlled drug delivery.

**Keywords:** Epilepsy, In situ gel, Oxcarbazepine, Poloxamer, nasal delivery.

**PC-249**

**DEVELOPMENT AND EVALUATION OF A PROBIOTIC-BASED HERBAL GEL FOR SUSTAINABLE SKINCARE**

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The growing demand for natural and multifunctional cosmeceuticals has encouraged the exploration of probiotic-based formulations for improved skin health and sustainability. In this study, a novel probiotic-incorporated gel was developed using cell-free supernatants derived from fresh curd, rich in probiotic metabolites. The gel base was prepared with carbopol-940, glycerin, aloe vera extract, and neutralized using triethanolamine (TEA) or NaOH to achieve optimal viscosity and stability. Active ingredients such as niacinamide (Vitamin B3), panthenol (Pro-vitamin B5), and green tea extract were incorporated for added therapeutic and antioxidant benefits. Phenoxyethanol and ethylhexylglycerin were used as primary preservatives, with sodium benzoate or potassium sorbate as alternatives.The probiotic supernatant was extracted by centrifugation and incorporated into the gel base under aseptic conditions. The final formulation was evaluated for physicochemical parameters (pH, viscosity, clarity, and stability), microbiological safety, and consumer acceptability. The optimized gel exhibited a skin-friendly pH (~5.5), uniform texture, and improved hydration potential due to synergistic effects of probiotics and herbal actives. Patch testing confirmed safety, while preliminary results suggested potential benefits in skin barrier support and protection against oxidative stress.This study demonstrates the feasibility of integrating probiotics with herbal ingredients into topical gel systems, offering a promising cosmeceutical innovation that combines natural sustainability, therapeutic activity, and consumer safety. Such formulations hold strong potential for commercialization in the growing natural skincare market.

**Keywords**: Probiotic lysate, herbal gel, cosmeceuticals, sustainability, skin health.

**PC-250**

**FORMULATION DESIGN AND CHARACTERIZATION OF SELF MICRO EMULSIFYING DRUG DELIVERY SYSTEM FOR PRAVASTATIN**

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The Pravastatin (PRAVA) self-micro emulsifying drug delivery system (SMEDDS) was developed to address the issues with poor solubility. Because PRAVA is almost completely insoluble in water, it exhibits irregular oral absorption and has an impact on bioavailability. According to saturated solubility studies, the oil phase was chosen for the formulation, and surfactants and co-surfactants were screened according to their capacity for emulsification. The self-emulsifying area was identified using ternary phase diagrams. It was determined that polyethylene glycol 200 (20%), almond oil (20%), and tween 80 (60%) were the components that were optimized. The droplet size, zeta potential, emulsification time, and rheological analysis were used to characterize the prepared SMEDDS. The trial validated PRAVA SMEDDS's potential for oral administration. The conclusion is that poorly water-soluble drugs like PRAVA can have their solubility and dissolution improved using the SMEDDS formulation technique.

**Keywords:** Pravastatin, SMEDDS, Phase Diagram, Dissolution Rate.

**PC-251**

**REVOLUTIONIZING PHARMACEUTICALS: TAILORED 3D PRINTING SOLUTIONS FOR PERSONALIZED MEDICINE**

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Personalized medicine has emerged as a transformative approach in modern healthcare, enabling treatments tailored to individual patient profiles, including genetic, physiological, and lifestyle factors. Traditional dosage forms provide limited flexibility in addressing patient-specific therapeutic requirements, often leading to complications such as polypharmacy, poor compliance, and suboptimal outcomes. Three-dimensional (3D) printing offers a promising technological breakthrough by enabling the design and fabrication of customized pharmaceutical formulations with precise control over dosage, drug release kinetics, and delivery systems. This work investigates the integration of 3D printing into pharmaceutical sciences, focusing on its applications in oncology and chronic pain management. Key innovations such as bioprinting, multi-material systems, and AI-driven formulation models are highlighted, with emphasis on patient-centric drug delivery approaches. Additionally, ethical and regulatory considerations, including risk analysis, equitable access, and patient data protection, are discussed. Findings suggest that 3D printing not only enhances therapeutic efficacy but also reduces adverse drug reactions, improves adherence, and holds the potential to revolutionize precision medicine.

**Keywords**: 3D Printing, Personalized Medicine, Drug Delivery Systems, Bioprinting, AI-driven Formulation, Precision Pharmacotherapy, Patient-Centric Design

**PC-252**

**SYSTEMS BIOLOGY AND IN SILICO STUDIES OF THE BIOACTIVES FROM HYPERICUM PERFORATUM L. AGAINST PROSTATE CANCER**

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Prostate cancer is the second most frequent cancer in men worldwide. It has an age-adjusted incidence rate of 29.4 per 100,000 population and produces around 14.2% of new cancer cases in men. Hypericum perforatum L.is a perennial flowered plant, which contains anthraquinones, carotenoids, flavonoids, cumarine, naphthodianthrones, xanthones, volatile oils and proanthocyanidins. In this present study, we made an attempt to investigate the potential of phytochemicals from Hypericum perforatum L. using a systems biology approach. The phytochemicals were obtained from Dr. Duke's Phytochemical and Ethnobotanical database, IMPPAT, the Coconut database, Phytohub version 1.4, the Medicinal Plants database, The Natural Products Atlas, and the KNApSAcK Core system databases. SwissADME, ProTox 3.0, and CardioTOXCSM webservers were used to estimate phytochemical's physicochemical, pharmacokinetic, and toxicological profiles. OSIRIS Property Explorer was used to estimate the drug score and the results demonstrated the compound's druggable nature. Network modelling and enrichment analysis predicted the phytochemical's precise targets, which merely indicated that they would be quite active against prostate cancer. The statistical significance of the targets was determined using survival analysis and found that only the target SRC was statistically significant ($p < 0.05$). Then, molecular docking against SRC using Autodock tools was performed and compared with the co-crystallized ligand and standard. Owing to the various in silico studies, the compounds Apigenin, Kaempferol, Kieclorin, Luteolin 5,3-Dimethyl ether and Naringetol were identified as hit compounds. Among them, Kieclorin was highly active against SRC with good binding energies and interaction profiles. Thus, these compounds can be used against prostate cancer. However, further in vitro and in vivo studies are warranted.

**Keywords:** Prostate Cancer, Hypericum perforatum L., In silico studies, Systems biology, Molecular docking

**PC-253**

**DEVELOPMENT OF ROPINIROLE HYDROCHLORIDE LOADED NLC'S FOR BRAIN TARGETING THROUGH NASAL ROUTE FOR THE TREATMENT AND MANAGEMENT OF PARKINSON'S DISEASE**


ISBN: 978-81-980623-8-3

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In the present investigation, Ropinirole Hydrochloride (RPH)-loaded Nanostructured Lipid Carriers (NLCs) were developed for brain targeting through the nasal route for the treatment and management of Parkinson's disease (PD). The objective of the study was to enhance the bioavailability of RPH, bypass hepatic first-pass metabolism, and overcome the blood–brain barrier (BBB) limitations by employing the nose-to-brain delivery approach. NLCs were prepared using glyceryl monostearate (solid lipid), cinnamon oil (liquid lipid), and surfactants (Tween 80 and Poloxamer 188) by high-pressure homogenization and optimized using a design of experiments (DoE) approach. The optimized NLC formulation exhibited particle size below 200 nm, narrow polydispersity index, high entrapment efficiency (>80%), and negative zeta potential ensuring stability. In-vitro release studies indicated sustained drug release following Higuchi and Korsmeyer–Peppas models, while ex-vivo permeation studies on goat nasal mucosa showed improved permeation with cinnamon oil-based NLCs compared to plain formulations. Histopathological evaluation confirmed the safety of the optimized formulation with no nasal mucosal damage. Stability studies revealed that the optimized formulation remained physically and chemically stable under accelerated conditions. Thus, the study successfully demonstrates that intranasal administration of RPH-loaded NLCs offers a promising strategy for direct nose-to-brain delivery, resulting in enhanced brain targeting, improved therapeutic efficiency, and minimized systemic side effects in the management of Parkinson's disease.

**Keywords:** Ropinirole Hydrochloride, Parkinson's disease, Nanostructured Lipid Carriers, Nose to-brain delivery.

**PC-254**

## DEVELOPMENT AND CHARACTERIZATION OF MULTIFUNCTIONAL CO-PROCESSED EXCIPIENT FOR DIRECT COMPRESSION

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Direct compression (DC) is a widely preferred method in tablet manufacturing due to its simplicity and cost-effectiveness. However, the success of this method largely depends on the functional properties of excipients. Single excipients often do not meet all requirements of direct compression, leading to the development of co-processed excipients. Co-processing aims to combine two or more pharmaceutically acceptable excipients to obtain a product with superior properties, without undergoing chemical changes.The objective of the present study was to develop and characterize a corn starch based multifunctional co-processed excipient (CCS) suitable for direct compression. Newly developed material was expected to offer enhanced flowability, compressibility, and compatibility. This reduced the number of incorporating excipients in tablets by converting native corn starch to multifunctional excipients. CCS was developed by cross-linking corn starch with epichlorohydrin and co-processed using poly-vinyl pyrrolidone (PVP) along with silicon dioxide (SiO2) and croscarmellose sodium (CrCs). Optimization was guided by the Sediment Delivery Model (SeDeM) Expert System, which evaluated key parameters including flowability, compressibility, and disintegration. Tablet formulations were then prepared using optimized blends and assessed for hardness, friability, disintegration, and dissolution, confirming their effectiveness for use in direct compression tablet formulation. Optimization confirmed a significant influence on compressibility, flow, and disintegration. FT-IR revealed the crosslinking, while XRD showed reduced crystallinity due to starch gelatinization. SEM images displayed predominantly spherical agglomerates with $SiO_2$ particles adsorbed on the surface. Enhanced solubility, swellability, flowability, and compressibility confirmed the successful development of a multifunctional excipient suitable for direct compression tablet formulation. These findings suggested that CCS may be potentially applied as one of the preferred multifunctional excipients for DC of tablets.

**Keywords:** Co-processed excipients, Direct compression, Multifunctional excipient, Spray drying, Box Behnken designs, SeDeM Expert system

**PC-255**

## FORMULATION, DEVELOPMENT AND EVALUATION OF NANOEMULSION LOADED TRANSDERMAL PATCH CONTAINING MIRABEGRON FOR TREATMENT OF OVERACTIVE BLADDER SYNDROME

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The present research study set out to formulate a nanoemulsion based transdermal patch loaded with mirabegron for the effective treatment of Overactive Blabber Syndrome (OBS), which is a condition affecting over 546 million individuals worldwide. Overactive Bladder Syndrome (OAB) is diagnosed by urgency of urination, usually with frequency and nocturia, and can significantly limit quality of life. Mirabegron was incorporated into a nanoemulsion system consisting of Maisine CC oil, Tween 80 as surfactant, Transcutol P as co-surfactant that was blended with hydrated HPMC K100M and PVA solution dissolved. Plasticizer PEG 400 was then added followed by casting the blend on glass petri plates using the solvent casting method. The optimized nanoemulsion contained 92.14 nm droplet size, 0.267 PDI, and -21.4 mV zeta potential, ensuring physical stability. The tensile strength of the optimized patch was 6.1 MPa, drug release at 24 hours being 90.02%, and transdermal flux being 28.84 µg/cm²/hr. The 3-month stability study showed >95% retention of drug and minimal physical degradation. Thus, here, developed nanoemulsion transdermal patch was efficient in delivering Mirabegron with improved permeation and controlled release, indicating its potential as a non-invasive treatment method of overactive bladder with advantages over the conventional oral therapy in terms of patient compliance and fewer GI side effects and other side effects.

**Keywords**: Nanoemulsion, Mirabegron, Transdermal Patch, Overactive Bladder

**PC-256**

## FORMULATION AND EVALUATION OF FICUS PUMILA HERBAL GEL FOR ANTI-INFLAMMATORY ACTIVITY

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Inflammation is an imperative defense response that, if not controlled, needs treatment, but conventional synthetic anti-inflammatory agents, especially NSAIDs, have severe side effects such as gastrointestinal issues and cardiovascular hazards, so this study aimed to formulate, prepare, and test a herbal gel extract as a safer option for the treatment of inflammation. Leaves of Ficus pumila were harvested, identified, and extracted with maceration using ethanol and water, and six gel formulations (F1-F6) were prepared with varying concentrations of Carbopol 934, hydroxypropyl methylcellulose (HPMC), and xanthan gum as gelling agents with complete assessment involving phytochemical screening, physicochemical analysis (pH, viscosity, spreadability, extrudability), test for skin irritation , and evaluation of anti-inflammatory activity with carrageenan-induced paw edema model in Wistar rats. Phytochemical analysis has validated the existence of bioactive molecules such as carbohydrates, steroids, flavonoids, saponins, and glycosides, whereas formulation F1 (0.5% Carbopol 934) showed ideal characteristics with pH 7.10 ± 0.2, good spreadability (3.85 $gcmsec^{-1}$), satisfactory extrudability (89.7%), non-irritant nature (PII < 2.0), anti-inflammatory activity compared to reference diclofenac gel. The 0.5% Carbopol Ficus pumila gel is an effective, safe medicinal herbal option for treating inflammation with better patient compliance and fewer adverse effects than in synthetic counterparts.

**Keywords:** Ficus pumila, Herbal gel, Anti-inflammatory, Phytochemical, Carrageenan-induced paw edema model.

**PC-257**




ISBN: 978-81-980623-8-3

**DEVELOPMENT AND OPTIMIZATION OF A THERMORESPONSIVE CHITOSAN–POLOXAMER IN SITU NASAL GEL FOR ENHANCED BRAIN DELIVERY OF RIVASTIGMINE IN ALZHEIMER'S THERAPY**

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Rivastigmine, a widely prescribed cholinesterase inhibitor for treatment of Alzheimer's disease, is limited by poor oral bioavailability due to extensive first-pass metabolism and low ability to penetrate the blood–brain barrier (BBB). To target these concerns, the current study aimed to formulate a thermoresponsive in situ nasal gel from a chitosan–poloxamer system for intranasal drug delivery and resulting brain targeting. The gel was prepared using the cold method at varying concentrations of chitosan and poloxamer 407 and then optimized utilizing a $3^2$ factorial design. The optimized gel produced a gelation temperature of 32.5 ± 0.6 °C, suitable for nasal delivery. The optimized gel maintained standard physicochemical properties with an acceptable pH (6.1 ± 0.2), viscosity and mucoadhesive strength for nasal residence time. In vitro drug release studies showed prolonged drug release of eight hours, which followed Higuchi kinetics. Ex vivo permeation studies across nasal mucosa showed a 1.8-fold increase in drug permeation compared to drug solution alone. Histopathological analysis did not show any mucosal damage or irritation after application. Overall, the outcomes indicate that this thermoresponsive in situ nasal gel has great potential as a painless non-invasive delivery system for Rivastigmine which will promote patient compliance and therapeutics in Alzheimer's disease.

**Keywords:** Rivastigmine, chitosan, nasal delivery, spray dryer.

**PC-258**

**FORMULATION AND EVALUATION OF GASTRO-RETENTIVE FLOATING TABLETS OF DASATINIB FOR ENHANCED BIOAVAILABILITY**

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We formulated and tested gastroretentive floating tablets of Dasatinib to enhance its oral bioavailability by extending the duration it remains in the stomach and releasing the drug slowly. The aims were to enhance Dasatinib's dissolution in the stomach, minimize the dosing frequency, reduce first pass metabolism and enhance patient compliance through a well-formulated floating tablet system. To prepare these floating tablets we have employed Hydroxypropyl Methylcellulose (HPMC K4M) and Carbopol 934 through wet granulation technique followed by compression on 10 station rotary tablet press using 8 mm flat faced punches. Preformulation studies entailed solubility, melting point and UV absorbance. In vitro dissolution study was carried out with the help of USP Type II dissolution apparatus at 50 rpm in 0.1 N HCl for 24 hours to analyze the influence of polymer concentration on drug release and buoyancy. We have optimized the formulation using $3^2$ factorial design. Optimized formulations exhibited satisfactory flow properties, floating lag time of less than 30 seconds and floating duration of greater than 12 hours. The release of the drug was according to non Fickian diffusion and was best described by Higuchi and Korsmeyer-Peppas models. The best batch (F3) had 92.45% cumulative drug release after 24 hours. Stability studies indicated no significant change for one month. Dasatinib floating tablets formulated using HPMC K4M and Carbopol 934 enhanced gastric retention and controlled release of the drug leading to improved bioavailability and patient compliance.

**Keywords:** Dasatinib, gastroretentive, floating tablet, HPMC K4M.

**PC-259**

**Dolutegravir Nanosuspension: Formulation, Optimization, and In Vitro–In Vivo Characterization**

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This study aimed to develop and optimize a nanocarrier-mediated nanosuspension of dolutegravir, an antiretroviral drug with poor aqueous solubility, using a Design of Experiments (DoE) approach. The nanosuspension was prepared by high-speed homogenization followed by probe sonication, employing Soluplus as a stabilizer. The optimized formulation was evaluated for particle size, polydispersity index (PDI), zeta potential, drug content, morphology, and pharmacokinetics. In vitro dissolution and in vivo studies in Wistar rats were conducted to assess performance. The optimized dolutegravir nanosuspension exhibited a mean particle size of 337.1 nm with a low PDI and negative zeta potential, confirming stability. In vitro release and solubility were significantly improved compared to the pure drug. Pharmacokinetic studies demonstrated enhanced oral bioavailability, as reflected by increased AUC values. Sonication time was a critical factor influencing particle size. Differential scanning calorimetry and X-ray diffraction revealed an amorphous drug state in the nanosuspension, contributing to improved dissolution. The nanosuspension strategy effectively enhanced dolutegravir solubility and bioavailability, highlighting its potential as a promising delivery system for HIV therapy. Further clinical investigations are warranted to confirm therapeutic applicability.

**Keywords:** Dolutegravir, Nanosuspension, Solubility enhancement, Nanocarrier, HIV/AIDS

**PC-260**

**FORMULATION, DEVELOPMENT AND IN VITRO SCREENING OF SPIRULINA AND INULIN FORTIFIED FUNCTIONAL CHOCOLATE**

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The increase demand in healthy food category has encouraged the formulation of functional chocolate. In the present study, we formulated a nutritionally rich chocolate with low sugar by using optimum blend of dark (cocoa) and white chocolate bases, fortified with a prebiotic dietary fibre (inulin) and a protein rich cyanobacterium (Spirulina platensis). Dark chocolate is known for its antioxidant's polyphenolic constituents, while white chocolate help in providing desirable texture and creaminess. In our formulation, sugar was partly substituted with inulin, and the formulation was optimized for meeting sensory and texture target. Three final optimum formulations were evaluated using in vitro antioxidant activity (DPPH radical scavenging, reducing power assay), and simulated gastrointestinal digestive system. In addition, total phenolic content was also quantified. The Spirulina–inulin fortified chocolate demonstrated significantly high antioxidant activity ($P < 0.01$) and phenolic content ($P < 0.05$), as compared to control formulation. Furthermore, simulated studies with digestive system suggested the release of Spirulina nutrients and cocoa antioxidants. Our optimized formulation showed reduced sugar content, more protein content, and enhanced antioxidant potential, proving it a promising functional confectionery for the benefit of health-conscious users.

**Keywords**: Functional chocolate; Inulin; Spirulina; Antioxidant; DPPH; Reducing power assay

**PC-261**

**FORMULATION AND EVALUATION OF SOLID PERFUME CHAPSTICK FORTIFIED WITH VITAMINS AND ESSENTIAL OILS AS A TOPICAL PREPARATION FOR SKIN BRIGHTENING EFFECT**

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The present work was aimed at formulation and evaluation of a solid perfume chapstick, a topical preparation enriched with vitamin E and a blend of essential oils. The formulation fortified with Vitamin C is aimed to give skin brightening effect with smooth silage leaving a lasting, gentler, softer, subtler aroma when applied to the underarms. For this, five different blends of waxes were made to prepare the base for the ChapStick formulation. One from these blends, were optimised to get appropriate consistency necessary for the formulation. Then, six different preparations consisting of Vit C, Vit E, preservatives and varied proportion of essential oils like Lavender, Vanila, Jasmine and jojoba oil were used in specified concentration as base for the ChapStick perfume.




ISBN: 978-81-980623-8-3

The preparation with pleasant aroma, applicability and other properties was selected for the evaluation process to ensure the desirable properties in the ChapStick formulation. After the evaluation of ChapStick it was packed in a suitable container and labelled for display/presentation purpose

**Keywords:** Chapstick, Solid perfume, Essential oils, Vitamin C, Vitamin E

**PC-262**

**DEVELOPMENT AND EVALUATION OF TOPIROXOSTAT-LOADED HPMC-G-PCL MICROSPONGES**

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Topiroxostat is used to treat hyperuricemia and gout. It is a selective xanthine oxidase inhibitor. However, it has limited oral bioavailability and low aqueous solubility (BCS Class II). The goal of this study was to improve its therapeutic performance by creating microsponges using hydroxypropyl methylcellulose-graft-poly(ε-caprolactone), a novel amphiphilic graft copolymer (HPMC-g-PCL). The copolymer's dual characteristics like hydrophilic swelling capacity of HPMC and biodegradable property of PCL helps to enabled efficient drug encapsulation and sustained release. Microsponges were prepared using the quasi-emulsion solvent diffusion method and optimized by a $3^2$ full factorial design by considering polymer concentration and stirring speed as critical factors. The optimized formulation results in production yield of 88.75%, entrapment efficiency of 92.10%, and cumulative drug release of 87% over 12 hours. The microsponges exhibit morphological characterization which confirmed spherical particles with interconnected pores, uniform particle size and good flow property. The release profile demonstrates sustained and controlled release behavior of drug by maintaining steady therapeutic levels and by reducing dosing frequency. Overall Topiroxostat-Loaded HPMC-g-PCL-based microsponges present a promising and innovative drug delivery system for the effective management of gout and presents the possibility for enhanced patient compliance and therapeutic outcome.

**Keywords:** Topiroxostat, HPMC-g-PCL, Microsponges, Sustained release, Gout management

**PC-263**

**FORMULATION AND EVALUATION OF NANOCRYSTAL LOADED NASAL IN SITU GEL FOR INTRANASAL DRUG DELIVERY**

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Epilepsy, affecting nearly 70 million people worldwide and 12 million in India, is marked by recurrent seizures due to abnormal brain activity, leading to significant physical, cognitive, and emotional impairment. Conventional treatments, including antiepileptic drugs, vagus nerve stimulation, ketogenic diets, and surgery, are limited by poor bioavailability and adverse effects, necessitating novel drug delivery approaches. Intranasal administration offers advantages such as bypassing the blood–brain barrier, rapid absorption, and improved therapeutic efficacy. In this study, oxcarbazepine, a BCS class II antiepileptic drug with poor solubility and bioavailability, was formulated into a nanocrystal-based in situ nasal gel. Nanocrystals were prepared by anti-solvent precipitation and incorporated into the gel via a cold process. The optimized nanocrystals showed a mean size of 244±71.20 nm, zeta potential of –25±6.45 mV, and needle-shaped morphology. The gel exhibited rapid sol-to-gel transition within 5 seconds at physiological temperature and maintained a nasal-compatible pH of 6.23±0.07. In vitro release studies showed sustained drug release, with nanocrystals achieving 85.24% release at 24 hours compared to 75.59% from the gel, indicating improved solubility and controlled release. Thus, it can be concluded that oxcarbazepine nanocrystal-loaded in situ gel is a promising intranasal delivery system capable of improving therapeutic efficacy, patient compliance, and overall epilepsy management.

**Keywords:** Oxcarbazepine, Nanocrystal Nasal delivery, In situ gel.

**PC-264**

**DESIGN AND OPTIMIZATION OF HYDROGEL WITH ADIANTUM CAPILLUS EXTRACT FOR ENHANCED WOUND HEALING**

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Wounds are a major global health issue, often leading to death and prolonged suffering, particularly in the case of chronic wounds. Despite the development of numerous treatments, there is still a lack of effective, widely used wound dressings. Hydrogel-based dressings are promising due to their ability to maintain a moist environment conducive to healing, alongside their biocompatibility and permeability. This study investigates the formulation and optimization of a hydrogel containing Adiantum capillus extract, a plant known for its medicinal properties, including anti-inflammatory and antimicrobial activities. The hydrogel was prepared using various concentrations of Polyvinyl Alcohol (PVA) and Glyceryl Monostearate (GMS) as independent variables. Nine formulations were designed using a factorial experimental design, with evaluations of folding endurance, drug content, swelling ratio, and in-vitro drug release. The results indicate that batch F5 (with 1.5% PVA and 1% GMS) exhibited the optimal properties, including high drug content (96.7%), folding endurance (223 folds), and an excellent drug release profile, with 90.04% drug release at 12 hours. Additionally, the hydrogel demonstrated favorable physical characteristics such as a uniform appearance and moderate moisture content. Statistical analysis validated the optimal formulation, confirming the hydrogel's potential for sustained drug release and controlled delivery in wound healing applications. This study highlights the promising role of Adiantum capillus-based hydrogels in advancing wound care solutions.

**Keywords:** Hydrogel, Adiantum capillus, Wound Dressing, Controlled Release, Pteridaceae

**PC-265**

**FORMULATION AND CHARACTERIZATION OF CRYPTOTANSHINONE LOADED NANOSTRUCTURED LIPID CARRIERS (NLC) FOR TOPICAL DELIVERY**

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Cryptotanshinone is one of the tanshinones extracted from the traditional Chinese herb Salvia miltiorrhiza and belongs to solanaceae family. Cryptotanshinone shows anti-inflammatory activity and can be therapeutically used for the treatment of Rheumatoid Arthritis. As nanotechnology can better target arthritic joints and has higher bioavailability, it has demonstrated increased success in treating rheumatoid arthritis. Topical delivery of nanomedicines can overcome some of the disadvantages of oral delivery, such as decreased bioavailability because of poor solubility, unpleasant taste, and first-pass metabolism. The stratum corneum barrier of skin produce hindrance in the topical delivery of skin which can be overcome by various nanocarriers, amongst which Nanostructured lipid Carriers (NLC) is an effective carrier of the drug through the skin. The current study aims to create NLC that is loaded with cryptotanshinone and evaluate it in vitro. Cryptotanshinone loaded NLC was developed by using Hot Homogenization method. Further, the characterization of the prepared nano-formulation was done using Zeta sizer, Entrapment efficiency, Drug loading capacity and Drug release profile. The results revealed acceptable size range 158.1±5.4nm, high drug entrapment efficacy 80.98±1.9%, acceptable polydispersity index 0.260±0.039, zeta potential -28.91±0.65 mv and high drug loading capacity. The result revealed that NLC would be a promising carrier for topical delivery of cryptotanshinone for anti-inflammatory activity.

**Keywords:** Rheumatoid Arthritis, Nanotechnology, Nanostructured lipid Carriers, Topical delivery

**PC-266**




ISBN: 978-81-980623-8-3

**FORMULATION, QBD BASED OPTIMIZATION AND CHARACTERIZATION OF ANTIPSORIATIC TRANSETHOSOMAL GEL**

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Psoriasis, a chronic autoimmune skin disease marked by inflammation and epidermal hyperproliferation, has garnered significant attention in dermatological research due to its complex pathophysiology, diverse clinical manifestations, and significant detrimental impact on patients' quality of life. Transethosomes are sophisticated lipid-based nanocarriers that can enhance the skin administration of hydrophobic medications, improving the effectiveness of treatment for psoriasis. The goal of the current study is to create a topical transethosomal gel of diosgenin that has efficient antipsoriatic action, enhanced skin penetration, and prolonged release. Diosgenin, a member of BCS class II, has a very low oral bioavailability yet has great potential for treating psoriasis. By preventing the synthesis of pro-inflammatory cytokines like TNF-α and IL-1β, which are crucial in psoriasis, it regulates the immune response. Thin film hydration was used to make the transethosomal gel, and the 32 response surface approach was used to optimize it. The developed transethosome was found to possess 184 nm particle size, 95.5% entrapment efficiency, 94.6 % drug release, and elevated anti-psoriatic. Using the Imiquimod (IMQ) model, an in-vivo antipsoriatic study was conducted on BALB/c mice. The treatment appreciably reduced the Psoriatic Area and Severity Index, thickness of epidermal layer, and inflammatory cytokines level. Based on the results, it can be concluded that the transethosomal gel loaded with diosgenin is an excellent delivery system for psoriasis since it improves skin penetration, sustained the drug release, and decrease the inflammation with little side effects.

**PC-267**

**TRANSFORMING FLURBIPROFEN DRUG DELIVERY: ENHANCING NANOEMULGEL FORMULATIONS WITH INNOVATIVE NANO-CARRIER SYSTEMS**

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The current investigation aims to improve the distribution of flurbiprofen by developing advanced nanoemulgel formulations. The purpose is to boost the drug's effectiveness by enhancing its stability, controlled release, and bioavailability through innovative nano-carrier technology. This new delivery method could significantly change how poorly soluble medications are given. After thorough testing, peppermint oil, Tween 80, and PEG-400 were selected for use. An optimal oil to surfactant and co-surfactant ratio was determined using a pseudo-ternary phase diagram to create the nanoemulsion. Using a high-pressure microfluidization technique, the study produced nanoemulsions with the labels NEF1 through NEF9, which were then optimised using a 22 Central Composite Design (CCD). The particles had zeta potentials ranging from -35.19 to -18.91, sizes ranging from 69.5 nm to 297.1 nm, and drug release percentages ranging from 76% to 92.1%. Carbopol 934(1%) gel was mixed with the optimal formulation, NEF1, to create a 5% w/w Flurbiprofen nanoemulgel. When compared to a commercial product, this new formulation demonstrated an 80.12% improvement in drug release and good physical qualities, including 97.4% drug release. Additionally, the nanoemulgel held up well at 4°C for 90 days, suggesting that it could be used for topical drug administration.

**Keywords:** Nano-carrier technologies, Bioavailability, Pseudo-ternary phase diagram, High-pressure microfluidization, Central Composite Design (CCD)

**PC-268**

**DEVELOPMENT OF FLOATING SOLID SELF NANOEMULSIFYING DRUG DELIVERY SYSTEM FOR IMPROVED GASTRIC RETENTION IN PEPTIC ULCER**

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Peptic ulcer disease is a chronic gastrointestinal disorder caused by excessive gastric acid secretion and pepsin activity. The SNDDS is isotropic mixture of natural or synthetic oils, surfactant and co-surfactants to produce fine oil-in water nanoemulsion through gentle agitations in aqueous environment. This study aimed to formulate and optimize a Gastroretentive self-nanoemulsifying drug delivery system (SNEDDS) to enhance solubility, stability, and therapeutic efficacy by using a Potassium-Competitive Acid Blocker (P-CAB), offers superior acid suppression. Pre-formulation studies, including organoleptic evaluation, melting point, solubility analysis, and UV-Visible spectrophotometry, established the physicochemical characteristics of the drug. The formulation was optimized using Box-Behnken Design. Solid SNEDDS was prepared by adsorption to solid carrier method, produced free-flowing granules, further compressed into gastroretentive floating tablets. From the all 13 batches, optimized F9 batch showed the appropriate results. The optimized formulation showed prolonged buoyancy for 11.5 hours, drug release of 94.5% over 12 hours, satisfactory hardness (5.5 kg/cm$^2$), Thickness of 3.54 ± 0.027, and Friability is 0.48. The developed gastroretentive solid SNEDDS formulation demonstrated enhanced drug stability, and increased oral bioavailability of drug with ensuring prolonged gastric retention for the management of peptic ulcer.

**Keywords:** Peptic ulcer disease, Gastroretentive, Box-Behnken Design, SNEDDS, Floating tablets.

**PC-269**

**INVITRO AND INVIVO EVALUATION OF THERMOSENSITIVE EAR HERBAL INSITU GELLING SYSTEM FOR OTITIS**

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Otitis media, a very common ear infection especially in children, remains a major global health concern, which often leads to ear pain, fever, discharge, and, if untreated might cause progressive hearing loss. The conventional and first line treatment relies on antibiotics and analgesics; however, their prolonged use leads to antimicrobial resistance and drug related side effects, which necessitates for safer and more effective alternatives. Utilising the ancient knowledge of traditional medicine, the antibacterial, antioxidant, and anti-inflammatory properties of garlic (Allium sativum) and ginger (Zingiber officinale) were investigated as potential therapeutic agents. The current study concentrates on creating an in situ gel based on ginger and garlic to modernise their delivery, providing extended retention, localized drug release, and minimized systemic exposure. The aim of this research is to develop thermo sensitive drug vehicles for ear infection Thermo sensitive ear drop was prepared using cold method by mixing thermo sensitive polymer pluronic F-127, viscosifying agent HPMC-E 50 LV and herbal extracts. Prepared nine formulations were evaluated for physical parameters like appearance, gelation temperature, pH, drug content, rheological properties, isotonicity, sterility test, in vitro diffusion study and antimicrobial testing demonstrated broad-spectrum efficacy, showing significant inhibition zones against both Gram-positive and Gram-negative pathogens. The drug released from selected F3 formulation provides sustained release over 8 hours period and showed excellent auricular tolerance. By bridging the gap between natural medicine and advanced pharmaceutical technology, this herbal in situ gel presents itself as a novel, safe, and promising alternative for the treatment of localised otitis.

**Key words:** Otitis, Allium sativum, Zingiber officinale, Thermosensitive in situ gel, Pluronic F-127

**PC-270**

**FORMULATION & EVALUATION OF METALLIC NANOPARTICLES (SILVER) OF ANTIVIRAL DRUG RIBAVIRIN FOR SOLUBILITY ENHANCEMENT**

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ISBN: 978-81-980623-8-3

The present study focuses on to develop and optimize Ribavirin-loaded silver nanoparticles for enhanced bioavailability and improved therapeutic efficacy in antiviral treatment. Ribavirin-loaded silver nanoparticles were formulated using a $2^3$ factorial design with silver nitrate concentration (2.5-5.0mM), reducing agent concentration (1.0-2.5% w/v), and stirring time (15-30 min) as independent variables. The nanoparticles were characterized for particle size, zeta potential, Polydispersity index, drug loading, entrapment efficiency, morphology, in vitro release, and stability. The optimal formulation AF8 achieved maximum desirability (0.999) through the factorial model design which produced particles with 40.7 ± 1.8 nm size and -32.5 ± 2.7 mV zeta potential and 0.189 ± 0.008 PDI and drug loading of 16.5 ± 1.2% along with an entrapment efficiency of 78.3 ± 3.9%. Drugs and excipients remained independent of each other according to FTIR and DSC testing. The biphasic drug release pattern of the nanoparticles showed 93.84% total drug discharge within 12 hours according to first-order ($R^2$=0.9925) and Higuchi ($R^2$=0.9948) kinetic patterns. The nanoparticles experienced only minimal modifications of their critical quality attributes throughout six months of accelerated stability evaluation while their particle size reached 45.6 ± 2.7 nm and their drug content held steady at 94.2 ± 2.1%. The introduction of silver nanoparticles loaded with Ribavirin shows potential as an efficient bioavailability enhancer for antiviral drugs thus potentially lowering medication doses and adverse effects.

**Keywords:** Ribavirin, Silver nanoparticles, Antiviral, drug delivery, Controlled release.

**PC-271**

## OPTIMIZATION AND CHARACTERIZATION OF LINAGLIPTIN TRANSFEROSOMAL GEL FOR ENHANCED TARGETED DELIVERY IN TYPE 2 DIABETES

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Transfersomes are highly flexible and ultra-optimized lipid molecular aggregates with the objective of improved transdermal drug delivery. Transfersomes can penetrate the human skin, even the stratum corneum, by diffusing through pores that are smaller compared to their vesicle size. Transfersomes are a very promising carrier system for transdermal drug delivery, and chemicals like soya lecithin, Span 80, and methanol (all analytical grade) were utilized in making them. Various transfersomal formulation (F-1 to F-8) were formulated and compared for vesicle size and entrapment efficiency. The vesicle sizes of the formulations were 465.2 nm to 314.3 nm. Entrapment efficiency ranged from 66.35% to 79.76%. Among these, formulation F4 showed the lowest vesicle size and the highest entrapment efficiency and was the best among them. Formulation F4 was then formulated in a gel base employing 1%, 2%, and 3% Carbopol, and was analyzed for drug content, pH, spreadability, viscosity, and drug release behavior. The transfersomal gel formula exhibited controlled release of drug as 81.71% within 12 h. The optimized Linagliptin transfersomal gel overcame the skin barrier property with ease, facilitating better drug release and providing a promising candidate for transdermal delivery.

**Keywords:** Linagliptin, Transfersomes, Soyalecithin, Span-80andTween-80.

**PC-272**

## Formulation And Evaluation Of Antimicrobial Ointment Containing Lantana Camara And Piper Betel Ethanolic Extract

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Formulating and testing an antibacterial ointment with ethanolic extracts of Piper betel (betel leaf) and Lantana camara (lantana) was the goal of this small project. Folk medicine has long utilized both of these herbs for their antibacterial and other medicinal qualities. In this investigation, a base ointment was made using ethanolic extracts of Piper betel and Lantana camara. Using a variety of bacterial and fungal strains, the ointment's antimicrobial activity was assessed using accepted microbiological methods. The physicochemical characteristics of the ointment, such as its stability, pH, consistency, and spreadability, were evaluated. The formulation showed potential efficacy against common infections, and the results showed significant antibacterial activity. In order to verify the ointment's biocompatibility, the study also evaluated its safety profile. The creation of the ointment by mixing these plant extracts offers a natural substitute for antibacterial therapy, which adds to the increasing demand for plant-based pharmaceuticals.

**Keywords:** Lantana Camara, Piper betel, Antimicrobial Ointment, Ethanolic Extract

**PC-273**

## FORMULATION AND EVALUATION OF SEMI-SYNTHETIC GEL CONTAINING TAGETES ERECTA AND CURCUMIN EXTRACT FOR THE TREATMENT OF ATOPIC DERMATITIS

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Atopic dermatitis (AD) is a chronic inflammatory dermatological disorder characterized by pruritus, dryness, and erythema, which significantly impairs the quality of life of affected individuals. Conventional treatments, including topical corticosteroids, immunomodulators, and emollients, often exhibit limitations such as adverse side effects and diminished therapeutic efficacy. This study aimed to design and evaluate a semi-synthetic gel formulation incorporating natural bioactive compounds from Tagetes erecta (marigold) and curcumin—both renowned for their anti-inflammatory, antioxidant, and wound-healing properties. The primary objective of this study was to formulate, optimize, and assess the efficacy of a semi-synthetic gel enriched with extracts from Tagetes erecta and curcumin as a potential therapeutic intervention for AD. The gel formulation was developed using a combination of natural and synthetic polymers, including carbopol and triethanolamine, and was rigorously evaluated for its physicochemical and microbiological characteristics. The gel demonstrated optimal spreadability, a pH within the skin's physiological range, and favorable viscosity, with stability observed under various storage conditions. In vitro assays revealed that the gel exhibited significant anti-inflammatory and antioxidant activities, as well as its capacity to mitigate both inflammation and oxidative stress. The anti-inflammatory effects were attributed to the presence of flavonoids and carotenoids from Tagetes erecta and curcumin, which modulated the expression of pro-inflammatory cytokines and enzymes. The antioxidant potential was linked to the ability of these bioactive compounds to neutralize reactive oxygen species (ROS) and reduce oxidative damage.Based on these findings, the semi-synthetic gel containing Tagetes erecta and curcumin extracts demonstrates considerable promise as a novel treatment modality for atopic dermatitis. Its favorable physicochemical properties, coupled with potent anti-inflammatory and antioxidant actions, suggest that it may offer a viable, natural alternative to conventional pharmacologic therapies for the management of AD.

**Keywords:** Atopic dermatitis, formulate, anti-inflammatory and antioxidant

**PC-274**

## PROTACS IN CANCER THERAPY: BRIDGING INNOVATION AND CLINICAL APPLICATION

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A revolutionary development in precision medicine, proteolysis-targeting chimeras (PROTACs) use the ubiquitin–proteasome system (UPS) to specifically break down disease-causing proteins, particularly those linked to cancer. PROTACs have a more long-lasting therapeutic effect. This review examines creation, uses, and difficulties of PROTACs in cancer treatment, highlighting how they can be used to take advantage of cancer's weaknesses, boost effectiveness, and go past resistance. Clarifying PROTAC mechanisms and their advantages over conventional treatments, showcasing developments in tumor-selective PROTAC design, and talking about the difficulties in putting them into practice are the main goals. Recent studies show that PROTACs tag target proteins for destruction via enlisting E3 ubiquitin ligases. Studies that compare them to small-molecule inhibitors highlight how much more




ISBN: 978-81-980623-8-3

effective they are.Enhancingtumor specificity, stability, and selectivity is the goal of optimization using chemical engineering and bioinformatics. PROTACs efficiently break down cancer-causing proteins, surpassing the drawbacks of inhibitors. By using tumor-specific E3 ligases, therapeutic accuracy is increased and off-target effects are reduced. Design advancements improve tumor selectivity, control resistance, and improve delivery even more. PROTACs are transforming oncology by providing innovative treatments for tumors that are resistant and challenging to cure. Even if there areissues with safety, pharmacokinetics, and clinical translation, research is still being done for experimental discoveries with practical uses, which has potential to improve patient outcomes.

**Keywords:** PROTACs, ubiquitin-proteasome system, E3 ligase, precision medicine, tumorspecific targeting.

**PC-275**

**DEVELOPMENT OF CHITOSAN-COATED PLGA NANOPARTICLES FOR TARGETED PULMONARY DELIVERY OF DOXORUBICIN IN LUNG CANCER**

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Doxorubicin HCl is a widely used anticancer drug, yet its clinical utility is restricted by poor solubility, low bioavailability, and unfavourable pharmacokinetics in conventional formulations. This study aimed to develop and evaluate a chitosan-coated PLGA nanoparticle system for passive, pulmonary-targeted delivery of doxorubicin in non-small cell lung cancer (NSCLC). Nanoparticles were prepared via a double emulsion solvent evaporation method and subsequently transformed into inhalable powder through lyophilization. Physicochemical characterization was carried out using SEM, FTIR, DSC, zeta potential, particle size analysis, and in-vitro release studies. The optimized particles measured 248–348 nm, with zeta potential shifting from negative to positive after chitosan coating, confirming successful surface modification. In-vitro release demonstrated sustained drug release over 48 hours. Cytotoxicity testing on A549 cells showed that chitosan-coated nanoparticles significantly enhanced antiproliferative activity compared to free doxorubicin. Overall, this delivery system exhibited improved bioavailability, prolonged release, and greater therapeutic potential, suggesting that chitosan-coated PLGA nanoparticles may serve as an effective pulmonary platform for doxorubicin delivery in lung cancer treatment.

**Keywords:** Chitosan, PLGA, Doxorubicin, Nanoparticles, NSCLC.

**PC-276**

**FABRICATION AND CHARACTERIZATION OF NANOSPONGES LOADED WITH AN ANTINEOPLASTIC AGENT**

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The main objective of the present work is to fabricate and characterize nanosponges loaded with an antineoplastic agent. The nanosponge was formulated by incorporating the drug in to the particles. Doxorubicin Hydrochloride has a wide anticancer activity. The activity of Doxorubicin Hydrochloride can be improved and its toxicity can be diminished by enhancing the relative specific accumulation in the tumour regions. The potential of the drug to be incorporated into the dosage form was analysed by preformulation studies such as FTIR study, solubility studies and the organoleptic properties. The formulation was carried out using Emulsion solvent diffusion method. In this method an organic phase consisting of the drug and polymer in dichloromethane is added to the aqueous phase consisting of PVA in water. The mixture was stirred using a magnetic stirrer at 1000rpm. The formulation was evaluated by Percentage yield, Entrapment efficiency, SEM, Zeta potential, Particle size distribution, Differential Scanning Calorimetry, In-vitro dissolution study, Porosity. The SEM images showed that the particles are spherical and nano-sized. The best formulation was selected based on the results of Entrapment efficiency, In-vitro dissolution study etc. Nanosponges are commonly developed as a topical dosage form but this study can be used as a model to develop controlled or targeted drug delivery systems that are cheap, effective and easily affordable to the patients. This study resulted in porous nature of nanosponges which provides a channel for the release of the drug and the method is quick and reproducible.

**Keywords**: Doxorubicin Hydrochloride, FTIR study, organoleptic properties, Emulsion solvent diffusion, SEM.

**PC-277**

**FORMULATION AND EVALUATION OF SILVER NANOPARTICLE BY USING TAMRINDUS INDICA FRUIT SHELL.**

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Nanoparticles has become a main branch of nanotechnology and there is an increasing commercial demand for nanoaprticlesdeu to the their ample applications.Nanoparticles play a major role in the field of engineering and medicine.This study investigates an efficient and sustainable route of Silver nanoparticles preparation from silver nitrate(AgNO3) using fruit shell extract of Tamarindusindica well known for their wide availability and medicinal property. For the synthesis of silver nanoparticles using the fruit shell extract of Tamarindusindica as a reducing agent from silver nitrate( AgNO3) has been investigated .The synthesis of silver nanoparticles mostly helps in enhancement of their Anticancer Activity.The synthesis of silver nanoparticles have been characterised using Ultaviolet Visible Spectroscopy, Fourier Transform Infrared Spectroscopy(FT-IR) ,Scanning Electron Microscopy (SEM) and X-Ray Diffraction Spectroscopy (XRD) and this synthesized silver nanoparticles shows an absorption peak at approximately 450 nm in the UV-visible spectrum.The morphological study of silver nanoparticles using SEM suggest that the nanoparticles are spherical in shape with a diameter around 20 to 100 nm.with their anticancer activity against MCF-7 Cellline .

**Keyword:** Nanotechnology, Green Synthesis, Silver Nanoparticles, Phytochemistry, Anticancer

**PC-278**

**BIOACTIVES LOADED ELECTROSPUN 2D-NANOFIBERS: OPTIMIZATION, CHARACTERIZATION AND EVALUATION AS CHRONIC WOUND HEALING DEVICE.**

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The study aimed to develop probiotic and fish oil-loaded 2D electrospun nanofibers (P&FO@NF) for chronic wound healing. Probiotics counter infections and modulate the wound environment, while fish oil rich in omega-3 fatty acids (33% EPA, 22% DHA) offers anti-inflammatory and regenerative effects. The two agents complement each other with FO enhancing probiotic viability and probiotic improving omega-3 bioavailability of fatty acids. However, instability of fish oil and reduced probiotic survival limit topical use. Hence, 2D NF are designed to overcome these issues, while the mimicking extracellular matrix, maintaining moisture balance and promoting tissue regeneration, and are considered wound healing devices. Optimization was carried out using Design of Experiments (DoE, JMP 17.1 custom design) to determine ideal emulsion and electrospinning conditions. The formulation composition and electrospinning parameters were optimized to obtain NF that showed uniform particle distribution (size 508 nm, PDI 0.228), stable morphology, and desirable physicochemical characteristics. Comprehensive characterization included FTIR, DSC, viscosity, thickness, and SEM analysis. Mechanical testing indicated good flexibility, while cytotoxicity studies on L929 cells demonstrated high viability (~72% at 1 µg concentration) without significant toxicity. Antibacterial assessments revealed effective inhibition of E. coli, MRSA, and Pseudomonas aeruginosa. In vivo evaluation using a diabetic wound model in male Wistar rats confirmed superior wound contraction (94.4%) compared to a marketed formulation (83.3%), with histological studies and biomarker estimation supporting enhanced tissue regeneration. These findings highlight the potential of P&FO@NF device as an efficient and biocompatible wound dressing for chronic wound management.




ISBN: 978-81-980623-8-3

**Keywords:** electrospinning, antibacterial, regeneration, matrix metalloproteinase, inflammation.

**PC-279**

**FORMULATION AND CHARACTERIZATION OF PROTEIN MAGNETIC NANOPARTICLES FOR TARGETED DELIVERY OF PEMETREXED DISODIUM IN LUNG CANCER**

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Lung cancer remains a leading cause of cancer-related mortality worldwide, with chemotherapy often restricted by systemic toxicity and insufficient drug targeting. Nanotechnology-based carriers present a promising strategy to overcome these limitations. In this study, protein-based magnetic nanoparticles (PMNs) were developed for inhalable delivery of pemetrexed disodium via the nasal route for targeted treatment of lung carcinoma. The nanoparticles were synthesized by the co-precipitation method and coated with albumin to enhance stability and biocompatibility. The optimized formulation (S7) displayed a mean particle size of 70.2 nm, narrow PDI, and favorable zeta potential, ensuring colloidal stability. Drug entrapment efficiency was notably high (82.42%) compared to less effective formulations (35.45%). In vitro diffusion studies demonstrated improved release, with PMNs achieving 58.81% drug diffusion at 60 minutes versus 42.49% for the pure drug. Ex vivo permeation studies across goat mucosa further confirmed enhanced permeability. Moreover, cytotoxicity evaluation on Ehrlich Ascites Carcinoma cells revealed stronger anticancer activity of PMNs than the free drug. Collectively, these results indicate that protein-coated magnetic nanoparticles significantly improve drug stability, release, permeability, and cytotoxicity, representing a promising nanocarrier system for targeted lung cancer therapy.

**Keywords:** Lung cancer, Nanotechnology, Protein magnetic nanoparticles, Targeted drug delivery.

**PC-280**

**EVALUATION OF STARCH FROM TARO (COLOCASIA ESCULENTA) AS DISINTEGRATING AGENT IN TABLET FORMULATION**

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Taro (Colocasia esculenta) contains about 70–80% starch, which can serve as a potential disintegrating agent in pharmaceutical tablet formulations. The aim of this study was to extract and evaluate starch from Taro and assess its suitability as a disintegrating agent. Starch was extracted using a simple process, and physicochemical tests confirmed its good properties without altering its chemical composition. The extracted starch was then used to prepare lactose tablets via wet granulation. The formulated tablets were evaluated for hardness, friability, weight variation, solubility, and disintegration time. Results showed that tablets containing taro starch disintegrated within 1.5 minutes, with wet granulation tablets exhibiting superior performance. These findings suggest that taro starch can be used as an effective alternative disintegrating agent in tablet dosage forms.

**Keywords**: Taro starch, Colocasia esculenta, Disintegrating agent, Tablet formulation.

**PC-281**

**FORMULATION AND EVALUATION OF FINERENONE EXTENDED-RELEASE TABLETS USING EUDRAGIT RS100 AS A MATRIX FORMER: A COMPARATIVE STUDY WITH HPMC-BASED FORMULATIONS**

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The present study was aimed at developing and evaluating extended-release matrix tablets of Finerenone which is a novel non-steroidal mineralocorticoid receptor antagonist, which uses Eudragit RS100 as the matrix-forming polymer. Finerenone is currently marketed as immediate-release tablets (Kerendia®) for the management of chronic kidney disease (CKD) which is associated with type 2 diabetes mellitus (T2DM) and requires daily administration. Developing an ER formulation could sustain therapeutic levels and reduce dosing frequency, and also improves patient adherence in chronic therapy. The hydrophobic, water-insoluble, yet permeable properties of Eudragit RS100 were chosen because they minimize the impact of gastrointestinal pH and motility on drug release, which is advantageous for poorly soluble medications. Direct compression was used to create these formulations, and pre- and post-compression parameters were assessed. The tablets hardness, friability, thickness, weight fluctuation, uniformity of drug content and in vitro release in gastrointestinal fluids were evaluated. The release profile of formulation of Eudragit RS100 was tested and compared with that of traditional HPMC hydrophilic matrix system. Compared to HPMC matrices, which are prone to variations due to agitation, the ionic environment, and gel strength, Eudragit RS100 formulations provide more stable, pH-independent, and controlled release profile. Stability tests was performed according to ICH guidelines which shows the robustness of the optimized formulation. Finally it was shown that ER finerenone tablets based on Eudragit RS100 has better control over drug release. This could result in better adherence, fewer doses, and increased therapeutic efficacy in the long-term management of CKD with type 2 diabetes

**Keywords:** Finerenone, Extended-release tablets, Eudragit RS100, HPMC matrix, Controlled drug delivery

**PC-282**

**INFLUENCE OF NATURAL STABILIZERS ON ESOMEPRAZOLE NANOCRYSTALS PREPARED BY ANTISOLVENT PRECIPITATION METHOD FOR ENHANCED ORAL BIOAVAILABILITY**

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Esomeprazole is proton pump inhibitor which has low aqueous solubility, therefore, reducing its oral bioavailability. The best course of action in increasing its therapeutic efficacy is to increase its solubility and rate of dissolution. The major aim of the research was to escalate the solubility and the dissolution speed of esomeprazole by planning nanocrystals of the drug using the technique of antisolvent precipitation. The nanocrystals of esomeprazole were made using the different stabilizers like the Guar gum, Karaya Gum, and polyethylene glycol 400 (PEG 400). The variability of such stabilizers was applied in the creation of eight formulations (F1, F2, F3, F4, F5, F6, F7 and F8). Particle size, drug content and in vitro drug release of the formulations were determined. The Fourier-transform infrared spectroscopy (FTIR) and differential scanning calorimetry (DSC) were used in characterization. The best formula released 99% of the drug in only 5 minutes, which is much more than the pure drug. The FTIR analysis showed that there was no drug-stabilizer interaction, which showed excipient compatibility. DSC data indicated lower crystallinity, which shows a successful formation of nanocrystal. Antisolvent precipitation as a method to produce stable Nanocrystals of Esomeprazole is simple and has high probability of producing Esomeprazole nanocrystals with high dissolution rates that can enhance oral bioavailability. Optimized formulation F8 showed 99 percent of the drug in 5 minutes. No convincible drug-excipient interaction. Enhanced dissolution because of reduced particle size and associated increase in surface area and effective stabilization Reduced crystallinity shown by DSC.

**Keywords**: Esomeprazole, Antisolvent precipitation, Guar gum, FTIR, Dissolution enhancement.

**PC-283**

**FORMULATION DEVELOPMENT AND EVALUATION OF FAST DISSOLVING TABLETS CONTAINING NANOPARTICLES OF TOPIROXOSTAT**

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Topiroxostat is a xanthine oxidase inhibitor and is used in the treatment of gout. Since it has low therapeutic efficacy due to poor aqueous




ISBN: 978-81-980623-8-3

solubility and dissolution rate, this study aims to develop and evaluate fast dissolving tablets (FDTs) containing nanoparticles of Topiroxostat to enhance it's solubility and dissolution rate. Solvent diffusion technique was used to prepare nanoparticles with spherical crystallization employing PVP-K30 and SLS as formulation variables. A $3^2$ full factorial design was used to optimize process parameters. Among the F1-F6 batches, the F4 batch demonstrated proper spherical shape, uniform size, and enhanced dissolution properties. The tablets were prepared by direct compression using Croscarmellose sodium (CCS) and Crospovidone as superdisintegrants. The absence of possible drug-polymer interactions was confirmed by FTIR analysis. The optimized formulation exhibited a disintegration time of 23 ± 0.10 sec, wetting time of 25 ± 0.22 sec, and significantly enhanced drug release as compared to the pure drug and it's marketed formulation. Stability studies were conducted for over a month which indicated no major changes in drug content, solubility and dissolution parameters. This study depicts that fast dissolving tablets containing nanoparticles of Topiroxostat provide enhanced dissolution and rapid drug release, putting forward a promising approach for enhanced therapeutic management and treatment of gout.

**Keywords:** Topiroxostat, FDTs, Nanoparticles, Superdisintegrants, Gout

**PC-284**

## DEVELOPMENT OF NANO ICARITIN LOADED POLYMERIC SCAFFOLD FOR DIABETIC WOUND HEALING.

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A diabetic wound is a complex, chronic non-healing wound that occurs in approximately 34% of patients with diabetes and is commonly referred to as Diabetic Foot Ulcer (DFU). Biomaterial-based scaffolds have entered this sector to provide structural stability and a favourable environment for cellular regeneration, thus imitating original tissue in function. To formulate Icaritin NLC-loaded Chitosan/ PVA/ Methylcellulose (ICT- Cs/PVA/MES) scaffold and study its effect on oxidative stress and inflammation via NrF 2 /HO-1 axis for diabetic wound healing in rats. Icaritin NLC-loaded Cs/PVA/MES scaffold was formulated by freeze-drying technique, characterized and evaluated for compatibility, morphology, degradation and in vitro drug release studies. In vitro SRB assay was carried out. It was further tested for diabetic wound healing studies on STZ-induced diabetic rats with an excisional wound model. The formulated scaffold was in a spongy texture and highly porous. In vitro SRB assay showed no cytotoxicity and in scratch assay within 48hr significant migration was observed in ICT-NLC The in vivo studies showed complete wound closure within 21 days in the ICT scaffold group with a significant increase in the expression of NrF2/ HO-1 and a significant decrease in the expression of NF-kB, TNF-α and IL-6.It was concluded that the developed scaffold could be a promising treatment strategy for diabetic wound healing.

**Keywords**: Icaritin, diabetic wound healing, nanoparticles, scaffold.

**PC-285**

## FORMULATION AND EVALUATION OF TOPICAL NANO-EMULGEL USING ANTI-INFLAMMATORY DRUG FOR THE TREATMENT OF ARTHRITIS

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The current research study was focused on the formulation of Celecoxib-based nanoemulsion hydrogel for the treatment of arthritis. Celecoxib, used to manage pain and inflammation. is hindered by several limitations, hence, a transdermal topical applicalion containing Celecoxib nanoemulgel was formulated. Pseudo-ternary phase diagrams were constructed using tea tree oil as oil phase, PEG 400 as surfactant, ethanol as co-surfactant, and water. 4:1 ratio of PEG 400 to ethanol (Smix) was found to yield the largest isotropic region. The formulations were further optimized using a 32 factorial design.Formulation C6 demonstrated the most desirable properties, including a globule size of 221.3 nm, a polydispersity index of 0.572, drug content of 95.2±0.16%, drug release of 75.34±0.44% after 8 hours, viscosity of 214±0.36 cP. The selected nanoemulsion (C6) was then incorporated into a Carbopol 940 gel base at concentrations of 1%, 1.5%, and 2% to produce three different Celecoxib nanoemulgels (C6F1, C6F2, C6F3). These Emugels were evaluated for pH, Viscosity, Spreadability, Extrudability, Drug content and % drug release formulation.Among these, formulation C6F3 exhibited the best performance, with a drug content of 98.04±0.22% by UV spectrophotometer and 98.13% by HPLC method and a drug release of 64.11±0.43% at 6 hours. Thus, it can be concluded that the objective of this study was successfully achieved through the development of the Celecoxib nanoemulgel, which offers enhanced therapeutic efficacy in treating arthritis and effectively managing pain and inflammation, underscoring its reliability as a topical treatment option for patients.

**Keywords:** Celecoxib, Transdermal , Nanoemulgel, Tea tree oil, Carbopol 940.

**PC-286**

## FORMULATION DEVELOPMENT AND EVALUATION OF MEDICATED LOZENGES OF AMISULPRIDE

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This study focuses on the formulation and evaluation of medicated lozenges which contain Amisulpride, which is used for the effective management of post-surgery emesis. A complexation approach was used using where β-cyclodextrin was used, where a 1:2 ratio of drug-to-carrier was demonstrated. The most significant improvement in solubility to prevail is the poor aqueous solubility of Amisulpride. Methods for preparing lozenges were used such as heating and congealing methods with excipients like sucrose, isomalt, HPMC E5, stevia, ginger, and citric acid which is selected based on preliminary compatibility and functionality studies. For systematic optimization a $3^2$ full factorial design was used, using sucrose and HPMC E5 levels as independent variables, while disintegration time, hardness, and drug release profile were used as dependent responses. The optimized formulation shows a disintegrated time of 9.41 minutes, hardness of 10.7 kg/cm², and it also shows cumulative drug release behavior, which supports product stability. The results show the successful development of stable and patient friendly lozenges of Amisulpride with enhanced solubility, and it has effective drug delivery. This work shows the importance of rational formulation design, application of factorial optimization, and integration of natural sweeteners and flavoring agents which improve both therapeutic efficacy and patient compliance. The study provides an effective strategy to the development of novel dosage forms which are intended for the management of emesis in clinical practice.

**Keywords:** Amisulpride, Lozenges, β-cyclodextrin, Factorial design, Emesis management

**PC-287**

## DESIGN AND EVALUATION OF CRISABOROLE-LOADED NANOSUSPENSION GEL: A NOVEL TOPICAL APPROACH FOR ATOPIC DERMATITIS THERAPY

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The present study is related to Formulation, Development and Evaluation of Nanosuspension of a drug Crisaborole which is poorly soluble PDE-4 inhibitor loaded in the gel for the treatment of Atopic dermatitis. The Research of last ten years reveals that the atopic dermatitis(AD) is influenced by immunologic, environmental, and genetic variables where the Atopic dermatitis affects 15–30% of children and 2–10% of adults worldwide, highlighting the condition's pervasiveness. There are several marketed formulations are Available for the Atopic dermatitis patient out of which the most desirable one thought is topical as the onset of action is quick. Crisaborole Nanosuspension was developed by Wet media milling method which contain Poloxamer 188 and Poloxamer 407 as Surfactants and Hydroxypropyl Methyl Cellulose K 100M (HPMC K 100M) and Polyvinyl Pyrrolidine K 30 (PVP K-30) as stabilizer in proportion 1:3, optimized by 32 Factorial Design and then suitably incorporated into nanogel with




ISBN: 978-81-980623-8-3

addition of 0.5% Carbopol 940 for topical delivery of nanosized Crisaborole. To determine the advantage of Crisaborole Nanosuspension Gel for skin application the in vitro experiment was performed using Franz diffusion cell. Best batch F8 has shown Maximum particle size 139.9 nm, zeta potential -11.1 mV and cumulative drug release 95.47%. The optimise batch was subjected to stability study for 30 days the visual evaluation showed no change in physical appearance during stability study after stability. This present study indicates that recently developed Nanosuspension based Topical gel can be used safely for treatment of Atopic Dermatitis.

**Keywords:** Atopic dermatitis (AD), Nanosuspension Gel, Crisaborole, 3Full factorial Design

**PC-288**

**DEVELOPMENT OF MUPIROCIN SLN-LOADED BIGEL FOR ENHANCED TOPICAL MANAGEMENT OF SKIN INFECTIONS**

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This work describes the development of a bigel-based topical drug delivery system containing mupirocin-loaded solid lipid nanoparticles (SLNs) for enhanced antibacterial treatment. Mupirocin is a highly potent and effective topical antibiotic, especially against Staphylococcus aureus and methicillin-resistant bacteria (MRSA); however, its clinical effectiveness is compromised due to faster systemic absorption and renal elimination after topical administration. To overcome these constraints, SLN were formulated by the solvent emulsification-evaporation method with Phospholipon 90G as the lipid matrix and Poloxmer 407 as the surfactant. The developed SLN formulation showed a mean particle size of 120nm, zeta potential of -22.5mV, and entrapment efficiency 86%, reflecting excellent colloidal stability and drug encapsulation. The SLNs were loaded in a bigel system containing hydrogel and oleogel phases to improve skin retention, spreadability, and drug permeation. The bigel was examined for physicochemical characteristics such as pH, viscosity, spreadabiliy, and homogeneity and also for its bioavailability. Sustained release of the drug from the SLN-loaded bigel (73.2% for 14 hours) compared with the commercial mupirocin ointment (92% for 8 hours) reaffirmed its controlled release nature. Antimicrobial evaluations also confirmed good activity against S. areus. The bigel was shown to be physically and chemically stable over 3 months' storage. These results indicate that the SLN-based bigel developed here provides a valuable opportunity for sustained topical delivery of mupirocin, with the potential to improve therapeutic efficacy and patient compliance in the treatment of localized skin infections caused by bacteria.

**Keywords:** Solid lipid nanoparticles, bigel, mupirocin, sustain release action, topical delivery, and bacterial skin infection.

**PC-289**

**FORMULATION AND OPTIMIZATION OF SANDWICHED OSMOTICALLY CONTROLLED DUAL DRUG DELIVERY SYSTEM FOR ANTIDIABETIC THERAPY**

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In the treatment of diabetes mellitus, conventional antidiabetic therapies frequently fall short due to erratic medication levels, frequent dosing and low patient compliance. The objectives of the presented research was to design a sandwiched osmotically controlled dual drug delivery system for the simultaneous administration of linagliptin (DPP-4 inhibitor) and empagliflozin (SGLT-2 inhibitor) for steady and regulated delivery, to improve glycemic control. After completing a thorough preformulation characterisation, Empaglifozin was mixed with HPMCK4M, KCl and Lactose Monohydrate along with talc and magnesium stearate to make one layer. Same was done with Linagliptin to make another layer. For giving it sandwiched osmotic nature, a push layer was made by mixing KCl, Lactose monohydrate, talc and magnesium stearate. The 8 mm round standard concave punches were used to compress tri-layer tablet. The obtained tablets were coated with cellulose acetate (5%, 10%, w/w) in conventional coating pan to develop semipermeable membrane. The delivery orifices was developed mechanically to precisely control the release of drugs. FTIR, DSC and XRD study concluded that drug and polymers were compatible with each other. Hardness, friability, weight variation and dissolution tests were performed. In vitro study showed that, improved formulation have zero-order release kinetics, regardless of agitation or pH. Batch F3 having 5% cellulose acetate coating showed empaglifozin and linagliptin 98.8626 % and 97.453 % release respectively at the end of 24 h dissolution study in 0.1 M HCl. It was concluded that, sandwiched osmotic tablets can be a game-changer for simultaneous delivery of antidiabetic drug for longer-acting effects and better patient compliance.

**Keywords:** Sandwiched osmotic tablet, Diabetes mellitus, Controlled release, Osmotic pump.

**PC-290**

**COMPARATIVE STUDY OF AI AND CYCLODEXTRIN TOWARDS BETTERMENT OF SOLUBILITY OF SOME APIS WITH POOR WATER SOLUBILITY**

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Inclusion complexation with Cyclodextrin (CD) is an industrially feasible approach to modify the physicochemical properties of poorly water-soluble drugs. In the case of CD techniques, the experimental determination of a complex binding constant is frequently troublesome and tedious. Therefore, AI-assisted computer-based methods have been applied as a device for anticipating CD association constants, which reduces the duration of assessment of the same and for identifying various driving forces associated in inclusion phenomenon. In this research work, CD inclusion complexation of Piperine (PIP) was prepared in aqueous medium, indicating 1:1 stoichiometry, which is previously confirmed by computational chemistry within a very short period. This computational methodology also predicted the inclusion mode of piperine inside b-cyclodextrin, different interactions & affinity of drug towards CD which is important for predicting the stability of inclusion complexes. As a result, AI is an effective tool in the exploration of Novel drug delivery and when it is combined with the Cyclodextrin approach, it may produce a less expensive, more researcher-friendly, less time-consuming technique in formulation development.

**PC-291**

**FORMULATION AND EVALUATION OF COLON TARGETING MESALAMINE ABLET USING POWDER COATING TECHNIQUE**

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Powder coating is a novel solvent free coating technology that has gained increasing attention in pharmaceutical field as an alternative to conventional liquid–based coating techniques. In this process, dry powder particles consisting of polymers plasticizers and functional excipients are applied onto solid dosage form and subsequently fused under controlled thermal or plasticizer conditions to form a continuous film. The advantages of powder coating is solvent free process, patient safety, uniform coating, control release, stability, taste masking and the disadvantage of powder coating is limited substrate, equipment requirement, coating defects, scaleup language. The objectives is to load mesalamine in chitosan macroparticles and formulate and evaluate powder coating enteric coated tablet using mesalamine loaded chitosan beads for colon targeting. Mesalamine loaded chitosan beads by using inotropic gelation method. FTIR confirmed the successful entrapment of mesalamine in chitosan beads having 39% drug loading with 58.5% Entrapment efficacy. Core tablets were prepared by direct compression method having mesalamine loaded chitosan beads with MCC, mannitol, sodium starch glycolate, povidone and evaluated for appearance, thickness (5.22mm), hardness (5.5kg/cm2), friability (0.7%), weight variation (250.2mg) and disintegration time (17mins). The powder coating to core tablets of mesalamine and mesalamine loaded beads were carried out using Eudragit L100, HPMC, PEG 6000, and talc by compression coating. Powder coated tablets were successful evaluated for enteric tablet by acid uptake and disintegration in 6.8 pH phosphate buffer, In-vitro drug released study showing controlled released of mesalamine about 76.67% in 6 hr at 6.8 pH phosphate buffer. In




ISBN: 978-81-980623-8-3

conclusion, dry powder coating technique successfully evaluated for colon targeting mesalamine delivery.

**Keyword:** Powder coating, chitosan beads, mesalamine, colon targeting.

**PC-292**

**COST OF ILLNESS ASSOCIATED WITH TYPE 2 DIABETES MELLITUS MANAGEMENT: A PROSPECTIVE ANALYSIS OF DIRECT AND INDIRECT COSTS**

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This prospective observational study assessed direct and indirect costs associated with Type 2 Diabetes Mellitus management. The study was conducted in private clinics in Suryapet through case reports and patient interviews about monthly expenditures. One hundred patients aged above 30 years with Type 2 DM were included, comprising equal gender distribution. Statistical analysis was performed using regression analysis and T-test. Results showed 63 patients (63%) had diabetes complications while 37 (37%) were without complications. Total annual cost of illness for patients with complications was 510.96 USD compared to 319.68 USD for those without complications, showing significant difference of 191.28 USD. Patients with complications spent 225 USD annually for medications versus 93.72 USD for those without. Laboratory charges were higher for complicated cases (78.60 USD) compared to uncomplicated ones (45.12 USD). This study highlights the substantial financial impact of diabetes complications, with complicated patients spending approximately 60% more on healthcare. The findings emphasize the need for effective complication prevention strategies to reduce economic burden on patients and healthcare systems.

**Keywords**: Type 2 Diabetes Mellitus, Cost of illness, Healthcare expenditure, Direct costs, Diabetes complications.

**PC-293**

**COMPARATIVE STUDY OF VITAMIN C CONTENT IN MARKETED COSMECEUTICALS**

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Vitamin C (L-ascorbic acid) is a water-soluble vitamin commonly applied in cosmetical products due to its strong antioxidant effect, its capacity to enhance collagen production, and its possible application in the prevention of oxidative and UV-related harm to the skin. As more consumers are increasingly willing to use vitamin C-based skin care formulations, there is a need to assess the real amount of vitamin C available in the marketed formulations. The aim of the current study was to determine the vitamin C level of marketed cosmeceutical products by the use of the 2,6-dichlorophenol indophenol (DCPIP) titration technique. The redox mechanism offers an easy and effective means of vitamin C quantification because it can be used in changing the color of DCPIP dye, which is blue, to colorless. Several of the marketed formulations with lots of lotions, serums, and creams were chosen to be analyzed. The findings showed that there was significant difference in vitamin C level of various brands and formulations. It was observed that some products have had a closer vitamin C content compared to the claim on the label and others had a relatively lower content. These findings are significant because it indicates the stability of the products, the differences in formulation, and the possibility of the therapeutic effectiveness in preserving the skin condition. Finally, the paper emphasizes the significance of analytical quality control over cosmeceutical products and reveals the formulation (Sugar pop sunscreen) with the greatest proportion of vitamin C (96.8) of all the ones analyzed. This article highlights the importance of vitamin C in cosmetics product as well as the importance of rigorous assessment of the products sold to the market in order to guarantee their effectiveness and safety to the consumer.

**Keywords:** L-ascorbic acid, cosmeceuticals, antioxidant, collagen synthesis, DCPIP method

**PC-294**

**DESIGN, SYNTHESIS AND COMPUTATIONAL MECHANISTIC STUDY OF 1,3-THIAZOLE DERIVATIVES TO CONSTRAINT CARDIOVASCULAR RISK FACTORS**

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Cardiovascular diseases (CVD) remain the leading cause of global mortality, necessitating novel therapeutic agents targeting underlying risk factors. This study focuses on the design, synthesis, and computational evaluation of novel 1,3-thiazole derivatives aimed at modulating cardiovascular risk. Thirty-five novel thiazole analogues were designed using in silico approaches, including molecular docking and quantitative structure-activity relationship (QSAR) analysis, targeting the angiotensin-converting enzyme (ACE), a key regulator implicated in hypertension and cardiac dysfunction. Databases such as PubChem, ZINC, and Enamine confirmed the novelty of selected compounds. Molecular docking revealed promising binding affinities, particularly for compounds AP27, VP21, and VP20. ADME profiling indicated favourable drug-like properties and toxicity assessments predicted acceptable safety profiles. Eight lead compounds were synthesized via microwave-assisted methods and structurally characterized by IR, NMR, and mass spectroscopy techniques. Preliminary acute oral toxicity studies using OECD guidelines demonstrated non-lethal toxicity levels for selected compounds. The integrative approach of computational predictions and experimental validations suggests these novel thiazole derivatives as potential candidates for cardiovascular therapeutics. Further pharmacological and clinical evaluations are warranted to establish their efficacy and safety profiles.

**Keywords:** Thiazole, Cardiovascular risk, Drug design, Molecular docking, QSAR

**PC-295**

**FORMULATION AND OPTIMIZATION OF DIRECTLY COMPRESSED FLOATING TABLETS CONTAINING IBUPROFEN AND RABEPRAZOLE**

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The goal of this study was to create gastro-retentive floating tablets with a mix of Rabeprazole and Ibuprofen that would improve stomach retention and provide sustained release by employing the direct compression method. The proton pump inhibitor Rabeprazole is acid-labile and needs gastric protection, while the widely used NSAID Ibuprofen frequently irritates the stomach when released quickly. To extend gastric residency and offer a concurrent therapeutic advantage, a floating drug delivery system (FDDS) was created. Formulations ($F_1$–$F_9$) were made with different amounts of HPMC as the release-retarding polymer, and effervescent agents such as citric acid and sodium bicarbonate. Characterization of the powder blend (bulk density, tapped density, Carr's index, Hausner's ratio, and angle of repose) verified that the majority of formulations had acceptable flow characteristics. The lag time for floating varied from 15 to 39 seconds, with $F_5$ exhibiting the shortest lag time. All formulations maintained their buoyancy for over 12 hours. In summary, the combination floating tablets of Rabeprazole and Ibuprofen were able to maintain buoyancy for an extended period of time. The formulation that showed the most promise among all of them was $F_4$, which combined the potential for enhanced therapeutic efficacy in gastro-retentive drug delivery with a rapid floating onset.

**Keywords:** Ibuprofen, Rabeprazole, Floating drug delivery system, Gastro-retentive tablets, Direct compression.

**PC-296**

**DEVELOPMENT OF EXOSOME-BASED DRUG DELIVERY SYSTEM FOR NATURALLY INSPIRED NOVEL MULTIFUNCTIONAL NEUROPROTECTIVE MOLECULES AND THEIR BIOLOGICAL EVALUATION IN ALZHEIMER'S DISEASE MODELS**

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Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by β-amyloid (Aβ) aggregation, tau hyperphosphorylation, oxidative stress, and cholinergic dysfunction, leading to cognitive




ISBN: 978-81-980623-8-3

decline. Despite promising leads, clinical translation is hindered by poor aqueous solubility and limited brain permeability due to the restrictive blood–brain barrier (BBB). Our laboratory previously developed two naturally inspired multifunctional neuroprotective molecules, F24 (Eur J Med Chem. 2020;198:112257) and F76 (Bioorg Med Chem. 2021;46:116385), with strong anti-Alzheimer potential, but their utility was restricted by unfavorable pharmacokinetics. To address these limitations, we engineered an exosome-based nanocarrier system using human plasma-derived exosomes for enhanced solubility, stability, and targeted brain delivery. Drug loading was optimized through a hybrid probe sonication–incubation method, yielding stable vesicles with high encapsulation efficiency. Exo-F24 and Exo-F76 exhibited sustained release at physiological pH and potent inhibitory activity against acetylcholinesterase (AChE) and butyrylcholinesterase (BChE), with enzyme kinetics confirming their inhibition mechanism. Both formulations also displayed significant antioxidant activity (DPPH assay), metal chelation, and effective BBB permeability (PAMPA-BBB). In SH-SY5Y neuroblastoma cells, they protected against $H_2O_2$-induced oxidative stress, confirming neuroprotective efficacy. Pharmacokinetic studies in rodents revealed improved oral bioavailability, sustained systemic exposure, and efficient brain distribution. In vivo, Y-maze testing in scopolamine-induced amnesia models demonstrated enhanced memory performance and cognitive protection. These findings highlight exosome-based delivery as a promising strategy to overcome solubility and delivery barriers of neurotherapeutics, establishing Exo-F24 and Exo-F76 as multifunctional candidates for AD therapy.

**Keywords:** Alzheimer's disease (AD), Exosome, Cytotoxicity, Biocompatibility, Drug delivery system

**PC-297**

**THE DEVELOPMENT OF BIODEGRADABLE MICROPARTICLES IN REGENERATIVE MEDICINE**

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Biodegradable microparticles are emerging as versatile platforms in regenerative medicine due to their ability to promote tissue repair and deliver therapeutics in a controlled, localized manner. Their tunable physicochemical properties, derived from both synthetic polymers and natural biomaterials, allow precise modulation of degradation rates, drug release kinetics, and surface characteristics, making them highly adaptable for clinical applications. Recent innovations in microparticle engineering have focused on optimizing fabrication techniques such as microfluidics and electrospraying to enhance uniformity, scalability, and reproducibility. Functional modifications have enabled their use as multifunctional systems for three-dimensional scaffolding, stem cell expansion, and targeted modulation of inflammatory responses, expanding their role beyond traditional drug delivery vehicles. Preclinical studies have demonstrated the efficacy of biodegradable microparticles in skeletal tissue regeneration, osteoarthritis treatment, and wound healing, with sustained therapeutic effects and reduced systemic toxicity. These advances highlight their potential to address unmet needs in precision medicine and tissue engineering. However, no clinically approved products are currently available, indicating significant translational gaps. While biodegradable microparticles demonstrate strong promise for regenerative therapies, barriers remain, including long-term biocompatibility evaluation, large-scale manufacturing challenges, and regulatory hurdles. Overcoming these limitations requires interdisciplinary collaboration across biomaterials science, pharmaceutical technology, and clinical research. Continued innovation and investment in this field are expected to accelerate the development of clinically viable solutions, offering improved therapeutic efficacy, personalized treatment strategies, and enhanced patient outcomes.

**PC-298**

**APPLICATION OF REFINED SUNFLOWER OIL FOR THE DEVELOPMENT OF SELF- MICROEMULSIFYING DRUG DELIVERY SYSTEMS FOR POORLY WATER SOLUBLE EMPAGLIFLOZIN**

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Empagliflozin, a sodium-glucose co-transporter 2 (SGLT-2) inhibitor, is used in the management of Type II Diabetes Mellitus, exhibits low solubility, and variable therapeutic efficacy. Refined Sunflower Oil is distinguished by being an edible, pharmaceutically approved lipid that is rich in polyunsaturated fatty acids, particularly linoleic acid, which improves membrane fluidity and facilitates lymphatic absorption. Solubility of EMP was carried out in various oils (Sesame oil, Orange oil, Castor oil, Olive oil, Labrafac, MCT, Sefsol, Virgin coconut oil, Hydrogenated coconut oil, Ref. sunflower oil, and Safflower oil), surfactant (Tween 20, Span 80, Plurol Oleique CC 497, Lauroglycol FCC) and co surfactant (PEG 200, PEG 400, and Propylene Glycol). The pseudo ternary phase diagram was constructed to identify microemulsion zone. The liquid SMEDDS formulations were developed using combination of Oil (refined Sunflower oil), Surfactant (Tween 20), co surfactant PEG 200 (L1) and oil (refined Safflower oil), Surfactant (Tween 20), and co surfactant PEG 200 (L 2). The liquid formulations were converted into solid using adsorbent Neusilin® US2. The liquid and solid SMEDDS formulations were evaluated for % transmittance, Drug content, in-vitro dissolution study and characterized for globule size and zeta potential. The liquid L1 and its converted solid formulation exhibited globule size of 516.7 nm, 870 nm and zeta potential value of -11.71 mV, S1 (-27.24 mV) respectively. The solid formulation exhibited improvement in in-vitro dissolution rate as that of plain drug. The developed solid SMEDDS formulation comprising of Oil (refined Sunflower oil), Surfactant (Tween 20), co-surfactant PEG 200 has the capability to improve the solubility.

**Keywords**: refined Sunflower oil, refined Safflower oil, globule size

**PC-299**

**EFFECT OF POLYMERIZED CYCLODEXTRIN ON INCLUSION BEHAVIOUR AND PHARMACOKINETICS OF ABIETIC ACID**

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Abietic acid is the predominant resin acid found in the oleoresin of various coniferous species, especially those in the genus Pinus. It is a major diterpenoid constituent of coniferous resin, has witnessed a remarkable journey from its traditional use in industrial applications to its emergence as a highly promising scaffold for modern drug discovery. In this research study, binary inclusion complex of abietic acid with polymerized cyclodextrins EPi-β-CD and CM-Epi-β-CD were prepared by three methods. Phase solubility was done to determine stiochiometric ratio and complexation efficiency. The complexes were characterized by FTIR and dissolution studies. Results of Phase solubility revealed AL type graph with R2 value 0.988 and 0.997 for both polymerized cyclodextrins with stability constant of 10671 M-1 and 13528 M-1. These complexes were subjected to pharmacokinetics study leading to improved solubility and bioavailability. In conclusion, polymerized cyclodextrin are prominent in improving the physical and chemical properties of BCS class II/IV drugs. This approach shows promise in overcoming solubility challenges associated conventional drugs may contribute to better treatment outcomes. In future, research and clinical studies are essential to validate the effectiveness and safety of bioactives as a viable delivery system.

**Keywords:** abietic acid, solubility, cyclodextrin, complex, dissolution, pharmacokinetics

**PC-300**

**FORMULATION AND EVALUATION OF MALTODEXTRIN BASED PRONIOSOMES LOADED WITH IBUPROFENAMINE HYDROCHLORIDE**

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The aim of the present study was to prepare, optimize and characterize Ibuprofenamine hydrochloride proniosomes. The objective of the research was to prepare proniosomes by using maltodextrin as a carrier




ISBN: 978-81-980623-8-3

using the slurry method. A central composite design was used for the optimization with the total surfactant loading(X1) and lipid concentration(X2) as the independent variables. Prepared proniosomes were characterized by particle size analysis and entrapment efficiency. Multiple regression analysis and contour plots were used to relate the dependent and independent variables. An optimized batch (IFop) was prepared and evaluated for particle size analysis, zeta potential, entrapment efficiency, SEM, TEM, DSC, XRD, In-vitro dissolution, and it was found that optimized formulation has a particle size of 158.3 nm, zetapotential value of -17.2, drug entrapment of 77.72%, drug release of 89.29%, the release profile of niosomes fits best with the Higuchi model. SEM and TEM images confirmed the proniosomes were nearly spherical; XRD analysis confirmed the amorphization of the drug. This work has demonstrated the use of central composite design in optimizing Ibuprofenamine hydrochloride proniosomes. The optimization model predicted the levels of X1 and X2, to minimize the particle size and maximize the entrapment efficiency. Over all, in this study, an approach to generating niosomes incorporating Ibuprofenamine hydrochloride using a slurry-based proniosome technology was demonstrated.

**Keywords:** Ibuprofenamine hydrochloride, Span 60**,** central composite design.

**PC-301**

**SYNTHESIS, CHARACTERISATION, IN-SILICO ANALYSIS, IN-VITRO STUDIES OF NITROGEN CONTAINING HETEROCYCLIC COMPOUNDS FOR ANTI-CANCER AND NEURO PROTECTIVE ACTIVITY**

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Neurodegenerative diseases and cancer cases are increasing rapidly worldwide and treating them with existing drugs is becoming difficult due to their complex mechanisms, limited efficacy of current therapies, and the discovery of shared molecular pathways. Our study is focused on developing novel heterocyclic nitrogen containing molecules like pyrazole and pyrimidinone derivatives that can precisely target specific disease mechanisms, such as protein aggregation in neurodegeneration and uncontrolled cell growth in cancer. we synthesised 5-acetyl-3,4-dihydropyrimidine derivatives, 5-(2,2,2-trifluoroacetyl)-3,4-dihydropyrimidine derivatives. 5 substituted 3 phenyl pyrazole derivatives and 2,2,2- trifluoro,5-substituted 3 phenyl pyrazole derivatives using Biginelli reaction a multicomponent reaction, their structures were confirmed by using IR. NMR and Mass Spectroscopy, further they were studied their ADMET profile using Biosig lab software and performed In-silico docking studies on proteins involved in neurodegeneration and cancer proteins using Pyrx and Biodiscovery studio where 2 hydroxy benzaldehyde and 2 nitro benzaldehyde derivatives shown a significant docking score was obtained, These compounds were synthesized and were studied for In-vitro and In-vivo studies.

**Keywords**: 5-acetyl-3,4 dihydropyrimidine derivatives, 5-(2,2,2-trifluoroacetyl)-3,4-dihydropyrimidine derivatives. 5 substituted 3 phenyl pyrazole derivatives and 2,2,2- Trifluoro,5-Substituted 3 phenyl pyrazole derivatives, Biginelli reaction.

**PC-302**

**DEVELOPMENT OF ETHOSOMAL GEL INCORPORATING FENOPROFEN FOR TOPICAL MANAGEMENT OF RHEUMATOID ARTHRITIS**

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In the present research, a topical gel of fenoprofen incorporated in ethosomes was formulated for the effective management of rheumatoid arthritis. The objective of the study was to enhance the dermal delivery of fenoprofen by overcoming the limitations of conventional topical systems such as poor penetration and reduced bioavailability. Ethosomes were prepared by the cold method using varying concentrations of phospholipid and ethanol The prepared ethosomes were evaluated for vesicle size, zeta potential, entrapment efficiency and drug release, and it was found that formulation F3 (prepared using optimized phospholipid and ethanol ratio) had a vesicle size of 165.2 nm, zeta potential –31.1 mV, maximum entrapment efficiency 85.3% and cumulative drug release of 96.66% over 24 h out of all the six formulations (F1 to F6). The DSC and FTIR analysis of formulation F3 suggested that the drug remained stable with no interaction with excipients. SEM and optical photomicrography confirmed the spherical shape and uniform size of the vesicles. The ethosomal dispersion of F3 was incorporated into carbopol gel and evaluated for pH, spreadability, drug content, washability, stability and in-vitro diffusion. Comparative ex-vivo permeation studies across rat skin showed that the ethosomal gel exhibited enhanced drug flux compared with marketed gel. Thus, it can be concluded that ethosome-based topical gel of fenoprofen is a promising approach for the effective treatment of rheumatoid arthritis.

**Keywords:** Fenoprofen, ethosomes, topical gel, rheumatoid arthritis, drug delivery.

**PC-303**

**BAMBOO SAP–CENTELLA ASIATICA FORMULATION: A DUAL-MECHANISM APPROACH TO WOUND HEALING**

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There is growing interest in plant-based products for wound healing because of their safety, versatility, and sustainability. The present research focused on developing a dual-action natural wound-healing cream that combines Bamboo sap and Centella asiatica extract in a stable topical dosage form. Bamboo sap, rich in silica, amino acids, vitamins, and antioxidants, was incorporated for its hydrating, anti-inflammatory, and tissue-protective properties, while C. asiatica extract, containing asiaticoside and madecassoside, was selected for its well-documented wound-healing, collagen-stimulating, and regenerative effects. The cream was prepared by an oil-in-water (O/W) emulsion method. The oil phase consisted of coconut oil, liquid paraffin, and cetyl alcohol, while the aqueous phase included glycerin, Bamboo sap, and C. asiatica extract. Tween 80 was used as an emulsifier and methyl paraben as a preservative. Both phases were separately heated to 70–75 °C, combined under continuous stirring, homogenized, and then cooled gradually to obtain a smooth, semi-solid cream. The formulation exhibited suitable physicochemical properties, with a pH of 5.8–6.3, compatible with skin. Spreadability was measured at 7.2 ± 0.3 g·cm/sec, ensuring ease of application, while viscosity ranged from 18,500 to 19,200 cP, indicating a consistent semi-solid texture. Organoleptic evaluation confirmed that the cream was homogeneous, visually acceptable, and non-irritating upon application. The combined action of Bamboo sap and C. asiatica supports hydration, barrier repair, collagen production, and tissue regeneration. In conclusion, this dual-action herbal cream may be a promising formulation for wound healing, with potential therapeutic applications.

**Keywords:** Phytocosmetic, Bamboo sap, Centella asiatica, Natural healing cream, Oil-in-water emulsion, Wound healing.

**PC-304**

**DEVELOPMENT, OPTIMIZATION, AND IN VITRO EVALUATION OF 5-FLUOROURACIL-LOADED CHITOSAN NANOPARTICLES FOR SUSTAINED RELEASE**

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This study aimed to develop and optimize 5-Fluorouracil (5-FU)-loaded polymeric nanoparticles for sustained release and enhanced anticancer efficacy. A Box-Behnken Design (BBD) with 15 experimental runs was employed to evaluate the impact of three independent variables—Chitosan (100-200 mg), Ethyl cellulose (100-200 mg), and Tween 80 (2-4 ml)—on the dependent variables: drug loading (Y1) and entrapment efficiency (Y2). Regression analysis identified a best-fit linear model for both responses ($R^2 = 0.8146$), confirming the model's predictive accuracy and significant p-value (0.0015). An optimization process using a desirability function successfully generated an optimized formulation. The experimental values for drug loading (59.36% ± 1.3) and entrapment efficiency (89.56% ± 1.4) were in close agreement with the predicted values, validating the statistical model's robustness. Fourier-Transform




ISBN: 978-81-980623-8-3

Infrared spectroscopy (FTIR) analysis indicated minor spectral shifts, confirming the chemical compatibility of 5-FU with the polymeric excipients through weak hydrogen bonding. Particle size analysis revealed a Z-average of 337.8±1.764 nm and a low polydispersity index (PDI) of 0.219, indicating a uniform, monodisperse nanoscale formulation. Scanning Electron Microscopy (SEM) confirmed the spherical morphology and smooth surface of the nanoparticles, which is advantageous for stability. In - vitro drug release studies demonstrated a sustained profile, with 97.56±1.2% of the drug released over 14.4 hours. The developed nanoparticle system shows significant potential for the effective and controlled delivery of 5-FU, providing a strong foundation for future in vivo and clinical investigations to enhance the pharmacokinetics of chemotherapeutic agents.

**Keywords**: Box-Behnken Design; Nanoparticles; Anti-Cancer, sustained release; Monodisperse

**PC-305**

## FORMULATION, DEVELOPMENT AND CHARACTERISATION OF TRANSDERMAL DRUG DELIVERY SYSTEM CONTAINING LOVASTATIN FOR THE TREATMENT OF DYSLIPIDEMIA

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Nanoparticles are widely studied drug delivery system because of many benefits like controlled release ability to reach target, smaller particle size enhancement of therapeutic activity and reduction of toxicity. SLN's ( Solid Lipid Nanoparticles) are novel nanoparticulated systems which invited substantial attention as a drug delivery carrier. The design of the study was to develop and evaluate Lovastatin solid lipid nanoparticles, loaded into transdermal patch. Lovastatin, a lipid lowering agent, because of its low bioavailability ( 5% ) and shorter biological t½ is a suitable drug to formulate into transdermal form. SLN's containing drug and non-toxic lipids ( stearic acid , cholesterol, glycerol monostearate ) tween 80 and PEG 400 as surfactant and co- surfactant were prepared using microemulsion process. FTIR study reports indicated that there was no interaction between Lovastatin and other excipients SLN's were assessed for their particle size, entrapment efficiency, PDI ( Poly dispersity index ) and in vitro studies. Scanning Electron Microscopy reports shown that nanoparticles are spherical shape and has size range 130-249 nm. PDI was found out to be in the range of 0.186-0.376 percent entrapmenmt efficiency was between 74.3 + 0.8-93.5 + 1.8.The SLN's were loaded into a transdermal patch formulated using HPMC in varying concentration. All the prepared patches were assessed for flatness, folding endurance, tensile strength, moisture uptake, moisture content and were determined to be in essential range. The SLNP2 in-vitro release rate studies shows better release than remaining formulations ( SLNP1 and SLNP3 ) and it was selected as optimized formulations.

**Keywords:** Lovastatin, lipids, SLN's, Microemulsion, Transdermal patch.

**PC-306**

## DEATH RECEPTOR-5 GUIDED NANOPARTICLE THERAPY: TARGETED Γ-SECRETASE INHIBITION FOR METASTASIS AND RELAPSE SUPPRESSION IN TNBC

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Triple Negative Breast Cancer (TNBC) is distinguished by aggressive growth, high metastasis, and frequent relapse. Conventional therapies often fail to eradicate breast cancer stem cells (BCSCs), which drive recurrence and dissemination. Targeting the Notch signaling pathway, crucial for both angiogenesis and BCSC maintenance, offers a new avenue for intervention; however, traditional γ-secretase inhibitors such as DAPT suffer from off-target effects that limit clinical utility. In this study, we engineered lipid–polymer hybrid nanoparticles (LPNPs) conjugated with anti-Death Receptor-5 (DR5) antibodies to deliver DAPT specifically to TNBC cells. The resulting DAPT-DR5-LPNPs displayed optimal size (132±1.72nm), high encapsulation efficiency (85.6%), and robust cytotoxicity in DR5-overexpressing MDA-MB-231 TNBC cells. Cellular assays confirmed efficient nanoparticle uptake, enhanced apoptosis, and marked suppression of Notch-1, MMP-2/9, and EMT markers, indicating reduced metastatic potential. In vivo, DAPT-DR5-LPNPs induced significant tumor regression in mouse models. These findings demonstrate that DR5-mediated targeting enables potent and selective elimination of both BCSCs and differentiated TNBC cells, offering a promising solution to overcome metastasis and relapse while minimizing systemic toxicity.

**Keywords: -** Triple Negative Breast Cancer (TNBC), Death Receptor-5 (DR5), γ-Secretase Inhibitor (DAPT) Breast Cancer Stem Cells (BCSCs) Nanomedicine

**PC-307**

## MESOPOROUS SILICA NANOPARTICLES AS A NOVEL CARRIER FOR ENHANCING ORAL BIOAVAILABILITY OF POORLY WATER-SOLUBLE DRUGS

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In the present investigation, mesoporous silica nanoparticles (MSNs) of Gliclazide, a poorly water-soluble BCS class II antidiabetic drug, is formulated to enhance its solubility and dissolution. MSNs are prepared by the precipitation method and drug loading is carried out using solvent evaporation. The prepared formulations are evaluated for compatibility, entrapment efficiency, particle size, morphology, crystallinity, solubility and in vitro release. FTIR confirmed no drug–excipient interactions. Entrapment efficiency ranged between 17.61% and 88.29%; with batch F4 showing the highest value. Particle size analysis indicated nano-sized particles (164.5 nm), while SEM revealed spherical particles with smooth surfaces. XRD analysis showed the absence of sharp crystalline peaks, confirming transformation of Gliclazide into an amorphous form within the MSN matrix. Solubility studies demonstrated a significant increase compared with pure Gliclazide. The optimized formulation (F4) is further compressed into fast dissolving tablets (FDTs) by direct compression. In vitro dissolution studies revealed that F4 tablets achieved 98.44% drug release within 40 minutes, demonstrating enhanced dissolution compared to pure drug. Stability studies conducted at 40 ± 2 °C /75 ± 5% RH for one month; indicated no significant changes in drug content or release profile, confirming formulation stability. Overall, MSN-based FDTs of Gliclazide effectively improved solubility and dissolution, which may lead to enhanced bioavailability and better therapeutic efficacy in diabetes management.

**Keywords:** Gliclazide, Mesoporous silica nanoparticles, Solubility enhancement, Fast dissolving tablets, Bioavailability.

**PC-308**

## GOLD METAL COMPLEXES: FROM ANCIENT ALCHEMY TO MODERN APPLICATIONS

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Gold metal complexes have emerged as a dynamic class of compounds with diverse applications across catalysis, materials science, and biomedicine. This review provides a comprehensive overview of the structural diversity, synthetic methodologies, and characterization techniques associated with gold(I) and gold(III) complexes. The unique electronic configuration of gold, influenced by relativistic effects, imparts distinctive properties to its complexes. These include high stability, soft Lewis acidity, and strong affinity for sulfur and phosphorus-containing ligands. Such features have enabled the design of gold(I) and gold(III) complexes with tailored reactivity and biological activity. In recent years, gold complexes have gained significant attention in medicinal chemistry, especially for their potential as anticancer agents. Unlike traditional platinum-based drugs, gold compounds often exhibit lower toxicity profiles and novel mechanisms of action, such as inhibition of thioredoxin reductase and induction of immunogenic cell death. Notably, recent studies have explored gold complexes in the treatment of cisplatin-resistant lung cancer, underscoring their therapeutic promise Recent advances in medicinal chemistry are highlighted, particularly the development of gold-based therapeutics targeting cancer and drug-




ISBN: 978-81-980623-8-3

resistant diseases. By integrating structural insights with emerging biomedical applications, this review underscores the evolving role of gold complexes in modern science.

**Keywords:** Gold, co-ordination Chemistry, anticancer, medicinal chemistry.

**PC-309**

**A NOVEL API-IONIC LIQUID FORMULATION FOR THE MANAGEMENT OF RHEUMATOID ARTHRITIS**

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DMARD (Disease Modifying Anti-Rheumatic Drugs), the combination of methotrexate (MTX), sulfasalazine (SSZ) and hydroxychloroquine (HCQ) has been most effective in management of Rheumatoid arthritis (RA), a chronic inflammatory autoimmune disease. The poor solubility and/or limited penetration of these drugs present significant challenges in their topical drug delivery. An ionic liquid (IL)-based nanoemulgel of combination of these drugs was developed using a Design of Experiments approach to overcome these limitations and enhance drug delivery efficacy. Third generation Ionic liquids, known for their biocompatibility, ability to improve solubility and permeability, were synthesized by converting DMARDs, into their API-IL forms using sodium docusate through a metathesis reaction. The synthesized ILs exhibited improved solubility and stability at pH 6.3. Characterization techniques such as UV-VIS spectroscopy, FTIR, DSC, and XRD confirmed the successful synthesis and stability of the ILs. A nanoemulsion was prepared using high-pressure homogenization, achieving an optimized particle size of 22.1 nm, which was then incorporated into a nanoemulgel to facilitate targeted drug release. Additionally, in-vitro diffusion and ex vivo skin permeation studies revealed enhanced transdermal penetration, supporting the formulation's efficacy. Images of goat ear skin captured with a fluorescence microscope after 6 hrs. of treatment with Rh6G-nanoemulgel showed deep penetration while drug solution (control) only displayed fluorescence in the superficial subcutaneous Stratum Corneum (SC) layer. The nanoemulgel also demonstrated effective COX-2 (potential anti-inflammatory marker) inhibition in cell-based assays. The developed nanoemulgel demonstrated potential as a novel topical drug delivery system for rheumatoid arthritis treatment, offering enhanced solubility, permeation and localized therapeutic action.

**Keywords:** Rheumatoid Arthritis, DMARDs, Ionic liquid, Nanoemulgel.

**PC-310**

**DEVELOPING AND EVALUATING GEMCITABINE-LOADED MPEG-PCL NANOPARTICLES FOR IMPROVED BBB TRANSPORT**

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Cancer is still one of the deadliest diseases in the world, posing a serious threat to our civilization even with improvements in detection and treatment. The purpose of this research project is to formulate Methoxy Polyethylene Glycol-Poly (Caprolactone)-loaded Gemcitabine (GCB) nanoformulations and perform physicochemical characterization. The main objective of this research work is to target brain glioma cells and improve drug transportation and penetration across the blood-brain barrier (BBB). The modified nanoprecipitation process was utilized to prepare MPEG-PCL nanoparticles loaded with gemcitabine by varying drug and polymeric concentrations. Particle size, zeta potential, entrapment efficiency, drug content, and in-vitro drug release of the prepared nanoparticles (NP) were evaluated. U-87 MG cells were used to test the in vitro cytotoxicity of drug-loaded nanoparticles. When the concentration of the polymer increased, the produced nanoformulations showed a noticeable rise in particle size. The optimized nanoformulations (MPEG-PCL nanoformulations loaded with GCB) showed nanoscale particle size distribution. FTIR spectra and DSC thermograms confirm that there is no significant incompatibility between the drug and polymers. Studies using SEM, TEM, and AFM revealed that the NPs had smooth, spherical surfaces devoid of pinholes or fissures. The optimized formulation exhibits an early burst release followed by a steadier and prolonged release phase, as demonstrated by in vitro release experiments (maximum drug release). The IC50 value of the cytotoxicity of MPEG-PCL nanoformulations loaded with GCB was decreased. Hoechst 33342 dye was used in an assay for detecting apoptosis, and the results showed that the fluorescence of the apoptotic cells increased. Comparing the GCB-loaded MPEG-PCL nanoformulations to the pure drug, invasive experiments show a considerable inhibition of cell migration. In U-87 MG glial cells, the GCB-loaded MPEG-PCL nanoparticles demonstrated enhanced cytotoxic activity at lower doses than the pure drug. Therefore, MPEG-PCL nanoformulations loaded with GCB may be useful as a drug delivery vehicle for the treatment of brain cancers.

**Keywords:** Gemcitabine, Nanoformulations, PLGA, MPEG-PCL, Brain Tumors and Glial Cells.

**PC-311**

**FORMULATION AND EVALUATION OF TRANSDERMAL PATCHES LOADED ANTI-INFLAMMATORY DRUGS AND POLYMERS**

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The transdermal drug delivery system is an alternative route for the systemic drug delivery, the total about 74% of drug taken orally and are found not to be as effective as desired. To improve such character's transdermal drug delivery system was emerged drug delivery through the skin to achieve a systemic effect of a drug is commonly known as transdermal drug delivery system and differ from traditional topical drug delivery. The purpose of the research work was to formulation and evaluation of the transdermal drug delivery system Celecoxib, Nimesulide using polymers such as Poly Lactic Co-Glycolic Acid, Hydroxy Propyl Methyl Cellulose by the solvent evaporation method. The Fourier transform study revealed no physical or chemical reaction in between Celecoxib, Nimesulide & PLGA. The differential scanning calorimetry study also confirms the sharp exothermic peak at melting point of drugs and polymers. the physical appearance also studied like physical evaluation, colour, odour, taste, solubility. The prepared formulation was evaluated for different physiochemical characteristics such as, thickness, weight uniformity, surface pH determination, skin irritation, drug content. The in vitro drug release was performed using Guinea pig skin. The result of in vitro drug release study shows maximum release of 99.60% in 22 hrs. Whereas F7 shows the minimum release of 69% in 24 hrs. based on that the drug release and physiochemical values obtained the formulation F5 was considered as an optimized formulation, which shows the higher percentage of drug release of 99.60% in 22 hrs. The developed transdermal patches increase the therapeutic efficacy and reduced toxic effect of celecoxib & Nimesulide.

**Keywords:** Nimesulide, PLGA, Celecoxib, Transdermal Patches and Topical drug Delivery.

**PC-312**

**Design And Evaluation Of Targeted Nano Carrier Systems For Site-Specific Delivery Of Anti-Cancer Drugs In Colon Cancer**

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Colon-specific delivery of drugs plays a crucial role in maximizing therapeutic efficacy with minimum systemic toxicity in colon cancer chemotherapy. The current research focuses on the construction of a new liposome-based nano carrier system for highly targeted delivery of 5-Fluorouracil (5-FU) and Irinotecan to the colon, thus increasing site-specific activity and decreasing off-target effects. Liposomes were designed through thin-film hydration combined with remote drug loading, with pH-sensitive polymers to provide selective release of drugs in colonic environments. Formulations were subjected to thorough physicochemical characterization through particle size analysis, zeta potential, morphology (by SEM), and encapsulation efficiency. In vitro release experiments mimicking gastrointestinal transit revealed that the optimized liposomes (size ~120 nm, zeta potential -32 mV) exhibited




ISBN: 978-81-980623-8-3

sustained and targeted release patterns, with >80% liberation of drug at colonic pH and negligible release in gastric/small intestinal conditions. HT-29 colon cancer cell line cytotoxicity assays demonstrated the significantly increased inhibition of cell growth against the free drugs, and target efficiency assays verified drug selective accumulation in colon-simulated environments. The system designed proved stable and exhibited superior drug delivery kinetics, validating its novelty and clinical significance. The sophisticated liposomal nano carrier system exhibits outstanding targeting specificity, controlled release of drugs, and promoted anti-cancer activity against colon cancer therapy, which represents a significant advancement in nanomedicine-based site-specific chemotherapy. The method presents a new, promising platform for the future of personalized and less-toxic cancer therapies.

**Keywords:** Liposomes, 5-Fluorouracil, Irinotecan, Colon-specific drug delivery, Nanoparticle.

**PC-313**

**Comparative Evaluation Of Curcumin Formulations For Treatment Of Polycystic Ovary Syndrome**

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Polycystic ovary syndrome (PCOS) is a multifactorial gynecological disorder affecting 5–26% of women worldwide, with nearly 75% remaining undiagnosed. It disrupts reproductive, endocrine, metabolic, and psychological functions. Current treatment approaches, including life style modifications and synthetic agents such as metformin, gliptins, and hormonal pills, address individual symptoms such as insulin resistance, anovulation, and hyperandrogenism but fail to treat PCOS holistically and are often associated with adverse effects. Phytochemicals and plant extracts have gaind attention as alternative therapies, with Curcumin (CUR) emerging as a promising phytocompound. However, its low solubility (0.66 µg/mL) and poor bioavailability (<1%) limit clinical use. This study explored two CUR formulations, a co-amorphous formulation (CAM) with Naringin (NRG) and phospholipid complex (CPLC) with Phospholipon 90H, to enhance solubility, bioavailability, and therapeutic efficacy. Molecular docking identified NRG as a potential co-former and P-glycoprotein inhibitor compared to Quercetin. CAM and CPLC prepared by quench cooling and solvent evaporation, respectively were characterized using DSC, FT-IR, PXRD, and SEM, confirming amorphous CUR an hydrogen-bonding interactions. Both formulations significantly improved solubility, dissolution, and ex-vivo permeability, with stability maintained for three months at 40 °C ± 2 °C / 75% ± 5% RH. Therapeutic efficacy was evaluated in dehydroepiandrosterone-induced PCOS rats on a high-fat diet. Both CAM and CPLC enhanced CUR bioavailability and improved reproductive and metabolic outcomes ($P<0.0001$). CAM effectively normalized estrous cycle, ovarian morphology, glucose, weight gain, and serum testosterone, while CPLC significantly improved serum lipid profiles. To conclude, both CAM and CPLC enhanced CUR's therapeutic effects, and their combined use may offer a comprehensive strategy for PCOS treatment.

**Keywords:** Curcumin, Co-amorphous, DHEA, ex-vivo permeability, molecular docking, PCOS, phospholipid complex, oral bioavailability enhancement

**PC-314**

**FORMULATION AND EVALUATION OF HERBAL TRANSDERMAL DRUG DELIVERY SYSTEM FOR THE TREATMENT OF RHEUMATOID ARTHRITIS**

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Rheumatoid arthritis (RA) is a chronic, progressive autoimmune disorder primarily affecting the peripheral joints through persistent inflammation. Conventional allopathic treatments for RA typically follow two standard therapeutic approaches; however, both are associated with notable side effects. This has led to increasing interest in safer, more natural alternatives such as Ayurvedic herbal therapies. In this study, a novel transdermal drug delivery system was developed using herbal extracts from Boswellia serrata, Cardiospermum helicacabum and Aloe barbadensis, known for their anti-inflammatory properties. The patches were prepared using the solvent casting method, incorporating the plant-based formulations into transdermal films. The developed patches were systematically evaluated for various physicochemical characteristics, including thickness, folding endurance, physical appearance, weight uniformity, moisture content, drug content, flatness, moisture uptake, surface pH, and stability. Overall, this research highlights a promising and innovative approach to utilizing transdermal drug delivery systems for herbal treatments, offering a safer and effective alternative for managing rheumatoid arthritis.

**Keywords:** Rheumatoid arthritis, Ayurvedic herbal treatment, Transdermal drug delivery, Solvent casting method, Physicochemical evaluation.

**PC-315**

**Formulation Development And Characterization Of Noscapine-Loaded Solid Lipid Nanoparticles**

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Solid lipid nanoparticles (SLNs) are attractive drug delivery systems owing to their biocompatibility and ability to enhance the solubility of poorly water-soluble drugs. In this study, noscapine (NCE)-loaded SLNs were formulated using stearic acid (SA) and glyceryl monostearate (GMS) by a modified high-shear homogenization method. The formulations were evaluated for particle size, polydispersity index (PDI), zeta potential, entrapment efficiency (EE), and in vitro drug release. The optimized GMS-based formulation (F3) exhibited a mean particle size of 195.66 ± 11. nm, a narrow PDI (0.212 ± 0.09), and high surface stability with a zeta potential of –35.74 ± 2.59 mV. It showed a high entrapment efficiency (86.77 ± 4.22%) and sustained drug release, reaching complete release within 24 hours.Analytical characterization confirmed the successful incorporation of noscapine into the lipid matrix. FTIR spectra indicated no chemical interaction between drug and excipients. DSC thermograms showed the disappearance of the characteristic melting peak of pure noscapine, suggesting molecular dispersion in the lipid. XRD patterns revealed a reduction in crystalline intensity, confirming partial amorphization and improved solubility. SEM analysis demonstrated spherical, smooth-surfaced nanoparticles with uniform morphology. These findings demonstrate that noscapine-loaded SLNs provide enhanced solubility, high stability, and controlled release, supporting their potential as an effective platform for targeted anticancer therapy.

**Keywords:** Noscapine, Solid Lipid Nanoparticles, Glyceryl Monostearate

**PC-316**

**LANDMARK PREDICTIVE MODEL FOR THE PRECISE SOLUBILITY PARAMETER PREDICTION OF LIPIDS FOR LIPID-BASED DRUG DELIVERY APPLICATIONS**

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The determination of solubility parameters is a pivotal element in pharmaceutical preformulation and formulation, guiding the selection and optimization of excipients for drug delivery systems. Traditionally, approaches such as molecular dynamics (MD) simulations have served as the gold standard for estimating solubility metrics but suffer from significant limitations, often requiring extensive computational time (up to 25 days on CPU or 2 days on GPU) and complex force field setups, rendering them unsuitable for large-scale application. In response to these bottlenecks, this research introduces a mathematical predictive model for the estimation of Hildebrand solubility parameters (δ), a




ISBN: 978-81-980623-8-3

quantitative measure of cohesive energy density that reflects a substance's dissolution propensity premised on the principle of "like dissolves like." The model integrates electrostatic forces (δElec), van der Waals forces (δVdW), and simulated specific heat capacity, enabling precise computation of lipid excipient solubility while circumventing resource-intensive simulations. Validation using training and test sets of 76 lipids revealed outstanding performance, with an adjusted $R^2$ of 98.21%, low mean prediction error of 4.3895%, strong dataset correlation (r=0.879), and an RMSD of 1.271, underscoring both accuracy and reliability. The absence of statistical disparity between predicted and experimental results further substantiates the model's robustness. The adoption of this predictive paradigm accelerates preformulation studies, supporting the rational design of advanced lipid-based drug delivery systems, including lipid nanoparticles and self-emulsifying delivery formats—for challenging, poorly water-soluble drugs. This transformative approach promises to revolutionize pharmaceutical development by enhancing efficiency, scalability, and accessibility while maintaining scientific rigor and feasibility.

**Keywords:** Predictive modeling; Solubility Parameter; Molecular Dynamics simulations; Lipid nanoparticle; Preformulation

**PC-317**

## OPTIMIZATION AND PHARMACOKINETIC EVALUATION OF GASTRORETENTIVE MUCOADHESIVE MICROSPHERES OF PROPRANOLOL HYDROCHLORIDE USING THIOLATED TRAGACANTH: A NOVEL STRATEGY FOR ENHANCED DRUG DELIVERY

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Background: Gastroretentive mucoadhesive drug delivery systems offer a promising approach to enhance the therapeutic efficacy of drugs with low bioavailability and short half-lives. The current study aims at the formulation and pharmacokinetic evaluation of propranolol hydrochloride-loaded gastroretentive mucoadhesive microspheres using thiolated tragacanth (TTG)—a chemically modified natural polymer with improved mucoadhesive capacity. Methods: TTG was prepared by esterification and characterized for thiol content, swelling ability, and mucoadhesive properties. Propranolol hydrochloride loaded microspheres were prepared employing ionic gelation with cross-linking using $CaCl_2$ and $BaCl_2$. Microspheres so prepared were characterized for particle size, drug entrapment efficacy, swelling index, and in vitro drug release profiles. Pharmacokinetic profile in Wistar rats was done to identify increases in bioavailability. Results: Thiolation of the polysaccharide resulted in 3.5-fold greater thiol levels, improving greatly the mucoadhesive character of tragacanth. Optimum microspheres were spherically shaped with excellent entrapment efficacy of 84.2 ± 2.7%. Release studies conducted under in vitro conditions indicated controlled drug release over a period of 12 hours following Korsmeyer-Peppas, indicative of non-Fickian or anomalous diffusion. Pharmacokinetic evaluation showed 2.8-fold relative bioavailability increase over the standard propranolol solution, with delayed Tmax and increased Cmax values, indicating improved systemic absorption. Conclusion: The thiolated tragacanth-based gastroretentive microspheres developed in this work showed enhanced drug retention and bioavailability, indicating their potential as a new drug delivery system for propranolol hydrochloride. This work highlights the promise of thiolated natural polymers in sustained drug delivery systems and invites further research in this direction.

**Keywords:** Mucoadhesion, Thiolation, Microspheres, Propranolol Hydrochloride, Optimization, Design of Experiments

**PC-318**

## EVALUATION OF STABILITY, PERMEATION OF EXENATIDE AND ITS PULMONARY DELIVERY OPTIMIZATION WITH MANNITOL CARRIERS

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Exenatide, a GLP-1 receptor agonist, is limited by conformational instability and permeability barriers. This study aimed to evaluate its structural stability, permeation properties, and potential for pulmonary delivery. Results from circular dichroism (CD) spectroscopy revealed that exenatide in its aqueous solution undergoes irreversible oligomerization, especially upon heating and cooling. This reported a decrease in the α-helicity from 36.3% (30 °C) to 15.5% (90 °C) and only partial recovery (19.8%) upon cooling. The corresponding increase in β-sheet content (to 21.9%) and ellipticity at 222 nm confirmed aggregation. In contrast, incorporation of sugars preserved secondary structure. Exenatide:mannitol (1:8) recovered 73.2% α-helix after thermal cycling, while trehalose (1:8) maintained 78.7%, with ellipticity ratios (R2) corroborated reduced aggregation. Franz diffusion studies demonstrated improved permeability with sugar formulations. In the presence of mucus, exenatide alone demonstrated a low permeability coefficient (P = 0.0008). However, mannitol (1:6) and trehalose (1:4) improved the permeability to P = 0.0012 and P = 0.0019, respectively. In the absence of mucus, exenatide showed poor transport (P = 0.0002), whereas mannitol (1:4) and trehalose (1:8) substantially increased permeation (P = 0.0014 and 0.0010, respectively). These findings indicate that both sugars mitigate the diffusion-retarding effect of mucus and facilitate peptide transport. To enable inhalation delivery, mannitol was engineered as a porous carrier employing spray drying. Optimized conditions (70°C outlet temperature, 2.5% solid content) yielded particles with uniform pores, high porosity (90.7%), reduced aerodynamic diameter (6.0 µm), and elevated specific surface area, favorable for deep lung deposition. Collectively, sugars stabilize exenatide, enhance mucus permeation, and engineered mannitol provides an efficient carrier for pulmonary delivery.

**Keywords**: GLP-1 Peptide stability; Pulmonary formulation; Porous mannitol; Circular Dichroism Spectroscopy; Spray drying

**PC-319**

## DEVELOPMENT OF FORMULATION AND EVALUATION OF ANTIRHEUMATOID TOPICAL HYDROGEL WITH METHANOL EXTRACTS OF POGOSTEMON QUADRIFOLIUS AND GLOBBA WINITTI VALIDATION BY INVITRO ELISPOT CYTOKINE ANALYSIS OF TNF A INHIBITION

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This study investigates the formulation and evaluation of topical hydrogels incorporating methanolic extracts of Pogostemon quadrifolius (MEPQ) and Globba wintii (AMEGW) for antiarthritic potential. The Method involved was extracts were incorporated into a Carbopol 940-based gel matrix. Anti-inflammatory activity was initially screened using an in vitro protein denaturation assay, where all formulations demonstrated dose-dependent inhibition. To further validate the immunomodulatory potential, an ELISPOT assay was employed to quantify cytokines (TNF-α,) in lipopolysaccharide (LPS)-stimulated PBMCs. The combination 2 % hydrogel (MEPQ+AMEGW) exhibited superior efficacy, showing reduced cytokine spot formation when compared with 2% individual extract of MEPQ and AMEGW using Diclofenac gel as Standard Statistical analysis has been performed utilizing one-way ANOVA, subsequently utilizing Tukey's post hoc test. Significance level of $p < 0.05$ has been employed to assess statistical differences. This confirms synergistic effect of the extracts and their potential as topical antiarthritic agents.

**Keywords:** Topical hydrogel, Pogostemon quadrifolius, Globba wintii, antiarthritic, ELISPOT assay, protein denaturation, cytokine profiling

**PC-320**

## SYMBIOTIC CULTURE OF BACTERIA AND YEAST (SCOBY)-INFUSED PROBIOTIC FERMENTED PRODUCT FOR ADVANCED NUTRACEUTICAL APPLICATIONS.

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The global demand for functional foods and nutraceuticals is steadily increasing, driven by consumer awareness of the relationship between diet and health. Among these, probiotics have attracted significant attention as live microorganisms that provide health benefits when consumed in adequate amounts. They play a vital role in improving gut health, enhancing immunity and preventing various metabolic and




ISBN: 978-81-980623-8-3

infectious diseases. Fermented foods are considered an ideal delivery system for probiotics as they enhance microbial stability, viability and bioavailability. Beyond gut health, improving haemoglobin levels is a critical nutritional requirement, particularly for populations at risk of anaemia. Moringa oleifera extract, recognized for its high nutritional value, is an excellent source of iron, vitamin C, flavonoids and polyphenols. These bioactive components synergistically promote haemoglobin synthesis, red blood cell formation and oxidative stress reduction, thus supporting effective anaemia management. The present invention introduces a dual-functional nutraceutical that integrates probiotic fermentation with Moringa oleifera extract. This novel formulation aims to improve gut microbiota composition while simultaneously enhancing haemoglobin levels. The combined effects include increased antioxidant potential, improved nutrient absorption, immune system modulation and prevention of anaemia.

**Keywords:** SCOBY, Moringa oleifera, probiotics, iron-deficiency anaemia

**PC-321**

**HIGH-PERFORMANCE HYBRID NANOFILLERS FROM ZIRCONIA-COATED, Γ-MPS FUNCTIONALIZED HALLOYSITE NANOTUBES**

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This study developed advanced zirconium dioxide (ZrO2)-reinforced halloysite nanotube (HNT) nanofillers with improved dispersion, interfacial bonding, and thermal stability for low-shrinkage, light-curable dental composites. Initially, pristine HNTs (PHNTs) were functionalized with γ-methacryloxypropyltrimethoxysilane (γ-MPS), confirmed by FT-IR peaks at 1492.34 cm-1 ((CH2)3 scissoring), 2921.05 cm-1 (C-H stretching), and 1708.62 cm-1 (C=O stretching), along with increased d-spacing from 7.38 Å to 7.66 Å in XRD, indicating successful surface modification. Functionalized HNTs (FHNTs) showed smoother surfaces, reduced aggregation, improved dispersion stability (zeta potential -40.07 Mv (FHNT) -33.35 mV for (PHNTs), and enhanced thermal stability (TGA weight loss -1.99 mg (PHNT) -2.44 mg (FHNT)). In the second stage, FHNTs were coated with ZrO2 nanoparticles via probe sonication, yielding Zr-FH-PS nanofillers with sharper Zr-O FT-IR peaks (427 & 462 cm-1), monoclinic ZrO2 XRD reflections, and increased crystallite size (269 nm). FE-SEM/EDX revealed a uniform rough-textured coating with Zr content (10.0 wt%), while HR-TEM showed well-distributed at 20-40 nm coating of ZrO2 particles on to the outer FHNT. TGA confirmed superior thermal stability, with weight loss reduced to -0.56 mg. The combination of γ-MPS functionalization and probe sonication enabled stronger surface grafting, better nanoparticle distribution, and improved interfacial bonding. These enhancements in crystallinity, dispersion, and stability make Zr-FH-PS a promising nanofiller for dental composites, expected to improve mechanical strength, reduce polymerization shrinkage, and enhance long-term durability in clinical applications.

**Keywords:** Halloysite nanotubes (HNTs), Zirconium dioxide (ZrO2), Probe sonication, Nanofiller

**PC-322**

**DEVELOPMENT AND EVALUATION OF VITAMIN D3 MICROSPHERES FOR PERIODONTITIS TRETMENT**

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This study presents EC-based microspheres and HPMC are used to create a patient-friendly, regulated delivery system by solvent evaporation. Through the preservation of vitamin D3, stability, bioavailability, and support for bone health, it improves the management of periodontitis. Important formulation parameters were optimized, including drug-to-polymer ratio, polymer concentration, and emulsification speed. Particle size, surface morphology, drug loading, encapsulation efficiency, zeta potential, polydispersity index, and in vitro release were all evaluated for the microspheres. The FESEM examination showed smooth-surface morphology of microspheres within 100 micrometer range. The average particle size was found to be 611.6nm. Studies conducted in vitro revealed diffusion-controlled sustained release of 2.43% in 12 hr. and zeta potential was found to be -19.1 mV. The solvent evaporation approach was used in this study to successfully create vitamin D3-loaded microspheres using HPMC and EC. Smooth, spherical particles with excellent encapsulation of 84%, indicating effective entrapment of Vitamin D3 within the polymer matrix. Effective microspheres with desired physicochemical features were produced by optimising the formulation parameters. A diffusion-controlled sustained release profile was validated in vitro, enhancing the stability and bioavailability of vitamin D3. Better patient compliance in the treatment of periodontitis is encouraged by this regulated delivery method, which also increases therapeutic potential.

**Keywords:** Vitamin D3, microspheres, periodontitis HPMC, EC.

**PC-323**

**SYNERGISTIC ANTIBACTERIAL POTENTIAL OF CEFIXIME AND CURCUMIN METALLIC NANOPARTICLES AGAINST MULTIDRUG-RESISTANT BACTERIA**

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Curcumin nanoparticles and metalloantibiotics represent promising alternatives to conventional antibiotics due to their potent antimicrobial activity. In this study, curcumin biofunctionalized and cefixime nanoparticles incorporating silver, palladium, cadmium, nickel, and zinc were synthesized via a one-pot, two-step green method and extensively characterized. Color and pH variations confirmed metal ion reduction, while UV-vis and FTIR analyses indicated nanoparticle formation. The synthesized particles displayed sizes of 25–100 nm with uniform distribution (PDI 0.2–0.4) and high stability (zeta potential −25 to −36 mV). FESEM revealed spherical, square, and disc-shaped nanoparticles, while EDX and XRD confirmed elemental composition and crystalline structure respectively. ICP-OES quantified silver content in the formulations. Antibacterial evaluation against Escherichia coli, Klebsiella pneumoniae, and Staphylococcus aureus showed enhanced inhibition by metallic nanoparticles compared to parent drugs. Minimum inhibitory concentration assays revealed markedly lower MIC values for curcumin biofunctionalized silver nanoparticles and drug-silver nanoparticle hybrids, demonstrating synergistic antibacterial effects. Moreover, efflux pump inhibition assays suggested improved intracellular drug retention. In vivo acute toxicity evaluation in rats showed no significant histopathological changes in major organs, indicating biosafety at tested doses. Collectively, these results highlight the synergistic antimicrobial potential of curcumin and antibiotic-conjugated metallic nanoparticles, offering a safe and effective nanoformulation strategy against multidrug-resistant pathogens.

**Keywords:** Curcumin nanoparticles, Metalloantibiotics, Silver nanoparticles, Green synthesis, Antibacterial activity, Efflux pump inhibition, Cefixime, Toxicity study.

**PC-324**

**DEVELOPMENT, EVALUATION AND STABILITY STUDIES OF SILVER NANOPARTICLE OF MEROPENEM AGAINST MDR MICROORGANISMS**

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Nanotechnology-based drug delivery systems are increasingly recognized as a powerful approach to overcome the limitations of conventional antibiotics in the fight against resistant pathogens. In this study, Meropenem-conjugated silver nanoparticles (Mero-Ag NPs) were synthesized via probe sonication, aimed at restoring and enhancing antibacterial activity against multidrug-resistant strains. UV-Vis spectroscopy confirmed nanoparticle formation through a characteristic absorption peak shift compared to Meropenem alone, while FTIR analysis revealed functional group modifications indicating successful conjugation. X-ray diffraction (XRD) demonstrated the crystalline structure of the nanoparticles, and field emission scanning electron microscopy (FESEM) showed spherical morphology with an average diameter of 121 nm. Energy-dispersive X-ray spectroscopy (EDX) validated their elemental composition, and stability testing indicated moderate zeta potential, supporting colloidal integrity. Antibacterial studies against Klebsiella pneumoniae, Escherichia coli, Staphylococcus aureus and Acinetobacter baumannii revealed superior performance of Mero-Ag NPs compared to free Meropenem, with significantly reduced




ISBN: 978-81-980623-8-3

minimum inhibitory concentration (MIC) values and enhanced biofilm disruption. Acute toxicity evaluations confirmed their biosafety. Collectively, these results suggest that Meropenem-loaded silver nanoparticles represent a promising nanomedicine-based strategy for combating multidrug-resistant bacterial infections and strengthening conventional antibiotic therapies.

**Keywords:** Meropenem, Silver nanoparticles (AgNPs), antibacterial, Antimicrobial resistance, Multidrug resistance

**PC-325**

**DEVELOPMENT, VALIDATION, AND PHARMACOKINETIC APPLICATION OF A STABILITY-INDICATING LC-MS/MS METHOD FOR QUANTIFICATION OF DACOMITINIB IN RAT PLASMA**

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A sensitive, selective, and robust liquid chromatography-tandem mass spectrometry (LC-MS/MS) method was developed and validated for the quantification of Dacomitinib in rat plasma, employing Entrectinib as an internal standard. Dacomitinib, a second-generation irreversible epidermal growth factor receptor (EGFR) tyrosine kinase inhibitor, is used for first-line treatment of metastatic non-small cell lung cancer. The chromatographic separation was achieved on an Inertsil ODS C18 column (150 mm × 4.6 mm, 3.5 µm) using a mobile phase composed of acetonitrile and triethylamine buffer (pH 2.5) with a flow rate of 1.0 mL/min and a total runtime of 5 minutes. Detection was carried out in positive ion mode using multiple reaction monitoring (MRM) with transitions m/z 560.28→212.36 for Dacomitinib and m/z 560.37→193.65 for Entrectinib. The assay exhibited excellent linearity over the concentration range 5–100 ng/mL with a correlation coefficient ($r^2$) of 0.9996. Precision and accuracy across quality control levels met USFDA guidelines. Stability studies, including bench-top, freeze-thaw, short-term, and long-term storage, confirmed the robustness of the method. The method was successfully applied to a pharmacokinetic study in rats following oral and intravenous administration of Dacomitinib. This validated LC-MS/MS method demonstrates suitability for rapid and reliable quantification of Dacomitinib in plasma, facilitating preclinical pharmacokinetic evaluations.

**Keywords:** Dacomitinib, LC-MS/MS method, Pharmacokinetic study, Rat plasma, Method validation

**PC-326**

**"DESIGN, DEVELOPMENT AND CHARACTERIZATION OF MUCOADHESIVE BILAYER TABLETS OF ACARBOSE"**

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Among the various routes of drug delivery, the oral route is perhaps the most preferred by patients and clinicians alike. However, pre oral administration of drugs has disadvantages, such as hepatic first-pass metabolism and enzymatic degradation within the gastrointestinal tract (GIT). So, there has been a growing interest in the use of delivery of therapeutic agent through various transmucosal routes to provide a therapeutic amount of drug to the proper site in body to promptly achieve and then maintain the desired concentration. In the present work buccal bilayer tablets of Acarbose were prepared by direct compression method by using polymers HPMC K4M and HPMC K15M.The prepared tablets were evaluated for physical parameters like appearance, hardness, thickness, weight variation, friability, swelling index and surface pH; biological parameter-mucoadhesive strength; and other parameters such as drug content uniformity, in vitro release, short-term stability and drug excipient interactions (FTIR). Among ten formulations, the formulation BTA151 containing HPMC K15M was found to be promising, which showed t25%, t50% and t70% values of 1.12, 4.24 and 5.48 h respectively and in vitro drug release of 93.28% in 8 h along with satisfactory bioadhesion strength (6.40 g). Stability studies on the promising formulation indicated that there are no significant changes in drug content and in vitro dissolution characteristics ($p<0.05$). Infrared-spectroscopic studies indicated that there are no drug-excipient interactions. The prepared buccal bilayer tablets of Acarbose could stay in the buccal for a longer period of time, which indicate a potential use of buccal tablets of Acarbose for treating of type 2 diabetes.

**Keywords:** Buccal bilayer tablets; Acarbose; Carbopol 934p; Hydroxy propyl methyl cellulose; Bioadhesive strength; In vitro dissolution.

**PC-327**

**DESIGN, DEVELOPMENT AND EVALUATION OF DUAL DRUG-LOADED NOVEL DRUG DELIVERY SYSTEM FOR THE EFFECTIVE TREATMENT OF HEAD AND NECK CANCER**

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Head and neck cancers (HNC) are among the most prevalent malignancies affecting the mucosal linings of the oral cavity, larynx, and pharynx. Despite the availability of multimodal treatment approaches—surgery, chemotherapy, immunotherapy, radiation therapy, and targeted therapy—current approaches are often limited by systemic toxicity, poor drug bioavailability, and high recurrence due to metastasis. As per the Global Cancer Observatory, over 947,000 HNSCC cases and 482,000 associated mortalities were observed globally, emphasizing the urgent need for more effective and safer therapeutic alternatives. The current study explores a novel targeted drug delivery using a Lipid Polymer Hybrid Nanoparticle (LPHNP) loaded with two anticancer drugs for HNC treatment. Two chemotherapeutic agents, each targeting distinct oncogenic pathways, were encapsulated to achieve synergistic anticancer activity. Nanoparticles were formulated using the thin-film hydration process and optimized through a Box-Behnken (BBD) statistical design. Characterization using SEM and TEM confirmed spherical morphology and desirable particle size. The optimized nanoparticles exhibited a mean particle size within acceptable limits and a high zeta potential, indicating stability. Entrapment efficiencies of the two drugs were 83.38% and 86.29%, respectively. In vitro release studies demonstrated a biphasic pattern with sustained drug release and prolonged retention, while HET-CAM assays confirmed the non-irritant nature of the formulation. Additionally, the system showed high biocompatibility and potential for tumor-specific accumulation. The results suggest that dual drug-loaded LPHNPs can significantly improve therapeutic outcomes by enhancing drug stability, targeting efficiency, and safety. The proposed system is anticipated to improve drug stability, tumor-specific accumulation, and controlled release, thereby enhancing therapeutic outcomes in HNC. This research offers a potential advancement in precise, effective, and safer cancer therapy.

**Keywords:** Head and Neck cancer; Lipid-Polymer Hybrid Nanoparticles; Synergism, Anticancer Efficacy

**PC-328**

**"EVALUATION OF ANTIOXIDANT POTENTIAL OF MORINGA OLEIFERA LEAF EXTRACTS OBTAINED BY DIFFERENT EXTRACTION TECHNIQUES"**

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The present study investigates the antioxidant potential of Mooring oleifera leaf extracts obtained through various extraction techniques including maceration, reflux condensation, soxhlet extraction and sonication extraction. The extracts were evaluated for their total phenolic, tannin and flavonoid content along with antioxidant activity using DPPH assays. Results indicated that extraction technique significantly influenced the yield and bioactive compound content. Among the methods tested, soxhlation extraction yielded the highest concentration of phenolics and flavonoids, correlating with superior antioxidant activity. Refluxation shows highest antioxidant activity and sonication shows least antioxidant activity. The study highlights the importance of selecting appropriate extraction methods to maximize the recovery of antioxidant constituents from Moringa oleifera leaves.

**Keywords:** Moringa oleifera, Extraction and Antioxidant activity.

**PC-329**

**FORMULATION AND EVALUATION OF RIZATRIPTAN LOADED NANOSUSPENSION**




ISBN: 978-81-980623-8-3

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Rizatriptan, a selective 5-hydroxytryptamine (5-HT) 1B/1D receptor agonist, is widely used for migraine treatment; however, its therapeutic efficacy is often limited by poor aqueous solubility and variable bioavailability. Enhancing its dissolution rate could improve clinical outcomes. This study aimed to develop and evaluate a nanosuspension of Rizatriptan to address these limitations and enhance its diffusion rate and potential bioavailability. Eight nanosuspension formulations were prepared using the precipitation–ultrasonication method, with variations in organic solvents (methanol and ethanol). Poloxamer 407 was used as a non-ionic surfactant, oleic acid as a penetration enhancer, and stearic acid as a stabilizer. All formulations were characterized for particle size, drug content, entrapment efficiency, and in-vitro diffusion. Among these, formulation F3 exhibited superior performance, achieving a drug content of 85.50%, entrapment efficiency of 80.78%, particle size of 316 nm, and cumulative drug release of 82.77% over 8 hours using a Franz diffusion cell. These results suggest that nanosuspension formulation could be a promising strategy to improve the therapeutic potential of Rizatriptan.

**Keywords:** Rizatriptan, Nanosuspension, Migraine.

**PC-330**

## FABRICATION AND EVALUATION OF BIODEGRADABLE GATIFLOXACIN-LOADED ORTHOPEDIC IMPLANTS FOR OSTEOMYELITIS TREATMENT

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Osteomyelitis, a severe complication of open fracture management, often necessitates prolonged antibiotic therapy. Conventional high-dose systemic antibiotics are associated with side effects and extended hospitalization. This study focuses on developing a biodegradable orthopedic implant capable of sustained drug release for at least six weeks at concentrations above the minimum inhibitory concentration (MIC). Polylactide-co-glycolide (PLGA) and polycaprolactone (PCL) were employed as biodegradable carriers, with gatifloxacin—an effective broad-spectrum fluoroquinolone—serving as the antimicrobial agent. Implants were fabricated using an injection molding technique, ensuring uniform drug distribution. Formulations underwent dimensional analysis, hardness testing, drug content determination, sterility evaluation, in-vitro release studies, and surface morphology assessment via scanning electron microscopy. The optimized formulation (F3) demonstrated a hardness of 8.47 kg/cm², drug content of 96.89%, and uniformity across samples. In-vitro studies revealed sustained drug release, with 91% of gatifloxacin released over 55 days. SEM analysis indicated smooth surfaces prior to release, transitioning to porous structures post-release due to drug dissolution. The combination of PLGA and PCL facilitated controlled degradation, maintaining therapeutic drug levels while eliminating the need for surgical implant removal. The residual PCL scaffold provided mechanical support and promoted bone cell growth after PLGA degradation. These findings suggest that gatifloxacin-loaded PLGA-PCL composite implants offer a promising localized delivery system for osteomyelitis treatment, combining prolonged antimicrobial action, biodegradability, and adequate mechanical strength for load-bearing applications. This approach reduces systemic side effects, minimizes surgical interventions, and enhances patient recovery outcomes in orthopedic infection management.

**Keywords:** Implant, beads, PLGA, PCL, gatifloxacin, osteomyelitis, biodegradable implant, sustained drug release, orthopedic infection, local antibiotic delivery, polymer composite, injection molding

**PC-331**

## STUDIES ON SIMVASTATIN-LOADED SELF-NANOEMULSIFYING DRUG DELIVERY SYSTEM (SNEDDS) INVOLVING ANTI-ENDOMETRIOTIC & ANTI-INFLAMMATORY EFFECTS IN HUMANISED ENDOMETRIOTIC RAT MODEL

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Endometriosis is a chronic inflammatory gynaecological condition characterised by the growth of tissue resembling the endometrium (inner tissue of the uterus) outside the uterine cavity, and it is most associated with pelvic pain and infertility. Using invasive (laparoscopy) and non-invasive (hormonal therapy/painkillers) approaches results in suboptimal outcomes in conjunction with adverse effects and endometriosis recurrence. Simvastatin, a HMG-CoA reductase inhibitor (statins), possesses pleiotropic properties, and it belongs to BCS Class IIa, meaning that it dissolves more rapidly in basic medium. This work explores the feasibility of simvastatin-loaded SNEDDS for use in the treatment of endometriosis. The formula of the pre-emulsion concentrate of drug-loaded SNEDDS was systematically optimised using the Quality by Design approach. The optimised diluted pre-emulsion concentrate of simvastatin-loaded SNEDDS achieved values of 45.1 secs self-emulsification time, 176.17 nm mean particle size, -10 mV zeta potential, and 0.318 polydispersity index. The female SD rats were intraperitoneally injected with endometriotic tissues collected from endometriotic women to induce endometriosis. After oral administration of simvastatin-loaded SNEDDS into disease-induced rats, a remarkable improvement was observed in the collected uterine, ovarian, and peritoneal tissues analysed by H&E staining and immunohistochemistry. Moreover, results from ELISA /colorimetric assays assessing anti-endometriotic markers (VEGF, TNF-α), diagnostic indicators (MMP-2,9 and TIMP-1,2), and inflammatory parameters ($Ca^{2+}$, NO, PGE2, and IL-8) in the plasma separated from the blood of treated rats further confirmed the therapeutic effectiveness of the drug-loaded SNEDDS compared to the drug solution alone in managing the endometriosis in humanised endometriotic rat model.

**Keywords:** Endometriosis, quality by design, simvastatin, SNEDDS, Sprague Dawley rats

**PC-332**

## SYSTEMATIC OPTIMIZATION, IN VITRO CHARACTERIZATION, AND IN VIVO EVALUATION OF RUTIN HYDRATE-LOADED FENUGREEK SEEDS-GENERATED EDIBLE PLANT-DERIVED EXOSOME-LIKE NANOPARTICLES

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Primary dysmenorrhea (PD) is a widespread and debilitating condition affecting millions of women worldwide, characterized by intense menstrual pain. This study explores the potential of using fenugreek seeds, (having the endogenously present trigonelline) as a source for developing edible plant-derived exosome-like nanoparticles (EPDENs) to alleviate PD-related pain. EPDENs were formulated using polyethylene glycol 6000 (PEG 6000) as a crowding agent and were systematically optimized through a quality-by-design approach. The optimized EPDENs formulation demonstrated favorable physicochemical characteristics, including a particle concentration of $6.4 \times 10^{10}$ particles/ml, mean particle size of 114.1 ± 0.508 nm, protein content of 8.62 ± 0.50 mg/ml, trigonelline concentration of 107.57 ± 1.80 µg/ml, RNA content of 56.826 ± 0.749 ng/µl, and zeta potential of -21.9 ± 0.208 mV. Rutin hydrate, a flavonoid glycoside with known anti-inflammatory properties, was successfully incorporated into the EPDENs using the freeze–thaw method, achieving an entrapment efficiency of 32.91 ± 1.33%. The incorporation was confirmed through X-ray diffraction (XRD), differential scanning calorimetry (DSC), and scanning electron microscopy (SEM). In vitro release studies showed cumulative percentage release values of 76.77 ± 0.27% for rutin hydrate and 44.75 ± 0.49% for trigonelline under different pH conditions. Cellular uptake studies revealed efficient internalization of coumarin 6-tagged, rutin hydrate-loaded EPDENs in RL95-2 uterine cells. Analgesic efficacy was evaluated through writhing response reduction in PD-induced mice, demonstrating that oral rutin hydrate-loaded EPDENs were as effective as aspirin. Furthermore, treatment significantly modulated prostaglandin levels by reducing $PGF_2\alpha$ and increasing $PGE_2$, thereby lowering the $PGF_2\alpha/PGE_2$ ratio. These findings suggest that rutin hydrate-loaded fenugreek-derived EPDENs as a promising natural alternative for PD pain management.




ISBN: 978-81-980623-8-3

**Keywords**: rutin hydrate, edible exosome-like nanoparticles, primary dysmenorrhea, Quality-by-Design, in vitro cellular uptake

**PC-333**

**BENZIMIDAZOLE SUBSTITUTED INDOLE ACETAMIDE DERIVATIVES AS POTENTIAL ANTI- INFLAMMATORY AGENTS: A COMPREHENSIVE STUDY OF VIRTUAL SCREENING, SYNTHESIS, AND BIOLOGICAL ACTIVITY**

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This study investigates the potential of benzimidazole substituted indole acetamide derivatives as novel anti-inflammatory agents through a multifaceted approach encompassing virtual screening, synthesis, and biological evaluation. Virtual screening using computational tools identified lead compounds based on their interaction with key inflammatory targets. Subsequent synthesis of the identified derivatives were achieved via efficient methodologies and characterized using spectroscopic techniques. Structure-activity relationship (SAR) analysis provided insights into the structural features essential for potency and selectivity. The findings highlight benzimidazole substituted indole acetamides as promising candidates for further development as therapeutic agents against inflammatory diseases.

**Keywords**: Benzimidazole, virtual screening, anti-inflammatory, structure activity relationship, indole.

**PC-334**

**TELEHEALTH WEARABLE SENSORS UTILIZING EMERGING MATERIALS AND NANOARCHITECTONICS**

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Wearable sensors have emerged as transformative tools in telehealth, enabling continuous, real-time monitoring of physiological and biochemical markers for early disease detection and personalized healthcare. Recent innovations leverage two-dimensional (2D) materials—such as graphene and transition metal carbides/nitrides (MXenes)—which offer exceptional flexibility, mechanical stability, and high sensitivity. These properties facilitate the creation of lightweight, skin-conformable devices capable of accurately tracking vital signs including body temperature, arterial oxygen saturation, respiratory rate, pulse, and muscle fatigue. This review examines five principal categories of wearable sensors—pressure, strain, electrochemical, optoelectronic, and temperature—highlighting their sensing mechanisms, integration approaches, and healthcare applications. Examples include graphene-based wrist-mounted pulse monitors, $Ti_3C_2$ MXene-based respiration masks, and multifunctional composite sensors for simultaneous strain, temperature, and heartbeat measurement. While these technologies show substantial promise for improving telehealth services, challenges remain in ensuring device stability under environmental stresses, developing flexible power solutions, achieving cost-effective mass production, and enhancing multi-parameter sensing accuracy. Furthermore, data privacy and secure wireless transmission are critical considerations for clinical adoption. The COVID-19 pandemic accelerated the adoption of wearable health technologies, underscoring their role in remote patient monitoring and health management during restricted physical access to healthcare facilities. Future research should focus on scalable, low-cost fabrication methods, novel 2D material architectures, and integration with advanced data analytics to enable predictive diagnostics. With sustained innovation, 2D-material-based wearable sensors are poised to redefine healthcare delivery, offering accessible, reliable, and continuous monitoring to support proactive and personalized medicine.

**Keywords:** Wearable sensors, 2D materials, telehealth, remote health monitoring, graphene, MXenes ($Ti_3C_2$), pressure sensors, strain sensors, electrochemical biosensors, optoelectronic sensors, temperature sensors

**PC-335**

**FORMULATION AND EVALUATION OF HYDROGEL-BASED TRANSDERMAL PATCH OF A SELECTED ANTIHYPERTENSIVE AGENT**

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Transdermal drug delivery systems (TDDS) are an emerging approach to controlled drug administration, designed to deliver medication through the skin at a fixed and predictable rate. Hydrogels, which are networks of hydrophilic polymers, can hold a large amount of water without losing their structural form. In transdermal patches, hydrogels not only offer a soothing, cooling sensation on the skin but also improve patient comfort compared to traditional patches. They are valued for biocompatibility, mechanical strength, reproducibility, and biodegradability. In this study, hydrogel-based patches of Losartan potassium were prepared using the solvent evaporation method. Polyvinyl alcohol was used as the base polymer, while chitosan, maleic anhydride (as a cross-linking agent), and propylene glycol (as a plasticiser) were added in different concentrations. Six different formulations were developed and tested for physical and chemical characteristics such as appearance, thickness, weight uniformity, tensile strength, swelling ability, and surface pH. Drug entrapment efficiency and in-vitro skin permeation studies were also performed, yielding satisfactory results. Among all formulations, F5 was identified as the most promising, showing superior physicochemical properties, maximum drug entrapment, and highest drug release. The Higuchi plot for F5 displayed the highest regression value, indicating that diffusion is a key mechanism of drug release.

**Keywords**: Losartan potassium; Chitosan; Polyvinyl alcohol; Maleic anhydride; Propylene glycol.

**PC-336**

**TARGETED DRUG DELIVERY USING LIGAND-CONJUGATED SLNS FOR PCOS: A NOVEL THERAPEUTIC APPROACH**

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Polycystic Ovarian Syndrome (PCOS) is a complicated endocrine illness that affects women of reproductive age. It is characterized by hormonal imbalance, insulin resistance, and ovarian dysfunction. The effectiveness of conventional medicines is frequently limited by their poor bioavailability, non-specific medication distribution, and side effects. The purpose of this research is to determine if ligand-conjugated solid lipid nanoparticles (SLNs) can enhance therapeutic results in polycystic ovary syndrome (PCOS) by acting as a targeted medication delivery mechanism. This nanocarrier platform aspires to improve drug bioavailability, reduce systemic toxicity, and overcome physiological obstacles by facilitating targeted delivery to ovarian tissues. Surface functionalization with ovarian-specific ligands, such as FSH-receptor-targeting peptides, followed the formulation of SLNs utilizing high-shear homogenization and ultrasonication procedures. The size, zeta potential, entrapment efficiency, drug release kinetics, and ligand conjugation efficiency of the nanoparticles were all measured. Animal models of polycystic ovary syndrome were used to evaluate cellular absorption in vitro and ovarian targeting efficacy in vivo. When contrasted with non-targeted formulations, the ligand-conjugated SLNs showed much better ovarian tissue absorption, regulated drug release, and increased stability. Hormonal profiles, ovarian shape, and insulin sensitivity were all significantly improved in preclinical mice treated with ligand-guided SLNs. By enhancing medication localization, decreasing side effects, and tackling the multifactorial character of PCOS, ligand-conjugated SLNs provide a potential targeted treatment approach. Further clinical exploration is warranted by this unique method, which presents avenues for tailored nanomedicine in reproductive health.

**Keywords:** PCOS, solid lipid nanoparticles, targeted drug delivery, ligand conjugation, ovarian targeting

**PC-337**

**FORMULATION DEVELOPMENT OPTIMIZATION AND CHARACTERIZATION OF LIPOSOMAL DRUG DELIVERY SYSTEM TO IMPROVE KINETIC PROFILE OF SELECTED ANTI-CANCER DRUG**

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ISBN: 978-81-980623-8-3

In the current research a liposomal drug delivery system for the anti-cancer drug Melphalan, with the goal of improving its kinetic profile and therapeutic efficacy was formulated using various techniques and excipients. Trails were conducted optimize the liposomal formulation parameters, such as particle size, encapsulation efficiency, and drug release profile, using statistical and experimental methods. The prepared formulations were characterized in terms of its physicochemical properties, stability, and in vitro release kinetics. In order to verify the presence of liposomes in the lyophilized powder and to further investigate their surface morphology, the MLs were submitted to TEM examination. In the reconstituted solution of lyophilized powder, TEM imaging indicated the presence of spherical, uniformly dispersed liposomes. The release of Melphalan was studied in PBS pH 7.4. In vitro release studies showed that Melphalan released more slowly in PBS pH 7.4 but exhibited accelerated release in acidic conditions (PBS pH 5.8). This indicates that liposomes can offer controlled and sustained drug release with enhanced rates in acidic environments. The study successfully characterized Melphalan and developed optimized liposomal formulations. Key parameters for formulation were identified, leading to stable liposomes with improved drug encapsulation.

**Keywords**: Melphalan, Liposomes, lyophilization.

**PC-338**

**DEVELOPMENT OF COW URINE DISTILLATE FORMULATIONS - A NUTRACEUTICAL APPROACH**

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Because of the current pandemic crisis and growing emphasis on total health, nutraceuticals are becoming more and more important. Nutraceuticals comprise goods that support immune system health and illness prevention. In Ayurveda, cow urine is a key medicinal drink used for therapeutic purposes. Nutraceuticals are becoming more and more significant due to the ongoing pandemic crisis and the increased focus on overall health. Nutraceuticals are products that promote the health of the immune system and the prevention of disease. Cow urine is an important medicinal beverage used for therapeutic purposes in Ayurveda. The Rigveda (10/15) compares CU to nectar. According to Charak (sloka-100) and Susruta (45/221), CU has a number of health advantages. These advantages include the potential to treat skin problems like vitiligo, reduce weight, reverse some cardiac and renal conditions, and relieve indigestion, stomach-aches, diarrhoea, edema, jaundice, anaemia, and haemorrhoids. Fresh cow urine and cow urine distillate undergo preliminary screening for nutritional and trace elements. Many formulations, including liquid, solid, and semisolid ones, are created and successfully tested. Five of the eleven liquid formulations that are prepared are chosen based on a variety of criteria, including stability and odour. A powder is made in solid formulation. A design professional assisted in the creation of the batches. Jelly is made in a semisolid dose form. All formulations underwent successful preliminary nutritional screening and trace element analysis. A variety of formulations, including liquid, solid, and semisolid ones, are effectively created and assessed. Stability investigations and odour masking of liquid formulations are completed successfully. No. 4 among these formulations has a nice smell and good stability. Every formulation that has been produced is suitable for oral ingestion. With a sufficient amount of trace elements, the produced formulations can be useful as nutraceuticals in terms of nutritional value.

**Keywords:** Cow Urine, Nutraceuticals, Nutritional Value and Trace Elements.

**PC-339**

**FORMULATION AND EVALUATION OF SOLID SELF-MICRO EMULSIFYING DRUG DELIVERY SYSTEM FOR ANTIDIABETIC ACTIVITY OF CASSIA TORA LINN.**

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Poor bioavailability of Cassia tora extract due to its gastric instability and low aqueous solubility limits its clinical application. The objective of present work was to formulate the solid self-micro-emulsifying drug delivery system (SMEDDS), to improve its bioavailability and solubility and stability for antidiabetic activity of cassia tora. Prior formulation pharmacognostic study of plant was done including morphology, microscopy, phytochemical screening revealing the presence of carbohydrates, proteins, amino acids, steroids, saponins, flavonoids, tannins, phenols, and in Cassia tora extracts. physicochemical parameter, quantitative estimation, in vitro antioxidant study, chromatographic fingerprinting including TLC and HPTLC was done. first prepare liquid SMEDDS including pre formulation solubility study, construction of pseudo ternary phase diagram of 3 ratio i.e 2:1, 3:1,and 4:1 in this the 3:1 ratio reveals the larger emulsification area than other 2 ratio .the thermodynamic stability study was done reveals that there is no any phase separation , creaming cracking is observed. Liquid SMEDDS was then convert it into solid SMEDDS by using adsorption method in this the microcrystalline cellulose was used as a adsorbent. The invitro drug release was carried out, the characterization of solid SMEDDS was FTIR, XRD, and SEM was done the FTIR ensures that our extract was completely encapsulated. Antidiabetic and histopathological studies on experimental rat revealed promising hypoglycemic activity of SMEDDS which sought for its ability to protect cassia tora extract in the stomach. By doing histopathology it reveals that the formulation has better tissue recovering ability than the cassia tora extract.

**Keywords:** Cassia Tora, Antidiabetic Activity, SMEDDS, HPTLC and Antioxidant Study.

**PC-340**

**FORMULATION AND EVALUATION OF A TIME-DEPENDENT DRUG DELIVERY SYSTEM FOR ASTHMA THERAPY**

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The objective of this study was to design and evaluate a single-unit, time-controlled oral pulsatile drug delivery system of salbutamol sulphate for the prevention of nocturnal asthma attacks. The system was designed to release the drug after a predetermined lag time of six hours, coinciding with the early morning peak in asthma symptoms. Fast-dissolving core tablets were formulated using various super disintegrants, including sodium starch glycolate, croscarmellose sodium, and crospovidone. Among these, crospovidone demonstrated the fastest disintegration time (0.31 minutes) and was selected for the core formulation. The core tablets were subsequently press-coated with hydrophilic and hydrophobic polymers, primarily hydroxypropyl methylcellulose K4M, to achieve the desired lag time. The optimized formulation with a 360 mg polymer barrier provided complete and rapid drug release after a 6-hour delay, as confirmed by in vitro dissolution studies. Stability studies over six months showed no significant changes in the drug release profile. The findings suggest that press-coated tablet technology can be effectively utilized to develop chrono-modulated drug delivery systems for conditions like nocturnal asthma.

**Keywords:** Salbutamol Sulphate, Asthma, Time-Controlled Pulsatile Tablet, Time Dependent Delivery, Press-Coated Tablet, Burst Release.

**PC-341**

**MOSQUITO REPELLENT NANOCOSMETIC CREAM USING ORANGE PEEL EXTRACT**

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Mosquito-borne illnesses are still a concern to world health, particularly in tropical and subtropical areas. An efficient defense against mosquito bites and the spread of these diseases is the use of mosquito repellents. Chemical-based mosquito repellents can be harmful to human health, especially to children and pregnant women. The use of natural plant-based component is a potential approach in the development of sustainable and eco-friendly mosquito repellents, which is gained popularity in recent years. In this study, we prepared a mosquito repellent cream using orange peels, as orange peels are a rich source of essential oils including limonene, which has been found to have mosquito-repelling qualities. This research article describe how orange peels can be used to make mosquito-repelling cream which is used to ward off mosquito. The dried orange peels were cut into pieces with




ISBN: 978-81-980623-8-3

same ratio for fine particles used for extraction of oil. For the preparation of Nano cosmetic cream first we have to prepare the silver nanoparticle solution and then we incorporate the solution into cream base. It has been demonstrated that the resulting cream has substantial anti-mosquito capabilities and can offer protection. There are many benefits to using orange peels as a raw material for mosquito repellent cream, including its availability, affordability, environmental friendliness and also have antioxidant activity. Overall, our study demonstrates the potential of orange peels as a natural source of mosquito repellent and provides a simple and effective method for preparing a mosquito repellent cream.

**Keywords:** Limonene. Extraction. Nano cosmetics.

**PC-342**

**FORMULATION AND EVALUATION OF FLUCONAZOLE AND CLOVE OIL ETHOSOMAL GEL**

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The present work on the preparation of topical ethosomal gel containing fluconazole and clove oil was an attempt to utilize the immense potential of ethosomes as a carrier to increase the permeability. Fluconazole is a synthetic antifungal agent belonging to the first generation triazole group and clove oil from the family Myrtacea is the aromatic flower bed of a tree, Syzygium aromaticum that exhibits broad antifungal and antibacterial activity. Topically applied ethosomes can increase residence time of drug in stratum corneum and epidermis. It improves the horny layer properties both by reducing trans epidermal water loss and by increasing smoothness via replenishing lost skin lipids & improves patient compliance. The ethosomal formulation was prepared using hot method using varying concentration of soya-lecithin i.e.; 5 formulations were prepared. Formulations were evaluated for percentage drug release and other parameters for selecting the best formulation. The best optimized formulation was selected based on vesicle size, entrapment efficiency, spreadability and in-vitro drug release. Five runs were done from which most appropriate were selected by range of vesicle size (1.94µm), entrapment efficiency (94.3%), spreadability (14.53gm/sec). Further evaluation studies were done for the optimized formulation such as viscosity, pH, SEM, zeta potential, ex-vivo drug permeation, skin irritation study and anti-fungal study. Therefore, the ethosomes containing soya lecithin (4%) having high amount of drug retained in skin, which can help in delivery of drug especially in fungal mediated skin diseases, thereby efficacy for prolonged period can be achieved with better patient compliance.

**Keywords:** Ethosomes, Fluconazole, Clove oil, Candida infections

**PC-343**

**GREEN-SYNTHESIZED $CuFe_2O_4$ NANOPARTICLES: A MULTIFUNCTIONAL PLATFORM FOR CATALYSIS, REMEDIATION, AND DRUG DELIVERY**

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Nanotechnology, the manipulation of matter at the nanoscale, has revolutionized scientific advancement across multiple industries, including medicine, environmental science, and catalysis. This study presents a green and sustainable approach for synthesizing copper ferrite ($CuFe_2O_4$) magnetic nanoparticles (NPs) using Psidium guajava (guava) leaf extract as a biogenic reducing and stabilizing agent. The synthesized NPs were characterized through IR, SEM, XRD, and UV-Vis spectroscopy, confirming their crystalline structure, nanoscale morphology, and magnetic properties. The $CuFe_2O_4$ NPs demonstrated excellent catalytic activity as heterogeneous catalysts in key organic transformations, such as the Biginelli reaction and the reduction of p-nitrophenol, showcasing their reusability and efficiency. Photocatalytic studies revealed their ability to degrade environmental pollutants, indicating strong potential in water purification applications. Furthermore, the nanoparticles exhibited notable antimicrobial and anti-inflammatory activities against a range of microorganisms, supporting their application in biomedical fields. Drug release studies using ibuprofen demonstrated their suitability for controlled drug delivery systems. The dual catalytic and biomedical functionality, along with an environmentally benign synthesis process, highlights the versatility of $CuFe_2O_4$ NPs. This work not only contributes to advancing green nanotechnology but also establishes a promising platform for applications in sustainable catalysis, environmental remediation, and pharmaceutical development. Future exploration in targeted drug delivery and magnetic hyperthermia could further enhance their impact in healthcare and nanomedicine.

**Keywords**: Magnetic Nanoparticles, Green Nanotechnology, Catalysis, Drug Delivery.

**PC-344**

**DESIGN AND OPTIMIZATION OF NANOSPONGES OF SELECTED ANTIFUNGAL DRUG FOR TREATMENT OF ONYCHOMYCHOSIS**

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In the current study, nanosponges are prepared using a recently developed colloidal system that can be modified to work with both hydrophilic and hydrophobic drugs, thus overcoming issues with medication toxicity, decreased bioavailability, and drug release over a wide area. In the study, terbinafine was selected as a model drug for the treatment of onychomycosis. Accordingly, the current work aims to develop Terbinafine-loaded nanosponges using factorial design. To study the effect of independent variables such as total amount of polymer (Eudragit RS 100 in mg) and stabilizer (Polyvinyl Alcohol in %), a two-factor three-level factorial design was used using Stat-Ease Design Expert v12. The experimental design led to the preparation of nine formulations. Polymer (X1) and stabilizer (X2) were selected as independent variables. The dependent variables were particle size (nm) at a range of (100 to 250), Zeta potential (mV) at a range of (-30 to -40), and drug loading (%) at a range of (60-75%). Further optimized formulation was fabricated into nanogels using carbomer as a gelling agent at a concentration of (0.1%-0.5%) and varying concentrations of triethanolamine at 0.05%. Gels were evaluated for pH, viscosity, drug content, in vitro diffusion studies, in vivo studies, and cell line studies. An optimized gel formulation was subjected to stability and release kinetics.

**Keywords:** Nanosponges**,** Nanogel, Terbinafine, Eudragit RS 100, Polyvinyl Alcohol, Carbomer.

**PC-345**

**DESIGN, DEVELOPMENT AND CHARACTERIZATION OF EDOXABAN LOADED SOLID LIPID NANOPARTICLES**

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Edoxaban is BCS class IV drug with poor aqueous solubility and intestinal permeability that results in poor oral bioavailability. Solid lipid nanoparticles (SLNs) are lipid based nanocarriers that enhance the solubility of hydrophobic drug substances and also improve their intestinal permeability similar to lipid digestion and absorption in the body. Current study aimed to prepare SLNs using Box-Behnken Design (BBD) and the resulting formulation was characterized for particle size, Poly Dispersity Index (PDI), and zeta potential. The formulation development was initiated by pre-formulation studies to confirm the authenticity of the drug substance and absence of drug excipient interactions. SLN formulations were optimized using BBD with three factors at three levels and five center points, resulting in 17 experimental runs obtained using DoE software. Glyceryl monostearate was used as lipid, lecithin as emulsifier and TPGS as co-emulsifier in the lipid phase. Aqueous phase is of 1.5% polysorbate 80 solution. Hot homogenization method was used to produce SLNs. The optimized formulation with 5% drug loading showed particle size of 120 nm, 0.213 PDI, and -24mV zeta potential. The entrapment efficiency was found to be 70%. Pre-formulation studies indicated that, there were no interactions between drug and excipients selected. Further in- vitro and in-vivo characterization is required to prove the full potential of SLNs for delivering the drug.




ISBN: 978-81-980623-8-3

**Keywords:** Solubility, nanocarrier, nanoparticles, emulsifier, particle size.

**PC-346**

**DEVELOPMENT, OPTIMIZATION AND EVALUATION OF CO-CRYSTALS OF BCS CLASS IV DRUG**

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Hydrochlorothiazide cocrystals were formulated to improve its solubility and permeability. Hydrochlorothiazide is a diuretic belonging to BCS class IV category having low solubility and low permeability. In this research work, preformulation studies of the drug were carried which included wavelength selection, calibration curve, saturation solubility, micromeritic properties and FTIR and DSC. Cocrystals were prepared by using solvent grinding method. In preparation of cocrystals, various coformers were used with hydrochlorothiazide in various ratios The evaluation of cocrystals were done for 1:3 ratio with benzoic acid, tartaric acid and salicylic acid as conformer. Evaluation of cocrystal was done with respect to percentage yield, saturation solubility, micromeritic properties, permeability studies, drug content, In vitro dissolution, stability studies. Solid State Characterization done by FTIR, DSC, SEM, and PX-RD. Result of evaluation obtained maximum % Yield for TA3 batch. High saturation solubility was shown by BA3, TA3 and SA3 formulation. Maximum drug Content obtained by TA3 and SA3 formulation. The higher drug release hydrochlorothiazide of cocrystals as compared to pure drug due to increase solubility of hydrochlorothiazide due to crystal modification by cocrystallization. Tartaric acid formulation was selected as optimized formulation it show all the parameter higher than benzoic acid and salicylic formulation. Hydrochlorothiazide cocrystals with tartaric acid were stable for a period of 30 days with no significant change in the measured parameter. Thus hydrochlorothiazide cocrystal with tartaric acid were stable.

**Keywords**: Hydrochlorothiazide, Cocrystals, Solubility, Permeability, Dissolution, Stability

**PC-347**

**API-IONIC LIQUID FORMULATION AS A NOVEL APPROACH TO ENHANCE CARBAMAZEPINE SOLUBILITY**

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In the current research, carbamazepine ionic liquid (CAR-IL) was synthesized by using citric acid. Carbamazepine has disadvantages, such as poor solubility and low bioavailability. To overcome these issues, an API-based ionic liquid was synthesized. The hydrogen bond is present between the OH group of citric acid and the amide group of carbamazepine, which is a cationic species, combining with the anionic species of citric acid. The CAR-IL was prepared using the solvent evaporation method. A 1:1 molar ratio mixture of carbamazepine and citric acid was dissolved in 5ml of methanol. This solution was then allowed to evaporate for two days to yield the desired product. The resulting (CAR-IL) Ionic liquid was obtained as an off-white solid powder. The CAR-IL obtained was confirmed through comprehensive analytical tests, including differential scanning calorimetry (DSC), X-ray diffraction (XRD), fourier transform infrared (FTIR) spectroscopy, and thermo gravimetric analysis (TGA). Furthermore, saturation solubility in water showed that the synthesized CAR-IL exhibited 4.55-fold improved solubility compared to pure carbamazepine. The UV spectra revealed no interference between the components, indicating that no significant interaction occurred. The in vitro studies (dissolution) of CAR-IL show 88.5% drug release. Preparation of CAR-IL is beneficial because it offers a multifunctional, eco-friendly, and effective strategy to enhance the solubility, dissolution, and delivery of carbamazepine widely used epileptic drug.

**Keywords:** Ionic liquid, carbamazepine, citric acid, solubility.

**PC-348**

**FORMULATION AND OPTIMIZATION OF A PRONIOSOMAL GEL OF TIZANIDINE HYDROCHLORIDE FOR SUSTAINED TRANSDERMAL DELIVERY**

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Tizanidine Hydrochloride (TZN), a BCS Class II drug with limited aqueous solubility and low oral bioavailability, This was formulated into a proniosomal gel to enhance solubility and enable sustained transdermal delivery. Proniosomes were composed of lecithin, cholesterol, and non-ionic surfactants, they transform into niosomes upon hydration. TZN-loaded proniosomes were prepared using the coacervation phase separation method with various surfactants (Tween 20, 40, 60, 80, and Span 80). The formulations were evaluated for vesicle size, polydispersity index (PDI), zeta potential, entrapment efficiency and morphology using optical microscopy, SEM and DLS analysis. The optimized formulation (F8) demonstrated a vesicle size of 169.7 nm, a PDI of 0.352, and a high entrapment efficiency of 93%, indicating uniformity and stability. The drug content and release were quantified via UV-Visible spectrophotometry at 318 nm and the In vitro release studies, were conducted using the dialysis bag diffusion method in phosphate buffer (pH 6.8), revealed sustained drug release beyond 24 hours. These findings suggest that proniosomal gel is a promising drug delivery system for enhancing solubility, stability and sustained transdermal release of Tizanidine Hydrochloride there by potentially improving therapeutic efficacy and patient adherence.

**Keywords:** Tizanidine Hydrochloride, Proniosomal gel, Transdermal drug delivery, Sustained release, UV-Visible spectrophotometry.

**PC-349**

**NATURE MEETS NANOTECH: DUAL ROLE OF CLERODENDRUM SERRATUM-BASED SILVER NANOPARTICLES IN INFECTION CONTROL AND WOUND HEALING**

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The rise of multidrug-resistant (MDR) ESKAPE pathogens and biofilm-associated infections poses a major therapeutic challenge, necessitating innovative strategies for effective infection control and wound management. This study reports the green synthesis of silver nanoparticles (AgNPs) and polyethylene glycol-coated AgNPs (PEG-AgNPs) using Clerodendrum serratum leaf extract and evaluates their dual antibacterial and wound-healing potential. Nanoparticles were synthesized, characterized and assessed for antibacterial, antibiofilm, and therapeutic activity. PEG-AgNPs demonstrated superior antibacterial efficacy with respect to MIC values 0.3906-12.5 µg/mL compared to AgNPs. Flow cytometry confirmed bacterial membrane disruption, and biofilm assays revealed potent inhibition against Pseudomonas aeruginosa and Acinetobacter baumannii. LC-MS analysis identified bioactive flavonoids, including pectolinarigenin, and salvigenin, which demonstrated strong binding affinities of -8.7 kcal/mol with key biofilm-associated proteins (ClpP1, PslG, BfmR, and OmpA) in molecular docking studies, elucidating their mechanistic role in biofilm disruption. To facilitate topical delivery, we aimed to design and develop a suitable Nanoformulation through a series of optimizations, the 3% PEG-AgNP gel emerged as the most effective formulation for further application. It exhibited uniform nanoparticle dispersion confirmed by SEM, with accelerated wound closure and promoted nearly complete healing in a rat excision model. This dual-action approach highlights the potential of C. serratum-derived PEG-AgNPs as a sustainable and effective nanoplatform for tackling two critical clinical challenges, infection control and wound repair. Through merging traditional medicinal knowledge with modern nanotechnology, this study not only provides mechanistic insight but also proposes a translationally relevant strategy that could complement or surpass existing antimicrobial and wound-care therapies.

**Keywords:** Clerodendrum serratum, PEG-AgNPs, Molecular docking, MDR-ESKAPE pathogens, wound healing.

**PC-350**

**DEVELOPMENT AND EVALUATION OF A RICE BRAN WAX-BASED EMULGEL CONTAINING GENTAMICIN FOR TOPICAL TREATMENT OF SKIN AILMENTS**




ISBN: 978-81-980623-8-3

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The present study focuses on the formulation and evaluation of an emulgel system combining the therapeutic benefits of gels and emulsions for the treatment of skin ailments. Utilizing natural rice bran wax as a base and Gentamicin as the active pharmaceutical ingredient, three emulgel formulations (F1, F2, F3) were developed and tested. Rice bran wax was extracted, purified, and saponified, and its physicochemical properties were assessed before incorporation. The emulsions were prepared using surfactant blends and integrated into a gel matrix containing Carbopol 940. Among the formulations, F1, which incorporated 2% Carbopol, exhibited the most desirable characteristics, including optimal spreadability, bioadhesion, pH, and viscosity. In vitro drug release studies using a Franz diffusion cell showed that F1 had the most rapid and complete drug release over a 120-minute period. Antimicrobial testing confirmed the activity of all formulations, with F1 showing the highest zone of inhibition, though slightly less potent than standard Gentamicin treatments. The findings demonstrate the successful use of rice bran wax in a stable and effective topical emulgel formulation, offering enhanced patient compliance due to its ease of application and promising therapeutic potential. Further in vivo studies are recommended to evaluate clinical effectiveness and optimize the formulation's antimicrobial profile. This research supports the use of sustainable, natural materials in topical drug delivery systems without compromising pharmaceutical standards.

**Keywords:** Emulgel, Rice Bran Wax, Gentamicin, Topical Drug Delivery, Skin Ailments, Carbopol 940.

**PC-351**

## FORMULATION, DEVELOPMENT AND EVALUATION OF A VANISHING CREAM INCORPORATING ETHANOLIC TAPROOT EXTRACT OF *DAUCUS CAROTA*

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This study investigates the formulation and evaluation of a vanishing cream incorporating ethanolic taproot extract of *Daucus carota* (carrot), aiming to provide rapid absorption, a non-greasy texture, and prolonged hydration. Vanishing creams, characterized as oil-in-water (O/W) emulsions, are renowned for their quick absorption and smooth, matte finish. The primary objective was to assess the impact of various ingredients and formulations on the cream's ability to deliver moisturization, smoothness, and a matte finish. Four formulations (F1–F4) were developed using a combination of emulsifiers, humectants, oils, preservative and aqueous phase. The ethanolic extract was prepared by macerating fresh taproots with food-grade ethanol at a 1:5 (w/v) ratio for 7–14 days at room temperature, followed by filtration and evaporation under reduced pressure. This extract was then incorporated into the vanishing cream. The final product was evaluated for appearance, odor, pH, spreadability, homogeneity, viscosity, consistency, and irritancy. Results indicated that all formulations exhibited even spreadability, rapid absorption, and maintained skin hydration over time. Formulation F1, in particular, demonstrated a creamy white color, smooth texture, pleasant carrot scent, pH of 5.7, spreadability of 12.3 g.cm/sec, uniform homogeneity, viscosity of 1500 cP, medium consistency, and non-irritant properties. Thus, it can be concluded F1 provided a matte finish, enhanced skin smoothness, and long-lasting hydration, exhibiting the most desirable attributes. Further studies are recommended to optimize texture, absorption rate, and skin-feel characteristics.

**Keywords:** Vanishing cream, Daucus carota extract, oil-in-water emulsion, skin hydration.

**PC-352**

## DEVELOPMENT OF MICROCRYSTALLINE CELLULOSE POWDER FROM COTTON LINTERS USING A BIOCHEMICAL PROCESS FOR TABLET EXCIPIENTS

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Microcrystalline cellulose (MCC) is a widely utilized excipient in pharmaceutical tablet formulations due to its excellent compressibility and binding properties. Traditionally sourced from costly wood pulp or refined cotton, alternative sustainable sources such as cotton linters are being explored. This study presents a novel biochemical process for the production of MCC from cotton linters using crude enzymes derived from Aspergillus sp. VM-1, cultivated on banana pseudostem waste. The cotton linters, containing 90–98% cellulose, underwent enzymatic hydrolysis at a 1:20 material-to-liquor ratio, followed by bleaching with hydrogen peroxide and sodium hydroxide at 90–95°C. This method significantly reduces alkali consumption and energy input compared to conventional techniques. The resulting MCC exhibited an α-cellulose content of 98.05% and a degree of polymerization of 210, comparable to commercial Avicel® PH101. Physicochemical characterization confirmed that the cotton linter-based MCC met pharmacopeial standards. When evaluated as a direct compression excipient in paracetamol tablets, the enzymatically derived MCC demonstrated excellent flow, compressibility, and mechanical strength, albeit with a slightly longer disintegration time (9.21 minutes) compared to Avicel® PH101 (4.50 minutes). However, both formulations exhibited similarly high dissolution rates, confirming the potential utility of cotton linter-derived MCC in solid dosage forms. This study establishes an eco-friendly, cost-effective, and sustainable enzymatic pathway for MCC production from agro-industrial residues. The process not only valorizes cotton linters but also supports green chemistry initiatives in pharmaceutical manufacturing by minimizing chemical usage and environmental burden.

**PC-353**

## FORMULATION AND CHARACTERIZATION OF SODIUM ALGINATE-BASED FLOATING MICROBEADS FOR VALACYCLOVIR HYDROCHLORIDE

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The present work successfully achieved the formulation and evaluation of floating microbeads designed for the gastroretentive delivery of valacyclovir hydrochloride. This formulation aims to enhance the bioavailability of the antiviral drug and provide sustained release. In this study, six formulations (F1–F6) were developed using the ionotropic gelation technique, incorporating sodium alginate in combination with HPMC or Carbopol 934P. Floating microbeads were prepared using these polymer mixtures and evaluated for surface morphology, particle size, percentage yield (up to 52.61%), swelling index (up to 145%), in vitro drug release (up to 57.72% over 4 hours), and drug entrapment efficiency (up to 90.47%). The particle size ranged from 5 to 8.5 mm. Floating behavior was confirmed through in vitro buoyancy studies, where formulation F1 showed the best floating ability, 31% of the beads remained buoyant for 24 hours in simulated gastric fluid (0.1 N HCl). The results, particularly the drug release kinetics, demonstrated sustained drug release behavior and indicated the potential for achieving consistent therapeutic plasma levels, reducing dosing frequency, enhancing drug absorption, and improving the drug release profile within the gastrointestinal tract. This simple formulation strategy is advantageous for drugs like valacyclovir. It can be further optimized and scaled up for clinical applications in the treatment of viral infections such as herpes simplex and herpes zoster. This approach offers a more patient-friendly and effective alternative to conventional oral antiviral therapy, supporting improved therapeutic outcomes and better compliance in long-term antiviral treatment.

**Keywords:** Valacyclovir hydrochloride, microbeads, ionotropic gelation method, entrapment efficiency, HPMC.

**PC-354**

## FORMULATION DESIGN AND EVALUATION OF AN ANTIMICROBIAL HYDROGEL PATCH CONTAINING ALLIUM ASCALONICUM EXTRACT

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ISBN: 978-81-980623-8-3

Skin and tissue infections are extremely difficult to treat and are frequently made worse by antibiotic resistance and side effect from traditional therapies. The creation and assessment of anti-microbial hydrogel patch contain extract from Allium Ascalonicum is the main goal of this work. Antimicrobial qualities of the extract, such as its anti-fungal and anti-bacterial capabilities, are well documented. This work offers a novel method of using a hydrogel patch that is bioactive and contains extract from Allium Ascalonicum. The procedure entails locating shallots, isolating bioactive substances, and creating hydrogel patch with certain ingredients. The quality of the patch is evaluated by different matrices, and the integrity of the bioactive components is guaranteed by characterisation using Fourier- transform infrared spectroscopy. The potential of Allium Ascalonicum to fight infections and the creation of unique hydrogel patch for skin and tissue infections are highlighted in the study's conclusion, adding to the body of knowledge on natural solution to problems with conventional medicine.

**Keywords:** Allium Ascalonicum, Extract, Skin infections, Antimicrobial activity

**PC-355**

## DEVELOPMENT OF AZILSARTAN MEDOXOMIL CO-CRYSTALS USING BENZOIC AND MALEIC ACID: A STRATEGY TO IMPROVE BIOPHARMACEUTICAL PROPERTIES

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Azilsartan Medoxomil, classified under BCS Class IV, exhibits poor aqueous solubility and limited permeability, leading to low oral bioavailability. This study aimed to enhance its solubility and dissolution profile by formulating co-crystals using different co-formers. Benzoic acid and maleic acid were employed as co-formers through two techniques: solvent evaporation and solvent drop grinding. The prepared co-crystals were evaluated for solubility, crystallinity, dissolution behavior, and physicochemical properties. Results demonstrated significant improvement in aqueous solubility and drug release compared to the pure drug and the marketed formulation. Among the formulations, F2—Azilsartan Medoxomil co-crystallized with benzoic acid via the solvent drop grinding method—showed the most promising results. It exhibited the highest degree of crystallinity (85.59%) and maximum drug release (87.35% at 12 hours). FT-IR analysis confirmed intermolecular interactions between the drug and co-formers, while SEM revealed distinct morphological changes. The findings suggest that co-crystallization effectively modifies the physical properties of Azilsartan Medoxomil without altering its chemical structure. In conclusion, the co-crystal approach, especially using benzoic acid as a co-former, offers a promising strategy to enhance the solubility, dissolution rate, and potentially the bioavailability of poorly soluble drugs like Azilsartan Medoxomil. However, further in vivo and long-term stability studies are warranted to fully validate these outcomes.

**Keywords:** Azilsartan Medoxomil, co-crystals, solubility enhancement, bioavailability, benzoic acid, maleic acid, solvent drop grinding, solvent evaporation, crystallinity, drug release.

**PC-356**

## FORMULATION AND ANTIMICROBIAL EVALUATION OF TIN OXIDE NANOPARTICLES SYNTHESIZED VIA CO-PRECIPITATION AND OPTIMIZED SPRAY DRYING TECHNIQUES

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Nanotechnology has revolutionized the biomedical field through the development of novel materials with enhanced properties. In this study, tin oxide ($SnO_2$) nanoparticles were synthesized using the co-precipitation method and optimized via spray drying and high-speed homogenization techniques to enhance their physicochemical and antimicrobial characteristics. The primary objective was to achieve nanosized particles with improved antibacterial efficacy suitable for therapeutic applications. Four trial formulations were evaluated, varying in precursors, pH adjustments, and drying methods. The optimized batch resulted in nanoparticles with a mean particle size of 243.2 nm and a 40% practical yield. Comprehensive characterization was performed using Fourier-transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), field emission scanning electron microscopy (FESEM), and energy-dispersive X-ray spectroscopy (EDS), confirming the crystalline structure and elemental composition of $SnO_2$. Zeta potential analysis demonstrated good stability with a potential of -18.5 mV. Antimicrobial activity was assessed using a 100 ppm nanoparticle solution against Escherichia coli and Staphylococcus aureus, resulting in complete inhibition of bacterial growth over 24 hours without recurrence. The study concludes that $SnO_2$ nanoparticles possess potent antibacterial properties and demonstrate promising potential for applications in infection control and biomedical formulations. Their efficacy, combined with scalable synthesis methods, positions them as strong candidates in nanomedicine for combating microbial resistance.

**Keywords:** Tin oxide nanoparticles, co-precipitation method, antimicrobial activity, spray drying, zeta potential, biomedical applications.

**PC-357**

## TARGETED DELIVERY OF CR-42-024 USING ALBUMIN NANOPARTICLES: A NOVEL STRATEGY FOR ENHANCING ANTI-CANCER EFFICACY

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The clinical application of CR-42-024, a potent tubulin polymerization inhibitor, is limited by its poor solubility, low tumor specificity, and non-selective toxicity. This study presents the design, synthesis, and evaluation of CR-42-024-loaded serum albumin nanoparticles (CR-SA NPs) as an innovative drug delivery system to overcome these barriers. Nanoparticles were fabricated using a modified desolvation technique, where ethanol was added as a desolvating agent and glutaraldehyde was employed as a crosslinker. The resulting CR-SA NPs demonstrated favorable physicochemical properties, including a spherical morphology, an average diameter of ~130 nm, and a zeta potential of approximately -30 mV, indicating good colloidal stability. Drug encapsulation was optimized to achieve a loading capacity of ~6 µg/mg albumin, with sustained release characteristics and no initial burst release. Cellular toxicity assays on the SW-620 colon cancer cell line revealed that CR-SA NPs had significantly lower IC50 values compared to free CR-42-024, highlighting their superior cytotoxic potential. These findings suggest improved intracellular delivery and therapeutic efficacy. While the current formulation utilizes glutaraldehyde, known for its potential toxicity, further studies are recommended to identify safer crosslinking agents for clinical translation. Overall, CR-SA NPs offer a promising platform for targeted cancer therapy, minimizing systemic toxicity while maximizing drug delivery to tumor sites. Future in vivo evaluations and formulation refinements are necessary to establish their potential in clinical oncology.

**Keywords:** Albumin nanoparticles, CR-42-024, tubulin polymerization inhibitor, targeted drug delivery, nanoparticle formulation, cancer therapy, controlled release, cytotoxicity, encapsulation efficiency, colorectal cancer, SW-620 cell line.

**PC-358**

## FORMULATION AND EVALUATION OF SILVER–QUERCETIN NANOCOMPLEX AND ITS EFFICACY AGAINST CERVICAL CANCER

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This study investigated the therapeutic potential of quercetin, a natural flavonoid found in various fruits and medicinal plants, in combination with silver nanoparticles (AgNPs) for pharmaceutical applications, with a focus on anticancer activity against cervical cancer. A metal–quercetin nanocomplex (MQNC) was formulated using silver via a green synthesis method. The resulting AgNPs demonstrated high drug entrapment efficiency and optimal particle size, indicating favorable physicochemical characteristics for drug delivery. The nanocomplex was comprehensively characterized using UV-Visible spectroscopy, Fourier Transform Infrared Spectroscopy (FT-IR), Scanning Electron Microscopy (SEM), Energy-Dispersive X-ray Analysis (EDX), X-ray Diffraction (XRD), zeta potential, and particle size analysis. UV-Vis spectra showed characteristic absorption shifts confirming nanoparticle formation, while FT-IR spectra revealed successful complexation of quercetin with silver ions. The in vitro cytotoxicity of the silver–quercetin nanocomplex was evaluated against HeLa cervical cancer cell lines using the MTT assay. The nanocomplex exhibited a significant cytotoxic effect, with an $IC_{50}$ value of 11.76 µg/mL, indicating enhanced anticancer potential compared to




ISBN: 978-81-980623-8-3

quercetin alone. These findings suggest that the silver–quercetin nanocomplex can serve as a promising candidate for targeted cervical cancer therapy. Further studies are recommended to explore the mechanism of action, optimize the formulation, and evaluate the in vivo efficacy and safety of this novel nanocomplex.

**Keywords**: Quercetin, silver nanoparticles, anticancer, cervical cancer, HeLa cell line, nanocomplex, Bottom of Form

**PC-359**

**DEVELOPMENT AND EVALUATION OF SUPERABSORBENT GELATIN-PVA FILMS FOR ENHANCED WOUND**

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The effective management of wound exudate is essential to accelerate healing and prevent infection in chronic and acute wounds. This study presents the development and evaluation of a novel wound dressing film formulated using gelatin and polyvinyl alcohol (PVA), crosslinked in-situ with glutaraldehyde, and plasticized with glycerin. The resulting superabsorbent film is designed to simultaneously absorb exudate and deliver antiseptic agents through a diffusion-based mechanism, making it suitable for incorporation into multilayered wound dressings. The formulation process involved dissolving PVA and gelatin in aqueous media under controlled temperatures, followed by blending, crosslinking, and film casting. The prepared films were subjected to extensive physicochemical and mechanical evaluations, including FTIR, thermal analysis (DSC and TGA), moisture vapor transmission rate, folding endurance, gel content, and antimicrobial testing. Results confirmed the film's structural stability, high water absorption capacity (35 g/g), and integrity loss upon hydration—essential for releasing therapeutic agents. FTIR spectra indicated successful crosslinking of gelatin without disrupting the PVA backbone. Thermal stability was maintained up to 150 °C, and antimicrobial testing showed promising activity, supporting its role in infection control. The developed film demonstrated favorable characteristics such as translucency, flexibility, uniform thickness, and soft texture, making it a viable option for use in exudate-heavy wound environments. These findings suggest that the optimized gelatin-PVA film holds potential as an advanced wound dressing component, offering a synergistic approach to exudate management and localized antimicrobial delivery.

**Keywords:** Wound dressing, superabsorbent film, polyvinyl alcohol, gelatin, glutaraldehyde, in-situ crosslinking, exudate management, antimicrobial activity.

**PC-360**

**DESIGN AND CHARACTERIZATION OF GASTRO-RETENTIVE FLOATING MICROSPHERES FOR LONG-ACTING DELIVERY OF ONDANSETRON HYDROCHLORIDE**

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Antiemetic drugs used to control nausea and vomiting caused by cytotoxic chemotherapy have a short duration of action, typically up to 6 hours, requiring multiple daily doses. Frequent dosing is difficult for patients suffering from emesis, leading to poor compliance and reduced treatment effectiveness. To overcome this, a drug delivery system that provides long-acting release, increases gastric retention, and improves bioavailability is necessary. Ondansetron Hydrochloride is prescribed for nausea and vomiting has a narrow absorption window in the stomach and low solubility in intestinal pH, resulting in reduced bioavailability beyond the gastric region. To resolve these challenges, gastro-retentive floating microspheres were developed to improve their absorption with an extended-release period. Here, floating microspheres are made using Ethyl Cellulose and Hydroxypropyl Methylcellulose (25% HPMC and 75% EC) by the solvent evaporation method. The optimized batch with an HPMC: EC ratio of 1:3 showed floating ability for over 12 hours, with particle sizes ranging from 154 to 345 µm and 60.52% drug entrapment efficiency. FTIR and DSC confirmed no chemical interaction between the drug and polymers, ensuring formulation stability. In vitro drug release shows up to 12 hours. The prepared floating microspheres successfully increased gastric retention, maintained the drug within its absorption window, and reduced dosing frequency, thereby improving bioavailability and patient convenience**.**

**Keywords:** Floating microspheres, Gastro-retentive system, Sustained release, Ondansetron Hydrochloride, EC, HPMC.

**PC-361**

**FORMULATION AND CHARACTERIZATION OF CIPROFLOXACIN-LOADED CHITOSAN-ALGINATE MICROPARTICLES WITH VARYING CROSS-LINKING CONCENTRATION**

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This study focuses on the formulation of ciprofloxacin-loaded chitosan-alginate microparticles using the ionotropic gelation technique, with calcium chloride (5%, 7.5%, and 10%) as the cross-linking agent. The objective is to enhance drug stability and provide controlled release by evaluating the impact of cross-linker concentration on yield, particle size, surface morphology, entrapment efficiency, and in vitro release, ultimately aiming to improve therapeutic efficacy and reduce dosing frequency through optimized formulation parameters. Formulation F3 exhibited the highest yield (88.20%), whereas F1 and F2 showed lower yields of 52.50% and 50.00%, respectively. A concentration-dependent reduction in particle size was observed, with F1 having the largest particles (0.617 ± 0.044 µm) and F3 the smallest (0.447 ± 0.029 µm). Morphological analysis revealed that F1 had a rough, folded surface, F2 showed a smoother structure, and F3 exhibited a uniform and dense morphology. The drug entrapment efficiency was highest in F1 formulation (71.49%), and lowest in F3 formulation (54.12%). All formulations exhibited sustained drug release over 240 minutes, with F1 releasing 70.95% and F3 releasing 50.15%. Release kinetics indicated that F1 and F2 followed first-order kinetics ($R^2$ = 0.9945 and 0.9976), while F3 best fit the Korsmeyer–Peppas model ($R^2$ = 0.9962), suggesting a transition from diffusion-controlled to polymer relaxation-mediated release with increasing cross-linker concentration. These findings suggest that modulation of cross-linker levels in polymeric microparticles offers a promising strategy for controlled delivery of ciprofloxacin, enhancing its therapeutic efficacy in the treatment of bacterial infections.

**Keywords:** Ciprofloxacin, Calcium Chloride, Microparticles, Chitosan-alginate, Morphology.

**PC-362**

**DEVELOPMENT AND CHARACTERIZATION OF PIPERACILLIN TAZOBACTAM-LOADED AQUASOMAL GEL FOR THE TREATMENT OF NOMA**

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Noma is a rapidly progressive and often fatal infection of the mouth and face, which predominantly affects children between the age of two and six years. It begins as an ulcer on the gums and rapidly spreads into the jawbone, cheek, and facial soft tissues. In 2023 noma was added to the World Health Organization's list of . The study sought to create and optimize piperacillin-tazobactam-loaded aquasomes for buccal delivery, with the goal of improving drug stability and antibacterial activity. Aquasomes were created with calcium phosphate as the core, trehalose as the coating, and piperacillin-tazobactam as the medication. Piperacillin-tazobactam-loaded aquasomal gel was formulated using 1% Carbopol 934. A central composite design was used to optimize formulation variables. An optimized piperacillin-tazobactam-loaded aquasomes had a particle size of 186 nm, zeta potential of -19.37 mV, and PDI of 0.3697, suggesting stability and uniformity. Entrapment efficiency was 68.18%, whereas in-vitro drug release was 61.39%. Piperacillin-tazobactam-loaded aquasomal gel was formulated using 1% Carbopol 934 and demonstrated good pH, spreadability, drug content, and viscosity for buccal drug delivery. In- vitro and ex- vivo tests showed that drug release was sustained and increased mucosal penetration.

**Keywords:** Aquasomal gel, Noma, Piperacillin Tazobactam and Buccal delivery.




ISBN: 978-81-980623-8-3

**PC-363**

**FORMULATION AND COMPARATIVE ANALYSIS OF CIPROFLOXACIN HCL MICROSPHERES PREPARED WITH DIFFERENT COMBINATIONS OF POLYMERS USING EMULSION GELATION TECHNIQUE**

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This study was based on preparation of Ciprofloxacin HCL microspheres by using emulsion gelation method with natural gum, polymers, cross linking agents like sodium alginate and calcium chloride. It facilitated controlled release in the drug delivery system. Overall, three formulations were prepared and evaluated for size analysis, percentage yield, swelling index, drug entrapment efficiency, In Vitro drug release, drug release kinetics study and stability testing. According to the observations maximum swelling index was observed for F1 (100 %) and F3 had shown enhanced entrapment about 88 % with the optimized polymer level. In Vitro drug release study revealed that F3 had greatest percentage of drug release of (89.479 %). In general, of the three batches, F3 showed the best combination of properties with the lowest particle size about 70 µm. F3 had shown controlled release drug delivery system with R2 value of 0.929. At the end of 1 month of storage for stability study the percentages of drug release were found to be almost unchanged where the value for F3 was 85.112 %. No visible colour, odour, or physical and chemical changes were observed, which reflects good stability of the formulations under the test conditions.

**Keywords:** Microspheres, Ciprofloxacin HCL, Drug release kinetics study, Emulsion gelation method and Controlled release drug delivery.

**PC-364**

**DEVELOPMENT AND EVALUATION OF DICLOFENAC SODIUM SUPPOSITORIES**

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In current research Diclofenac sodium suppositories were formulated by using fusion moulding method using different suppository bases like cocoa butter, PEG 4000 and gelatin with glycerin. The rectal route was chosen to avoid gastrointestinal side effects and to enhance patient compliance, especially in individuals unable to take oral medications. The prepared suppositories were evaluated by size determination using vernier caliper, melting time determination, weight variation, disintegration time determination and in-vitro drug release study. Drug release kinetics were determined by Zero order, First Order, Higuchi model, Hixon Crowel model, Korsmeyer model. The results showed that the suppositories met the required standards for physical characteristics, drug content and release profiles. All formulations met acceptable limits for weight variation, uniformity, and physical appearance. Melting time of the suppositories were within 25 minutes. Among the three bases, the PEG 4000 based suppositories exhibited high percentage of drug release within the desired time frame. The glycerin-gelatin based suppositories showed a more sustained release than PEG 4000, while cocoa butter base suppositories had a slower release rate with a prolonged sustained release activity. A prolong release pattern of diclofenac sodium suppositories were noticed over 240 minutes (38.88%). The study concludes that cocoa butter suppositories offer a prolonged release profile suitable for sustained therapeutic action, while PEG-based suppositories are ideal for faster onset of action and the suppositories follow the Higuchi model.

**Keywords:** Diclofenac Sodium, Sustain release, Fusion moulding.

**PC-365**

**FORMULATION, OPTIMIZATION AND EVALUATION OF POLYMERIC NANOPARTICLES OF IMEGLIMIN HYDROCHLORIDE FOR DIABETES MELLITUS**

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In the current research, polymeric nanoparticles of anti-diabetic drug Imeglimin hydrochloride (ImH) were formulated and evaluated. The objective behind the research was to achieve sustained drug release and reduce the required dosage compared to conventional formulations for improved Type 2 diabetes management. Imeglimin hydrochloride is a novel oral antidiabetic agent with a dual mechanism of action targeting mitochondrial function and insulin sensitivity. Despite its efficacy, it exhibits limited permeability and requires high oral doses. Polymeric nanoparticles were prepared using the double emulsion solvent evaporation method with poly (D, L-lactic-co-glycolic acid) (PLGA) as the polymer and polyvinyl alcohol (PVA) as the stabilizer. Different drug-to-polymer ratios, percentage of stabilizer were evaluated to optimize particle size, zeta potential, drug entrapment efficiency, and release profile. FTIR and DSC analysis indicated no chemical interaction between drug Imeglimin hydrochloride and polymer. The fabricated ImH loaded nanoparticles were characterized for particle size, drug-loading and drug release profiles. The optimized formulation exhibited a mean particle size of 189 ± 4.7 nm, a zeta potential of –32.8 ± 2.6 mV, and encapsulation efficiency of 76.5 ± 3.2%. FTIR and DSC analysis indicated no chemical interaction between Imeglimin hydrochloride drug and polymer. ImH-loaded PLGA nanoparticles exhibited sustained drug release over 24 hours in vitro. ImH-loaded PLGA nanoparticles demonstrated favourable characteristics for oral delivery, including sustained release and high encapsulation. The findings of this study suggest that the developed Imeglimin hydrochloride loaded polymeric nanoparticles have the potential to achieve optimal therapeutic outcomes and improving patient compliance.

**Keywords:** Imeglimin hydrochloride, PLGA, Box Behnken design, Double emulsion solvent evaporation method

**PC-366**

**FORMULATION AND EVALUATION OF BIOPOLYMER-BASED MICROBEADS CONTAINING VALACYCLOVIR HYDROCHLORIDE**

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In the present research, biopolymers using sodium alginate with gellan gum or guar gum are used to prepare microbeads containing an antiviral drug (Valacyclovir Hydrochloride) based on a microbead formulation. The objective aims to determine how different polymer-to-drug ratios affect the effectiveness of drug entrapment and the behavior of drug release, and the kinetic properties of Valacyclovir Hydrochloride using various mathematical models. The particle size of microbeads ranges from 0.4-0.8mm; hence, with a small size, there is an increase in surface area and release profile. A smooth, uniform, and spherical surface has been determined by surface morphological study using Digital Microscope and Scanning Electron Microscope (SEM). Analysis based on the six formulations of Valacyclovir Hydrochloride in which Formulation 6 showed the most promising results with the highest swelling index (160%), drug entrapment efficiency (67.95%), and controlled in-vitro release; hence, it releases the drug over a prolonged period. F5 also gives a high entrapment efficiency but with low swelling index and release characteristics. The drug release mechanism shows diffusion-controlled release, as the kinetic modelling of the drug follows the Higuchi model. Moreover, the linearity in both first and zero order release graphs suggests the microbeads offer predictable and long- lasted therapeutic effects. Hence, Valacyclovir Hydrochloride-loaded biopolymer-based microbeads increase patient compliance and efficacy by reducing the dose frequency of an antiviral drug. The study can give a promising approach in the modern pharmaceutical field against viral infections.

**Key Words:** Biopolymer, Valacyclovir hydrochloride, guar gum, gellan gum, sodium alginate

**PC-367**

**FORMULATION AND EVALUATION OF NORFLOXACIN-LOADED ALGINATE MICROSPHERE USING GUAR GUM AND GELLAN GUM WITH DIFFERENT CROSS-LINKING AGENTS**

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ISBN: 978-81-980623-8-3

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The study aimed to develop and characterize Norfloxacin-loaded alginate microspheres using two natural gums i.e. guar gum and gellan gum in combination with various cross-linking agents, namely calcium chloride ($CaCl_2$), aluminum chloride ($AlCl_3$), and a combination of both with ionotropic gelation method. It focused on evaluating how the choice of polymer and cross-linking strategy affected physicochemical property and drug release behavior of the microsphere. A series of formulations were prepared and evaluated for percentage yield, particle size, surface morphology, drug entrapment efficiency, and in-vitro release behavior. The formulation's yield was found to vary between 64.20% (F1) and 88.60% (F6), indicating that dual crosslinking improves matrix integrity. Dual crosslinking agents (F3 and F6), resulted in small and more uniform particle size, ranging b/w 0.417mm (F6) to 0.633mm (F1). Scanning Electron Microscopy (SEM) analysis showed that F6 had the most consistent and compact surface, F3 appeared coarse and fibrous, F2 and F4 showed porous and uneven surfaces. Maximum entrapment efficiency 68.16% is achieved by F6, while 30.90% was the lowest value achieved by F2. According to the drug release behavior, F2 released the drug more quickly 93.65% after 240 minutes, while F6 showed the slowest release rate 57.38% during the same period. The most advantageous characteristics showed by the gellan gum based microspheres cross-linked with both $AlCl_3$ and $CaCl_3$ (F6), which included the best yield, the smallest particle size, the compact surface shape, and more prolonged drug release. Overall, the study was helpful for future application.

**Keywords:** Gellan gum, Guar Gum, Microsphere, Ionotropic gelation

**PC-368**

**FORMULATION AND EVALUATION OF LIPOSOME CONTAINING 5-FLUOROURACIL**

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In the framework of this research, liposome containing 5-Fluorouracil (a key anticancer drug) was formulated. Once formulated, the liposomes underwent a series of characterization tests like Fourier Transform Infrared (FTIR) Spectroscopy, dynamic light scattering (DLS) analysis, drug entrapment efficiency, in vitro drug release study, surface morphology examination. It was found that the particle size ranging from 110-300 nm suggesting a relatively uniform particle distribution, the entrapment efficiency shows that F1 formulation achieved the highest drug encapsulation at 83.54% and F8 had the lowest at just 15.48% out of all nine formulations (F1-F9). This results suggest that increase in lecithin concentration may reduce the drug entrapment efficiency. The FTIR analysis confirmed that there were no chemical interactions between 5-Fluorouracil and the liposomal components during the formulation process. The FE-SEM analysis revealed that the liposomes had a consistent shape and structure. F1 batch shows the highest drug release at 54.51% and followed Korsmeyer-Peppas release model, indicating a sustained release behavior. Overall, the findings of this study highlight the potential of liposomal drug delivery system, especially for cancer treatment. This innovative delivery system holds strong potential to meet existing medical need and move the pharmaceutical industry closer to more personalized and targeted treatment option.

**Keywords:** 5-Fluorouracil, FTIR spectroscopy, dynamic light scattering, lecithin, FE-SEM.

**PC-369**

**FABRICATION AND EVALUATION OF RITONAVIR FDDS TABLETS FOR CONTROLLED RELEASE AND BIOAVAILABILITY**

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Ritonavir, a widely prescribed antiviral for HIV/AIDS, is practically insoluble in water and presents challenges in formulation and development. This research focuses on developing Ritonavir floating tablets for controlled drug release and prolonged gastric retention, aiming to enhance bioavailability, reduce dosing frequency, improve therapeutic efficacy, and increase patient compliance. The tablets were prepared using the wet granulation method with PVP K30, magnesium stearate, talc, sodium bicarbonate, citric acid, xanthan gum, lactose, and varying ratios of HPMC K4M and K100M. Post-compression tests assessed hardness, weight variation, thickness, diameter, drug content, lag time, buoyancy time, and in vitro dissolution. All formulations showed good mechanical strength. Sodium bicarbonate and citric acid produced $CO_2$ in 0.1N HCl, enabling buoyancy. Xanthan gum aided in controlled release. The combination of citric acid and sodium bicarbonate provided optimal floating capability. Among the formulations, RF6 (with HPMC K100M) showed drug release following mixed-order kinetics and Higuchi's mechanism. Higuchi's equation and Peppa's plots confirmed non-Fickian diffusion and sustained release behavior. The study concludes that the formulated tablets successfully retain the drug in the stomach for extended periods, improving its solubility, bioavailability, and therapeutic outcomes.

**Keywords:** Ritonavir, HPMC, Xanthan gum floating drug delivery system.

**PC-370**

**DESIGN, DEVEOPMENT AND EVALUATION OF TRASNFEROSOMAL BUCCAL PATCHES OF CARDIOVASCULAR AGENT**

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Cardiovascular disease (CVD) is the foremost cause of mortality worldwide and one of the world's most critical health issues. Cardiovascular Agents reduces the heart rate as well as systolic blood pressure, which reduces the oxygen demand of the heart and thus treats CVD. Oral administration of Cardiovascular Agents has the disadvantage of low bioavailability due to an extensive and highly variable hepatic first-pass metabolism. In addition, they possess short a half-life hence requires frequent dosing. Thus, it is important to give the drug other than by oral route. IV route has poor patient compliance due to needle pain and assistance required. Therefore, designed, develop and evaluate transferosomes of Cardiovascular Agents and incorporate it into Buccal patch for release of drug propranolol hydrochloride (P-HCl), Transferosomes were prepared by thin film hydration technique using soya lecithin, Lipoids S 100 and tween 80. Formulations were subjected to %EE, MPS, PDI, zeta potential, In-vitro drug release etc. Optimized transferosomes showed good characteristics such as 87.42 %EE, 212.8 nm MPS, and uniform, spherical shape. Transferosomes were further incorporated it into buccal patch using carbopol-940 and ethyl cellulose. In-vitro drug release of P-HCl loaded transferosomal buccal patch was found to be 89.47% upto 12 hours, which was greater than plain P-HCl loaded buccal patch. Stability studies were performed on optimized formulations and were found to be stable at all the three temperature conditions, specially at 27±2℃ temperature. Thus, buccal patch of P-HCl formulated achieved patient compliance due to its easy applicability.

**PC-371**

**FORMULATION AND EVALUATION OF HERBAL NANOEMULGEL FOR ASSESSMENT OF ANTIMICROBIAL ACTIVITY**

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In this current work to study the formulation and evaluation of nanoemulgel containing Punica granatum Leaf Extract, for antimicrobial activity. The main objective is to develop and evaluate a nanoemulgel incorporating pomegranate leaf extract to enhance topical antimicrobial efficacy, offering improved stability, bioavailability, and skin permeation compared to traditional formulations. The methodology encompassed extraction, formulation, testing, antibacterial assays, In-vitro diffusion study involving maceration using methanol solvents. The physical properties and antibacterial efficacy of the Nanoemulgel were evaluated. All the Physical and Chemical parameters of prepared Nanoemulgel Formulation F1 to F5 were evaluated and it was observed Batch F4 results were found within the limit and it shows excellent antimicrobial activity against Streptococcus aureus. The zone of




ISBN: 978-81-980623-8-3

inhibition was to be 1.9 cm. The Nanoemulgel loaded with pomegranate leaf extract offers a promising natural antimicrobial treatment, with potential applications in managing wound infections, skin conditions, and other dermatological disorders.

**Keywords:** Nanoemulgel, antimicrobial activity, Punica granatum leaf extract etc.

**PC-372**

**DEVELOPMENT OF MOUTH DISSOLVING TABLET USING NATURAL SUPERDISINTEGRANTS**

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Mouth dissolving tablets (MDTs), also known as orally disintegrating tablets (ODTs), represent a promising drug delivery system aimed at improving patient compliance, especially among pediatric, geriatric, and dysphagic populations. The use of natural superdisintegrants in MDT formulation not only enhances disintegration and dissolution but also offers biocompatibility, sustainability, and cost-effectiveness. This study focuses on the formulation and evaluation of MDTs using natural superdisintegrants such as Plantago ovata (Isapghula husk), Lepidium sativum (garden cress seeds), and Mucilage of Hibiscus rosa-sinensis. A model drug with poor solubility and conventional compliance issues was selected for incorporation. The tablets were prepared using direct compression technique and evaluated for pre- and post-compression parameters including hardness, friability, disintegration time, wetting time, and in vitro drug release. Results indicated that formulations containing natural superdisintegrants exhibited rapid disintegration (under 30 seconds) and enhanced dissolution profiles compared to conventional synthetic disintegrants like sodium starch glycolate. Among the natural agents tested, Plantago ovata demonstrated superior performance in both disintegration and drug release, likely due to its high swelling index and mucilage content. The study underscores the potential of natural superdisintegrants in developing effective, eco-friendly MDTs. This approach aligns with the current trend of green pharmacy and offers a scalable solution for improving therapeutic efficacy and patient adherence.

**Keywords:** Mouth Dissolving Tablet, Natural Superdisintegrants, Plantago ovata, Direct Compression, Patient Compliance, Disintegration Time, Herbal Excipients, Green Pharmacy, Orally Disintegrating Tablet, Drug Delivery System

**PC-373**

**PHARMACOKINETIC PROFILING OF BIOFUNCTIONALIZED ZINC OXIDE NANOPARTICLES FOR SYNERGISTIC THERAPEUTIC INTERVENTION IN RHEUMATOID ARTHRITIS**

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Rheumatoid arthritis (RA) is a chronic inflammatory disorder that leads to deterioration of the synovial membrane in joints, resulting in significant deformity and destruction of the joints. Although rheumatoid arthritis cannot be eliminated, many treatments can alleviate symptoms and avert consequences. A singular nanocarrier capable of targeting several variables may function as a prospective therapy for rheumatoid arthritis treatment. Although the glucocorticoid dexamethasone sodium phosphate (DSP) is shown effective in treating RA, its application is limited by tissue accumulation and related adverse effects. Moreover, the DSP necessitates bi-daily treatment to maintain plasma concentrations, hence reducing patient compliance. The multifunctional nanocarrier has been designed to address these shortcomings. Zinc Oxide ions are utilized to formulate the multifunctional nanocarrier, which is decorated with folic acid for targeting. The nanoparticles are defined by their morphological analysis, thermal stability, and molecular interactions. The synthesized FA-DSP-ZnONPs have appropriate antibacterial, anti-inflammatory, and antioxidant properties. The in-vitro release profile indicates improved cell viability and conforms to the Korsmeyer-Peppas model of release kinetics. Furthermore, pharmacological assessment in the Adjuvant-induced Arthritis (AIA) model demonstrates a notable decrease in inflammatory cytokines, paw thickness, and arthritic score. It also signifies that, relative to the DSP, there is a substantial decrease in the concomitant unfavorable effects on renal impairment, body weight, blood glucose levels, and hematological anomalies. The FA-DSP-ZnONPs shows significant enhancement of pharmacokinetic profile with minimal distribution of drug towards vital organs that signifies no side effects as compared to DSP alone. The studies indicate that FA-DSP-ZnONPs could function as an efficacious treatment for RA.

**Keywords:** Rheumatoid arthritis, anti-inflammatory, antioxidant, MTT assay, Adjuvant-induced Arthritis.

**PC-374**

**QBD-DRIVEN DEVELOPMENT OF FLUTAMIDE-LOADED CUBOSOMES FOR HIRSUTISM: FORMULATION, EVALUTATION AND ANALYTICAL METHOD DESIGN**

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Hirsutism is a common endocrine disorder in women, marked by excessive terminal hair growth in androgen-dependent regions, often linked to polycystic ovarian syndrome (PCOS). Although Flutamide, a nonsteroidal antiandrogen, is effective for treatment, its oral use causes hepatotoxicity and poor bioavailability. This study aimed to develop a topical Flutamide-loaded cubosomal gel using a Quality by Design (QbD) approach to enhance efficacy and safety. Flutamide-loaded cubosomes were prepared via a top-down method using glyceryl monooleate and Poloxamer 407 and optimized through a Central Composite Design (CCD) based on particle size and entrapment efficiency. The optimized cubosomes were incorporated into a xanthan gum-based gel. The formulation underwent extensive evaluation, including physicochemical characterization, in vitro release, ex- vivo permeation, analytical method development via HPLC, and in-vivo efficacy and irritation studies using female Wistar rats. The optimized cubosomes displayed a mean particle size of 122.7 nm, a zeta potential of –24.3 mV, and an entrapment efficiency of 78.67%. The cubosomal gel showed ideal pH (6.8), high viscosity (4290 cps), and excellent spreadability. Drug content analysis confirmed uniform distribution (98.5%). In vitro studies showed sustained drug release over 12 hours (83.2%), while ex-vivo skin permeation studies indicated enhanced transdermal delivery compared to plain gel. The in vivo, rats treated with cubosomal gel showed significantly reduced hair regrowth and no signs of erythema or edema. Histopathological analysis demonstrated decreased follicular density and normal skin architecture. The Flutamide-loaded cubosomal gel offers an effective and safe alternative to oral therapy for hirsutism, improving bioavailability and reducing systemic toxicity.

**Keywords:** Hirsutism, Flutamide, Anti-androgen, Quality by Design, High Performance Liquid Chromatography

**PC-375**

**A NOVEL APPROACH TO ENDOMETRIOSIS MANAGEMENT: DESIGN, DEVELOPMENT AND EVALUATION OF DUAL DRUG-LOADED DELIVERY SYSTEM**

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Endometriosis (EM) is a chronic, inflammatory disorder defined by the abnormal growth of endometrial-like tissue outside the uterine cavity, leading to severe pelvic pain, dysmenorrhea, infertility, and reduced quality of life. Affecting approximately 10% of reproductive-age women globally, current diagnostic and therapeutic strategies remain limited, often relying on hormonal treatments that carry significant side effects and high recurrence rates. Given the multifactorial nature of EM, involving genetic, immune, hormonal, and environmental factors, there is an urgent need for innovative, non-hormonal therapies. In this context, the present study aims to develop lipid polymer hybrid nanoparticles (LPHNPs) loaded with two drugs as a novel, non-hormonal approach for targeted endometriosis therapy. This system combines anti-angiogenetic and antioxidant drugs, aiming to disrupt the dysregulated molecular and signalling pathways involved in EM




ISBN: 978-81-980623-8-3

pathogenesis. LPHNPs were formulated using the thin film hydration technique, with process parameters optimized using the Box-Behnken design (BBD), and characterized through various analytical techniques. SEM and TEM imaging confirmed the spherical shape of the particles, while the optimized nanoparticles exhibited an average particle size (PS) within the desired range and a high zeta potential, ensuring stability. The drug entrapment efficiency was found to be 84.56% and 87.65% for the two drugs, respectively. In vitro irritation studies using the HET-CAM method confirmed the non-irritant nature of the formulation, supporting its safety for clinical use. This nanoparticle-based strategy holds promise for improving therapeutic outcomes, minimizing adverse effects, and sustained drug release, addressing critical clinical gaps. In conclusion, this study highlights nanotechnology's promise as a transformative approach for endometriosis treatment, potentially revolutionizing care and offering renewed hope to millions of women globally.

**Keywords:** Endometriosis; lipid polymer hybrid nanoparticle; non-hormonal therapy; dual drug delivery

**PC-376**

## NOVEL QUERCETIN-LOADED GRAPHENE OXIDE NANOPARTICLES FOR TARGETED BREAST CANCER THERAPY

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This study aimed to develop graphene oxide (GO) nanoparticles (NPs) loaded with quercetin (QUE) for targeted oncological applications, enhancing therapeutic efficacy while minimizing adverse effects. QUE-GO NPs were synthesized using Tween 80 and probe sonication. A Box-Behnken Design (BBD) optimized three critical parameters: GO weight, surfactant volume, and sonication time. The optimized formulation (Batch 14) exhibited an entrapment efficiency (EE) of 92.5 ± 0.7%, a particle size of 86.9 ± 0.46 nm, and a polydispersity index (PDI) of 0.158 ± 0.001, confirming stability. Sustained drug release (88.60 ± 2.3% over 8 h; n = 3) was observed. Cytotoxicity assays demonstrated significantly enhanced efficacy against MCF-7 breast cancer cells (IC50: 126.20 µg/mL; $p < 0.001$) compared to pure QUE (IC50: 175.89 µg/mL; $p < 0.05$; MW: 302.24 g/mol). HEK293 noncancerous cells showed minimal cytotoxicity (IC50: 1009.40 µg/mL), indicating a favorable safety profile. QUE-GO NPs are a promising nanocarrier system for targeted cancer therapy, offering enhanced cytotoxicity against tumor cells and reduced toxicity toward healthy cells.

**Keywords:** Graphene oxide, Nanocomposites, Quercetin, Nanomedicine, Anticancer, Response surface methodology, Drug delivery systems

**PC-377**

## FORMULATION AND EVALUATION OF BETA- CYCLODEXTRIN BASED NANOSPONGES GEL OF BRYOPHYLLUM PINNATUM EXTRACT FOR ITS ANTIMICROBIAL ACTIVITY

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The objective of the present study was to develop cyclodextrin-based nanosponge based topical gel of Bryophyllum pinnatum extract using crosslinker diphenylcarbonate and Carbopol polymer. The β-Cyclodextrin nanosponges were prepared using various concentrations of βCyclodextrin and diphenyl carbonate and characterized. Based on evaluation parameters the β-Cyclodextrin nanosponges formulations displayed narrow particle size, sufficiently high particle size, and maximum solubilization efficiency. Bryophyllum pinnatum extract was loaded into five β-Cyclodextrin nanosponge formulations by freeze-drying method and evaluated. Among all five formulation F5 formulation was selected. The particle size is 110.7 nm and zeta potential are -15.3 mV were displayed by F5 formulation hence formulated into a gel and evaluate. The optimized Bryophyllum pinnatum extract loaded nanosponge formulation (F5) was incorporated into a model carbopol gel formulation and was evaluated for stability and antimicrobial activity. The nanospongesloaded gel has a viscosity of 6831±0.34cps. The ph of the nanosponges-loaded gel is 6.2, and the spreadability is 12.61, showing that the gel loaded with nanosponges has excellent release and permeability. The results collectively suggest that because of the excellent release and good storage stability, cyclodextrin nanosponges based gel formulation of Bryophyllum pinnatum extract has tremendous potential to serve as a topical delivery system.

**Keywords:** β-Cyclodextrin, Bryophyllum pinnatum, diphenylcarbonate, nanosponge, freeze drying method

**PC-378**

## ADVANCEMENTS IN STIMULI RESPONSIVE SMART HYDROGEL SYSTEMS FOR DIABETIC WOUND MANAGEMENT

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Diabetic wounds (DWs) are a significant problem for people with diabetes mellitus because they are caused by a complicated pathophysiological microenvironment that makes people more likely to get sick and die. Conventional management approaches often fail to address the intricate characteristics of these wounds appropriately. Nanomaterials that respond to stimuli have become a potential way to heal wounds and grow new tissue because they can change to meet the needs of the wound environment. These innovative materials can react to various environmental stimuli, like temperature, light, pH, magnetic fields, and enzyme activity. This lets you very precisely control the release of therapeutic chemicals and helps tissues heal. To manage diabetic wounds, we need to use several different treatments that are specific to their pathophysiological traits, like frequent bacterial infections, long-term inflammation, high oxidative stress, and inadequate angiogenesis. The development of smart hydrogel/bandages that respond to stimuli opens up new ways to treat diabetic wounds. These smart hydrogels speed up the healing of diabetic wounds by reacting to numerous biological and physical cues. This lets researchers monitor the lesion and make precise modifications to the microenvironment around it. This paper provides a summary of the features of diabetic chronic wounds and describes the current clinical management approaches. We define the advanced applications of physical and biochemical signal-responsive materials/ hydrogel for the treatment of diabetic wounds through the modification of the wound microenvironment.

**Keywords:** Diabetic wounds, Stimuli-responsive delivery, current clinical treatment approaches.

**PC-379**

## SKIN MICROBIOME AND ITS INFLUENCE ON COSMETIC PRODUCT DEVELOPMENT

Hanshakala Bista And Rajat Sayyed

The skin microbiome, a diverse ecosystem of microorganisms residing on the human skin, plays a crucial role in maintaining skin health and barrier function. Recent scientific advancements have highlighted the importance of this microbial community in influencing various dermatological conditions, including acne, eczema, and psoriasis. As a result, the cosmetic and pharmaceutical industries are increasingly shifting focus toward microbiome-friendly and microbiome-targeted skincare products. This paradigm shift has led to the emergence of novel formulations incorporating prebiotics, probiotics, and postbiotics aimed at restoring or enhancing the natural skin flora. Cosmetic product development now emphasizes preserving microbial balance, avoiding harsh ingredients that disrupt the microbiome, and fostering beneficial bacteria. Additionally, advanced sequencing technologies and metagenomics are being utilized to understand individual microbiome profiles, paving the way for personalized skincare solutions. Regulatory challenges, formulation stability, and consumer awareness remain key considerations in bringing these innovative products to market. This explores the growing relevance of the skin microbiome in cosmetic science and underscores its potential to revolutionize skincare by promoting health through microbial harmony. Future trends suggest that microbiome-based cosmetics will continue to evolve as an essential category in both preventive dermatology and cosmetic therapy.


ISBN: 978-81-980623-8-3

**Keywords:** Skin microbiome, Cosmetic product development, Microbial balance, Prebiotics, Probiotics, Postbiotics, Personalized skincare, Dermatological conditions, Metagenomics, Microbiome-targeted skincare, Microbial harmony, Preventive dermatology, Skincare innovation.

**PC-380**

**FORMULATION AND EVALUATION OF ORALLY DISINTEGRATING TABLETS (ODTS)**

Saniya Ilahi Shaikh, Swapnil Dounde

Orally Disintegrating Tablets (ODTs) are solid dosage forms that disintegrate or dissolve rapidly in the mouth without the need for water, offering improved patient compliance, especially for pediatric, geriatric, and mentally ill patients. The present study focuses on the formulation and evaluation of ODTs containing a model drug, aiming to enhance the bioavailability and convenience of administration. Superdisintegrants such as crospovidone, sodium starch glycolate, and croscarmellose sodium were incorporated in varying concentrations to optimize disintegration time and drug release. Direct compression method was employed due to its simplicity and cost-effectiveness. The prepared tablets were evaluated for pre-compression parameters like flow properties and post-compression parameters including hardness, friability, weight variation, disintegration time, and in-vitro drug release. Among the formulations, the batch containing 5% crospovidone showed the most desirable characteristics with a disintegration time of less than 20 seconds and over 90% drug release within 10 minutes. The study concludes that ODTs can be effectively developed using suitable excipients and techniques to improve patient acceptability and therapeutic efficacy.

**PC-381**

**BIOTECHNOLOGY AND BIOTHERAPEUTICS: A NEW ERA IN PHARMACEUTICAL SCIENCE.**

SHAIKH ZAKIYA

Biotechnology and biotherapeutics are transforming the way we understand and treat diseases. Biotechnology uses living organisms, cells, or biological systems to create products that improve health and quality of life. In the pharmaceutical field, it helps develop new medicines, vaccines, and diagnostic tools. Biotherapeutics—also known as biologics—are medicines made from living cells, such as proteins, antibodies, or genes, that are used to treat serious conditions like cancer, diabetes, and autoimmune diseases. Unlike traditional chemical drugs, biologics are more targeted and often have fewer side effects. For B.Pharm students, learning about biotechnology and biotherapeutics is important, as these areas are becoming central to modern healthcare. They combine biology with technology to offer more effective and personalized treatments. As these fields continue to grow, they open up exciting opportunities for research, innovation, and careers in the pharmaceutical and healthcare industries.

**Keywords:** Biotechnology, Biotherapeutics, Biologics, Pharmaceutical Science, Drug Development, Monoclonal Antibodies, Gene Therapy, Personalized Medicine.

**PC-382**

**FORMULATION OF A FLOWER BASED NATURAL SUNSCREEN FOR ALL SEASON USE**

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As a concern about the harm that synthetic sunscreen cause to the environment and the human health is increasing . That is why the attention is shifting to more plant-based alternatives. Flower extracts are one of the most promising natural uv flters because of the abundance of 294odelling294, anthocyanins , carotenoids and phenolic acide they contain . These physiologically active potent have skin – soothing, UV protection, antioxidant, anti-infammatory qualities. These fowers like hibiscus, calendula , chamomile, rose , blue pea , and lotus have many skin care benefts. The extract of this are typically made by water or hydroalcohol solutions.The research aims to formulate a natural sunscreen that is safe , weather adaptive, water resistant and is appropriate for rainy season using UV absorber derived from fowers . The sunscreen act as mild heating agent which provides comfort during winter . This startergies 294odelling the rising need for sustainable and natural sunscreens .

**Keywords**: Flower Extracts, natural sunscreen, UV absorbers, PA+++

**PC-383**

**3D PRINTING IN PERSONALIZED DRUG FORMULATION: A PARADIGM SHIFT TOWARD PRECISION MEDICINE**

Shahid Ashpak Shaikh and Swapnil Dounde

The advancement of 3D printing (3DP) technology has opened new frontiers in pharmaceutical sciences, enabling the fabrication of complex, customized dosage forms with high precision. Personalized drug formulation using 3DP represents a transformative approach in medicine, allowing the production of patient-specific tablets tailored in terms of dose, release profile, geometry, and combination therapies. This study explores the application of 3D printing techniques—such as fused deposition 294odelling (FDM), inkjet printing, and stereolithography—in designing personalized oral drug delivery systems. The flexibility of 3DP allows for on-demand production of multi-drug polypills, pediatric-friendly shapes, and dosage forms with immediate or controlled release characteristics, all in a single unit. In the Indian context, where patient diversity and polypharmacy are prevalent, 3DP offers a scalable and adaptable solution for tailoring therapies based on age, weight, pharmacogenetics, or comorbidities. Additionally, 3DP minimizes drug wastage and supports decentralization of drug manufacturing, which is particularly advantageous in rural or resource-limited settings. Key challenges include regulatory uncertainties, scalability, material standardization, and integration into existing pharmaceutical supply chains. However, with ongoing research and supportive regulatory evolution, 3DP is poised to become a cornerstone of personalized medicine. This highlights the principles, advantages, and future potential of 3D printing in pharmaceutical formulation, emphasizing its role in driving precision, flexibility, and patient -centric healthcare.

**Keywords:** 3D Printing, Personalized Medicine, Drug Formulation, Fused Deposition Modeling, Polypill, Precision Dosage, Additive Manufacturing, Patient-Centric Drug Delivery, Oral Solid Dosage Forms, Pharmaceutical Innovation

**PC-384**

**FORMULATION AND EVALUATION OF OSMOTIC TABLET OF CLOPIDOGREL**

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Clopidogrel is growing as a drug of choice in the treatment and management of heart attack and cerebrovascular accident. It is stable and soluble in acidic pH, hence outlining an osmotic drug delivery system to regulate drug release with single dose is the goal of this study. This system also excludes the requirement for expensive and complicated laser drilling and sustain continuous therapeutic concentration. Total 15 formulations were prepared using Sodium chloride, Mannitol and Fructose are used as osmotic agents and cellulose acetate as a semi permeable membrane. The tablets were evaluated for precompression and post compression studies weight variation, diameter, hardness, friability, disintegration, and drug content and drug release in vitro. All the formulations showed good dissolution profiles. Among the all formulations F11 was optimized based on the state of release and it showed an extended drug release of 55.2% in 12hrs. The optimized formulation was stable for 3months and followed zero order kinetics.

**Keywords:** Osmotic tablet, Clopidogrel, Sodium chloride, Mannitol, Fructose.

**PC-385**

**DESIGN AND EVALUATION OF LUTEOLIN-LOADED NANOCAPSULES FOR IN VITRO ANTICANCER AND ANTIOXIDANT ACTIVITY**

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ISBN: 978-81-980623-8-3

Luteolin (Lut), a naturally occurring flavonoid, exhibits notable medicinal properties, including anticancer and antioxidant activities. However, its poor water solubility, limited stability, and low bioavailability hinder its pharmaceutical applicability. In this study, luteolin was encapsulated into nanocapsules using a nanoprecipitation technique, with poly(ε-caprolactone), Tween 80, soybean oil, and varying amounts of phosphatidylcholine as key components. The resulting nanocapsules displayed nanometric size, narrow polydispersity index, negative zeta potential, high encapsulation efficiency, and excellent stability, including under thermal stress. Increased phosphatidylcholine content enhanced luteolin loading capacity. The nanocapsules with higher luteolin content demonstrated significant reactive oxygen species (ROS) scavenging activity and cytotoxic effects against human colon adenocarcinoma (HCT116) cells. These findings suggest that luteolin-loaded nanocapsules can effectively enhance the solubility, stability, and biological activity of luteolin, offering promising potential for future pharmaceutical applications.

**Keywords**: Luteolin Nano capsules, Phosphatidylcholine. Biocompatible polymer, Anticancer, Antioxidant

**PC-386**

## FORMULATION & EVALUATION OF (CHALCONE BASED- SEMI SYNTHETIC) NANO-GEL FOR THEIR, ENHANCED ANTI-INFLAMMATORY & ANALGESIC ACTIVITIES

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Chalcones are a class of natural compounds that exhibit promising anti-inflammatory and analgesic properties, exemplified by compounds such as Curcuminoid chalcone and Naringenin chalcone. However, their therapeutic potential is often hindered by poor solubility and bioavailability. While various formulations are available, there is a pressing need to develop semi-synthetic Nano-formulations that can provide rapid effects with minimal side effects. The primary purpose of this work is to design and obtain a series of Chalcone-based semi-synthetic Nano-Gels, specifically the Chalcone–NSAID Herbal formulation. This formulation aims to target arthritis, gout, tendinitis, and inflammation—conditions that significantly affect many elderly individuals. By combining chalcones with herbal components, the formulation seeks to leverage the synergistic effects of both, enhancing therapeutic benefits. Chalcones are recognized for their anti-inflammatory and analgesic properties, while the addition of herbs can contribute additional therapeutic benefits, optimizing treatment outcomes. The development of a Nano formulation that uniquely combines chalcones with herbal components aims to enhance the treatment of inflammation and analgesia. By utilizing nanotechnology, this formulation seeks to improve the solubility and bioavailability of chalcones and herbal medicine, allowing for more effective therapeutic outcomes. This innovative approach offers a promising strategy for optimizing treatment while minimizing side effects.

**Keywords:** Chalcone, Nano-gel, Anti-inflammatory, Analgesic, Semi-synthetic.

**PC-387**

## ENHANCEMENT OF SOLUBILITY OF POORLY WATER-SOLUBLE DRUG BY SOLID DISPERSION METHOD AND PREPARATION OF ORAL CAPSULE

TUKARAM M KALYANKAR

Rivaroxaban is an antiplatelet/anticoagulant drug used in treatment of venous thromboembolism, belongs to Biopharmaceutical Classification System Class II; hence has low solubility. The aim of this study was to enhance solubility of drug by solid dispersion method. Solid dispersion is combination of two component- hydrophilic matrix and hydrophobic drug. There are various methods used for preparation of solid dispersion from which solvent evaporation method was used in this research. The solubility of Rivaroxaban was increased by dissolving different polymers with Rivaroxaban API using suitable solvent (Dichloromethane+methanol) in three different ratios 1:0.5, 1:1, 1:1.5 and then this preparation kept for 24 hours in Hot air oven to get solvent evaporate. The best polymer and ratio screening was done with the help of solubility study, it was done with different buffers like pH 6.8 phosphate buffer, pH 4.5 acetate buffer, 0.1N HCL(pH 1.2), water with the help of UV spectrophotometer. The evaluation of final dosage form was done with the help of dissolution study in media 4.5 acetate buffer+0.2% SLS for about 2 hrs at specific time interval 10, 15, 30, 45, 60, 90, 120 minutes. Drug polymer compatibility study was done by different analysis like FTIR, XRD, DSC and SEM.

**Keywords:** Rivaroxaban, Solid Dispersion, Solvent Evaporation, anticoagulant, Polymers, BCS Class II, Solubility.

**PC-388**

## FORMULATION AND OPTIMIZATION OF SOLID LIPID NANOPARTICLE FOR PALIPERIDONE BY CENTRAL COMPOSITE DESIGN

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Paliperidone is indicated for the treatment of schizophrenia. It has an absolute oral bioavailability of about 28 % as it is poorly soluble in water and also undergoes hepatic first-pass metabolism. Initially, the solubility of paliperidone was improved by making complex with HP-ß-cyclodextrin (HP-ß-CD). The paliperidone and HP- ß-CD complex exhibiting highest solubility (1:3 molar ratio) was formulated as solid lipid nanoparticle (SLN) by considering three critical factors vis-à-vis concentration of solid lipid (glyceryl monostearate), probe sonication time and concentration of surfactant (labrasol). The SLN formulations were prepared as per central composite design (CCD) using high shear homogenization followed by the ultra-sonication technique. SLN formulations were evaluated for entrapment efficiency, particle size, polydispersity index, zeta potential and In-Vitro diffusion study. The optimized SLN formulation exhibited lowest particle size, PDI with stable zeta potential and drug release for 24 h. Hence the approach of formulating SLN for paliperidone after improving solubility by complexing with HP-ß-CD has the potential of improving In-vitro bioavailability.

**Keywords:** Probe sonication, GMS, Labrasol, Homogenization, Inclusion complexation.

**PC-389**

## TO INVESTIGATE THE ANTICANCER POTENTIAL OF NIGELLA SATIVA THROUGH INTEGRATED IN SILICO AND IN VITRO APPROACHES FOR THE IDENTIFICATION OF BIOACTIVE COMPOUNDS AND THEIR MECHANISMS OF ACTION AGAINST BREA

SHAILESH L PATWEKAR

To investigate the anticancer potential of Nigella sativa through integrated in silico and in vitro approaches for the identification of bioactive compounds and their mechanisms of action against breast cancer. To select Nigella sativa as the candidate medicinal plant and retrieve its phytochemical constituents from the IMPPAT (Indian Medicinal Plants, Phytochemistry And Therapeutics) database. To evaluate the drug-likeness and pharmacokinetic properties (Absorption, Distribution, Metabolism, and Excretion) of the phytoconstituents using computational ADME prediction tools. To identify cancer-related pathways associated with the selected phytoconstituents through KEGG (Kyoto Encyclopedia of Genes and Genomes) pathway analysis To construct and analyze compound-target-pathway interaction networks using Cytoscape for identifying key target nodes potentially involved in breast cancer mechanisms. And perform molecular docking of the top 10 prioritized compounds (based on network centrality) against key protein targets to assess binding affinities and interactions Also Visualize and interpret docking interactions using BIOVIA Discovery Studio, providing insights into the molecular interactions between phytoconstituents and target proteins. To carry out the ethanolic extraction of Nigella sativa seeds using appropriate extraction techniques with ssess the cytotoxic potential of the Nigella sativa extract on breast cancer cell lines using the MTT assay

**PC-390**

## CEFTRIAXONE SODIUM-AGNPS LOADED HYDROGEL:AN OPTIMIZED NANO FORMULATION FOR ENHANCED WOUND RECOVERY

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ISBN: 978-81-980623-8-3

Injuries harbor a multifaceted and grave threat to the well-being and existence of individuals. Among the prevalent challenges is the, emergence of persistent wounds, which entail significant harm to the underlying tissues. Thus, the innovation of novel pharmaceutical materials offers a beacon of hope in enhancing treatment outcomes for infected wounds. In this investigation, we unveiled a synthesis approach of AgNPs- Ceftriaxone sodium loaded into hydrogel. The objective of the work was to demonstrate the therapeutic role of Ceftriaxone sodium-AgNPs loaded hydrogel for wound healing. Preparation of AgNPs, Preparation of CTX-AgNPs nanocomposite and Preparation of CTX-AgNPs loaded hydrogel for wound healing. Optimization carried by Box Bhenken Design of AgNPs, Incorporated CTX-AgNPs nanocomposite and CTX-AgNPs loaded hydrogel for wound healing characterization was found in standard limits and In Vivo study showed efficacy of wound healing extensive in optimized CTX-AgNPs loaded hydrogel.

**Keywords:** AgNPs, CTX-AgNPs nanocomposite, Hydrogel, In Vivo, Wound healing

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**INNOVATIVE MICRONEEDLE BASED DRUG DELIVERY SYSTEM FOR TARGETED MANAGEMENT OF INFLAMMATION**

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Inflammatory skin conditions such as psoriasis, acne,eczema, ,and chronic wounds remain a significant concern due to the limitations of present therapies, including systemic side effects, poor dermal penetration and low patient adherence. Recently, microneedle (MN) technology has become a viable substitute for intradermal and transdermal drug delivery, providing better bioavailability, patient comfort, and minimally invasive administration. Tulsi and Manjishtha , two well-known Ayurvedic herbs with strong anti-inflammatory, antioxidant, and wound-healing qualities, are the subjects of the current study's design and development of anti-inflammatory microneedles. In order to guarantee batch-to-batch consistency, phytoconstituents were isolated and standardized using appropriate analytical techniques. Using micromolding techniques, biocompatible polymer-based microneedle arrays were created using PVA,PVPK polymers in a ratio of 1: 1 and 2:1 and tuned for features such as physical appearance, weight variation, percentage moisture content, penetration ability, drug loading capacity, mechanical strength, and SEM Analysis . The developed formulations were further evaluated for biocompatibility and in-vitro drug release . Protein denaturation assay were used to evaluate the anti-inflammatory effects, and ex-vivo testing revealed an improved skin localization in comparison to standard topical formulations. MNs loaded with tulsi and manjishtha were able to effectively penetrate the stratum corneum and release bioactives with a superior anti-inflammatory potential. The optimized formulation had a weight variation of 66.5 mg, moisture content of 5.55% and required 230 gm load to break it with the mechanical strength of 14.18 MPa. Hence according to the findings, this herbal MN system is a novel and patient-friendly way to treat skin inflammation.

**Keywords:** Microneedles, Tulsi, Manjishtha, Anti-inflammatory, Herbal formulation

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**PLANT-MEDIATED GREEN SYNTHESIS OF SILVER NANOPARTICLES: METHODS, CHARACTERISATION, AND ANTIMICROBIAL APPLICATIONS**

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Nanotechnology, especially silver nanoparticles (AgNPs), is increasingly used in biomedical sciences for its potent antimicrobial properties. Traditional methods of nanoparticle synthesis often involve toxic chemicals, posing environmental and biological risks. The objective behind the research is to explore green synthesis of AgNPs using plant extracts as a safer, eco-friendly alternative, and to evaluate their antimicrobial activity and characterization profiles. AgNPs are synthesized by reducing silver nitrate using various medicinal plant extracts acting as natural reducing and capping agents. The process includes plant material preparation, extract boiling, silver ion reduction, and observation of color change. Nanoparticles were characterized using UV-Vis spectroscopy, FTIR, SEM, TEM, DLS, zeta potential, and XRD. Synthesized AgNPs showed predominantly spherical morphology with sizes ranging from 5–100 nm. They exhibited strong antibacterial activity against pathogens such as E. coli, S. aureus, and P. aeruginosa, by disrupting cell membranes, generating reactive oxygen species, and interfering with microbial DNA replication. Green synthesis of AgNPs using plant extracts presents a cost-effective, scalable, and non-toxic approach. Their promising antimicrobial potential supports further research into medical, pharmaceutical, and industrial applications.

**Keywords:** Silver nanoparticles, Green synthesis, Plant extracts, Antimicrobial activity, Characterization techniques

**PC-393**

**FORMULATION AND EVALUATION OF FLOATING TABLETS OF FUROSEMIDE**

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The present study aimed to develop and optimize gastro-retentive floating tablets of furosemide to enhance gastric residence time and sustain drug release for improved therapeutic efficacy. Preformulation studies confirmed compliance of the drug with pharmacopoeial standards in terms of organoleptic properties, melting point and spectral identity, while solubility profiling revealed strong pH dependence with maximum solubility in 0.1 N HCl. FTIR and DSC analysis confirmed compatibility between furosemide and selected excipients. Powder blend evaluation indicated good flowability and compressibility and compressed tablets met pharmacopoeial requirements for weight variation, hardness, friability, thickness and drug content uniformity. Optimization using a $3^2$ factorial design identified sodium bicarbonate concentration as the most significant factor influencing floating lag time, while both sodium bicarbonate and HPMC K15M significantly affected drug release at 12 hours. The optimized batch (F3) achieved a floating lag time of 64 seconds and 98.4% drug release at 12 hours, closely matching model predictions with minimal errors. In vitro dissolution confirmed sustained release over 12 hours, and accelerated stability studies over six months showed minimal changes in physical and functional attributes, indicating formulation robustness. The developed gastro-retentive floating tablet of furosemide demonstrates potential to enhance drug bioavailability and therapeutic performance by maintaining prolonged gastric residence and controlled drug release.

**Keywords:** Furosemide; Gastro-retentive drug delivery; Floating tablets; Sustained release; Stability studies

**PC-394**

**FORMULATION AND EVALUATION OF PEEL-OFF MASK FROM BUTTERFLY PEA FLOWER**

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It can be used to wash and moisturize the skin. Polymers, which can stick to skin in small layers, are used to make most peel-off masks. They are available as gel. Dead skin can be removed with peel-off masks. The most common skin disorders among young people, usually those between the ages of 18 and 25, are acne and oily skin. This study focuses on the development and testing of a topical peel-off gel mask that contains fenugreek, salt, carbopol, and polyvinyl alcohol (PVA) together with other chemical reagents including polymers. The gel formulation also contains preservatives and other ingredients including talc and triethanolamine. The efficacy of fenugreek powder in treating skin conditions, such as oily skin and reducing acne, has been documented in the literature. The formulations F1, F2, and F3 were made, and their color, aroma, consistency, washability, pH, spreadability and oil removing capacity and many characteristics that were assessed. Additionally, each batch's peel-off gel masks were made by drying them and measuring how long it took for them to peel. The peel-off gel formulation showed favorable outcomes across all evaluation metrics, indicating that the




ISBN: 978-81-980623-8-3

peel-off gel mask would be a good alternative to the artificial anti-acne gels.

**Keywords:** Acne, Wrinkles, Peel off mask, Clitoria ternatea, Butterfly pea flower.

**PC-395**

**EFFICIENT COLORECTAL CANCER TREATMENT USING NANOENGINEERED VINBLASTINE-LOADED ZINC OXIDE NANOPARTICLES**

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Vinblastine (VB) is a well-known chemotherapeutic drug noted for its therapeutic efficacy; yet, its application is constrained by systemic toxicity. Targeted medication delivery via biocompatible zinc oxide nanoparticles (ZnONPs) is a promising approach to this challenge. This research aimed to evaluate the therapeutic efficacy of vinblastine-loaded zinc oxide nanoparticles (VB-ZnONPs) against colorectal cancer cells (Caco-2), examine their mechanism of action, and analyze their capacity to restrict metastasis. VB-ZnONPs were assessed for their cytotoxic effects on Caco-2 cancer cells by real-time cell analysis (RTCA) and morphological abnormalities. Following this, investigations into intracellular ROS production and cell migration were performed. VB-ZnONPs demonstrated concentration-dependent cytotoxicity towards Caco-2 cancer cell lines (IC50: 25.21 ± 2.44 µg/mL 24 h). The mechanism responsible for cell death was determined to be linked to elevated intracellular reactive oxygen species (ROS). Furthermore, VB-ZnONPs demonstrated the ability to impede cell migration in Caco-2 cancer cells. This study demonstrates the fascinating potential of VB-ZnONPs for targeted drug administration, providing increased efficacy with less side effects.

**Keywords:** Anticancer, Caco-2 Cancer Cells, Reactive oxygen species, Vinblastine sulphate, Zinc oxide nanoparticles.

**PC-396**

**FORMULATION AND EVALUTION OF CURUMIN TRANSDERMAL PATCHES TO ENHANCE WOUND HEALING**

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The study focuses on the formulation and evaluation of curcumin-loaded transdermal patches designed to enhance wound healing and overcome curcumin's poor oral bioavailability. Using the solvent casting method, patches were prepared with polymers like polyvinylpyrrolidone and methyl cellulose, along with plasticizers and penetration enhancers such as propylene glycol and dimethyl sulfoxide. The resulting patches underwent comprehensive physicochemical testing—including thickness, weight variation, folding endurance, surface pH, and drug content uniformity—as well as in vitro dissolution and ex vivo permeation studies. The optimized formulation exhibited strong mechanical properties, skin-compatible pH, and consistent drug distribution. Drug release followed first-order kinetics, and FTIR analysis confirmed no chemical interaction between curcumin and excipients. These findings support the potential of transdermal delivery systems to provide sustained release and improved therapeutic efficacy of curcumin for wound healing applications.

**Keywords:** Curcumin, Transdermal patches, Polyvinypyrrolidone, FTIR, Therapeutic efficacy.

**PC-397**

**DESIGN, FORMULATION AND EVALUATION OF SUBLINGUAL ORODISPERSIBLE TABLET FOR MIGRANE THERAPY BY USING NATURAL SUPERDISINTEGRANTS**

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Migraine is a chronic neurological disorder characterized by recurrent headaches often accompanied by nausea, vomiting, and sensitivity to light or sound. The unpredictable nature of migraine attacks demands rapid therapeutic action for effective management. The present research was undertaken to formulate and evaluate sublingual orodispersible tablets (SODTs) of Eletriptan Hydrobromide, a selective serotonin (5-HT1B/1D) receptor agonist widely prescribed in the acute treatment of migraine. Despite its proven efficacy eletriptan suffers from poor oral bioavailability and extensive first-pass metabolism when administered through conventional routes thereby limiting its clinical potential. To overcome these challenges, sublingual delivery was explored as a promising alternative for faster onset of action and improved absorption. In this study, natural superdisintegrants such as fenugreek mucilage and isapgol mucilage were isolated, characterized and incorporated into the formulations to enhance disintegration and drug release. The tablets were prepared by direct compression and evaluated for precompression and postcompression parameters including hardness, friability, weight variation, drug content, disintegration time, and invitro drug release. A Box–Behnken design was applied to optimize the influence of fenugreek mucilage, isapgol mucilage, and microcrystalline cellulose on key formulation variables. The optimized batch demonstrated desirable hardness, rapid disintegration, and improved dissolution characteristics. Furthermore, ex-vivo permeation studies across goat buccal mucosa confirmed enhanced transmucosal drug permeation, supporting the feasibility of sublingual administration. Overall study establishes that natural superdisintegrants can be effectively utilized in the development of sublingual orodispersible tablets, providing faster onset of action, improved bioavailability, and better patient compliance in the treatment of migraine.

**Keyword:** Eletriptan Hydrobromide, Natural Superdisintegrants, Sublingual Tablets

**PC-398**

**FORMULATION AND VALIDATION OF CURCUMIN-FORTIFIED GROUNDNUT MILK FOR FATTY LIVER MANAGEMENT**

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Curcumin-Fortified Groundnut Milk (CFG-Milk) was developed and validated as a novel functional formulation for the dietary management of non-alcoholic fatty liver disease (NAFLD). Each 200 mL serving was standardized to contain groundnut extract (10 g), soy protein (8 g), microencapsulated curcumin (200 mg), piperine (5 mg) to enhance bioavailability, and soluble fiber (1 g psyllium husk). The formulation was processed by homogenization and pasteurization, with microencapsulation ensuring curcumin stability and palatability. Quality validation confirmed high monounsaturated fatty acid content, retention of bioactive curcumin, low peroxide values, and microbial safety, with aflatoxin screening of peanut raw materials ensuring compliance. Sensory evaluation indicated good acceptability, while stability testing demonstrated minimal phase separation over 14 days under refrigeration. A 12-week pilot clinical validation in adults with imaging-confirmed NAFLD showed that daily consumption of CFG-Milk produced greater reductions in hepatic fat (MRI-PDFF) and significant improvements in liver enzymes (ALT, AST), insulin resistance (HOMA-IR), and lipid profile compared to placebo, without adverse effects. Mechanistically, the formulation integrates hepatoprotective and anti-inflammatory properties of curcumin, bioavailability enhancement by piperine, lipid-modulating effects of groundnut MUFA, and metabolic benefits of soy protein and soluble fiber. These findings suggest that CFG-Milk is a safe, palatable, and effective nutraceutical adjunct for fatty liver management.

**Keywords:** Groundnut milk, Curcumin, Piperine, Non-alcoholic fatty liver disease (NAFLD).

**PC-399**

**FORMULATION, OPTIMIZATION, EVALUATION OF PANCHAGAVYA GHRITA ORAL FORMULATION IN THE TREATMENT AND MANAGEMENT OF ARTHRITIS**

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Arthritis is a chronic inflammatory condition characterized by joint pain, swelling, and progressive tissue damage. This study aimed to develop and evaluate an oral multiple emulsion formulation of Panchagavya Ghrita (PGG) for the effective management of arthritis. Multiple




ISBN: 978-81-980623-8-3

emulsions were prepared using a two-step emulsification technique with Tween 80 and Span 80 as surfactants. The formulations were characterized for physicochemical properties including pH, viscosity, particle size, globule size, drug content, in-vitro release, and stability. The optimized batch exhibited a globule size of 5.5 µm, pH values ranging from 6.48 to 7.04 (near neutral), zeta potential of 21.5 ± 0.9 mV, entrapment efficiency of 84.62%, and drug content of 85–91%. Panchagavya Ghrita showed a sharp UV absorption peak at 239 nm, confirming spectral purity, while FTIR analysis revealed characteristic drug peaks with no significant drug–excipient interactions. In vivo evaluation using Complete Freund's Adjuvant (CFA)-induced arthritic rat models demonstrated that PGG multiple emulsions significantly reduced paw inflammation, attenuated pain, and prevented weight loss compared with the control group. These results suggest that the multiple emulsion system enhanced the therapeutic efficacy of PGG by improving bioavailability and sustaining the release of active constituents. Stability studies further confirmed that the emulsions remained physically stable without phase separation or degradation during the test period. Overall, the PGG-based multiple emulsion was found to be safe, stable, and effective, indicating strong potential as a novel oral delivery system for the long-term management of arthritis.

**Keywords:** Panchagavya Ghrita, Arthritis Disease, Multiple emulsion, Antioxidant activity, sustained release.

**PC-400**

## CURCUMIN-LOADED SOLID LIPID NANOPARTICLES FOR EPILEPSY: INTRANASAL DELIVERY AND IN-VIVO ASSESSMENT

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Curcumin, a natural antioxidant with strong neuroprotective effects, is considered a promising candidate for treating neurological disorders such as epilepsy. However, its therapeutic potential is limited by poor bioavailability. This study aimed to develop intranasal curcumin-loaded solid lipid nanoparticles (SLNs) for epilepsy treatment. Nanoparticles were prepared using the microemulsification method and evaluated for particle size, entrapment efficiency, bioadhesion, and in vivo performance. The resulting SLNs were discrete and spherical, with an average particle size of 206.5 nm and a narrow size distribution (polydispersity index: 0.495). They showed high entrapment efficiency 80.64%–98.89%, strong bioadhesion potential 92.60%, and high ex vivo permeation 95.46% without causing morphological damage to goat nasal mucosa. Antiepileptic efficacy was tested using the PTZ-induced seizure model in Sprague Dawley rats, where intranasal administration of curcumin SLNs demonstrated significantly better results than intravenous delivery, effectively delaying the onset and reducing the duration of convulsions. These findings highlight intranasal SLNs as a promising strategy for enhancing curcumin delivery in epilepsy management.

**Keywords:** Curcumin, Solid lipid nanoparticle, Intranasal, Epilepsy, Drug delivery

**PC-401**

## FORMULATION AND OPTIMIZATION OF SELF-NANOEMULSIFYING FAST DISSOLVING TABLETS (SNEDDS-FDTS) OF CLONAZEPAM

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Clonazepam, a BCS Class II antiepileptic drug, suffers from poor aqueous solubility and variable absorption, resulting in low oral bioavailability and delayed therapeutic response. To overcome these limitations, a novel formulation was developed by integrating self-nanoemulsifying drug delivery systems (SNEDDS) with fast dissolving tablets (FDTs), combining solubility enhancement with rapid oral disintegration to ensure improved therapeutic efficacy. SNEDDS were optimized using olive oil (oil phase), Tween 80 (surfactant), and PEG 200 (co-surfactant), via pseudo-ternary phase diagrams, producing stable nanoemulsions with globule size less than 100 nm. The optimized SNEDDS was adsorbed onto solid carriers and compressed into fast dissolving tablets containing sodium starch glycolate, crospovidone, MCC, and mannitol, enabling rapid disintegration and effective taste masking. The optimized formulation demonstrated a disintegration time of 18.5 ± 2 seconds and 95% drug release within 12 minutes, compared with only 52% release from conventional tablets, confirming significant improvement in dissolution and bioavailability. FTIR analysis showed no drug–excipient interactions, while stability studies indicated robust physicochemical properties without significant changes. The Clonazepam SNEDDS-FDTs thus represent a pioneering approach for rapid onset of action, enhanced solubility, and improved patient compliance, offering a promising solution for effective epilepsy management, particularly in pediatric and geriatric populations. This demonstrates the potential of SNEDDS-based FDTs as a clinically relevant and patient-friendly strategy for poorly soluble drugs.

**Keywords:** Clonazepam, SNEDDS, fast dissolving tablets, bioavailability, epilepsy management.

**PC-402**

## AMPHIPHILIC XANTHAN GUM NANOMICELLAR CARRIERS FOR GASTROINTESTINAL DELIVERY OF CANAGLIFLOZIN

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BCS Class IV drugs pose significant challenges in the development of oral drug delivery carriers due to their low solubility and poor permeability. To address these challenges, the design of nanomicellar carriers using nontoxic, biodegradable polysaccharides could be beneficial. In this study, the aldehyde groups were introduced into xanthan gum via TEMPO-mediated oxidation and were further conjugated with heptyl amine to impart amphiphilic properties to xanthan gum. FTIR spectroscopy confirmed the introduction of -CHO groups and the formation of imine (C=N) bonds. The modified polymer could self-organize into spherical nanomicelles as evidenced by TEM images. The critical aggregation concentration (CAC) of the amphiphilic polymer was found to be 4.9 µg/mL in water. The self-association of amphiphilic xanthan gum was driven by Gibbs' free energy (. The hydrodynamic diameter of micelles was in the range of 500- 800 nm. An increase in the drug: polymer weight ratio (1:2, 1:4) resulted in increased canagliflozin entrapment efficiency from 49.44% to 54.4%. Further increase in drug: polymer ratio (1:6) diminished the drug entrapment efficiency to 42.02%. The incorporation of canagliflozin into the polymer resulted in a 5.32-fold, 5.86-fold, and 4.56-fold increase in the solubility of canagliflozin compared to that of pure canagliflozin in water at room temperature. Furthermore, the micellar carriers provided sustained drug release behaviours under simulated gastrointestinal pH. Hence, amphiphilic xanthan gum nanomicelles had the potential to act as solubility enhancers as well as sustained drug release carriers for the antidiabetic drug canagliflozin.

**Keywords**: Canagliflozin, controlled drug delivery, nanomicelles, xanthan gum.

**PC-403**

## DESIGN OPTIMIZATION AND INSILICO ANALYSIS OF PHYTOPHARMACEUTICAL HESPERIDIN LOADED LIPOSOMAL GEL THROUGH TOPICAL ROUTE FOR THE TREATMENT OF PSORIASIS

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Psoriasis is a chronic immune- inflammatory triggered skin disorder, characterized by the skin layer scaling, epidermal thickening and keratinocyte hyperproliferation. 125 million population effected by this disease throughout the world. Conventional and biological treatment available in psoriasis is not at all satisfactory with higher side-effects. Phytopharmaceutical approach with flavonoidal hesperidin shows inhibitory effect on the signalling pathways cascade to restrict the release of cytokines like TNF-Alpha, IL-17A and IL-23. Liposomal formulation prepared by the thin film hydration technique and characterized by the particle size, PDI, Entrapment efficiency and drug




ISBN: 978-81-980623-8-3

release patterns. The optimized formulation selected based on critical quality attributes by using Design of experiments (DoE). The desired liposomal formulation with particle size (173nm), PDI (0.327), EE (82.5%) and Drug release (77.85%) incorporated in Carbopol 934 polymer to formulate gel. Molecular docking studies were conducted to know the binding effinity of the hesperidin with the psoriasis evaluated cytokine proteins. Hesperidin shows the highest binding effinity with cytokine TNF-Alpha, ADMET analysis used to measure the pharmacokinetic properties. Psoriasis is a noncurable, life period disorder and the natural dietary flavonoidal hesperidin liposomal gel formulation modify the disease condition with less side effects in safe and effective manner.

**Keywords:** Psoriasis, flavonoids, hesperidin, Design of experiments, Optimization and Liposomal gel.

**PC-404**

## DESIGN AND CHARACTERIZATION OF GINSENOSIDE LOADED CHITOSAN NANOPARTICLES AGAINST HUNTINGTON'S DISEASE

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A genetic condition known as Huntington's disease (HD) causes the neurons in some areas of the brain to slowly degenerate and die. The illness also affects brain regions involved in the regulation of voluntary movements. Panax ginseng, a well-known beneficial herb of the Araliaceae family, is an essential medicinal plant that is frequently used therapeutically. The ginsenosides in Panax ginseng help to enhance nerve impulse transmission by requiring damaged neurons. All such medications, however, have restricted delivery since they are unable to cross the blood-brain barrier and enter the central nervous system. The drug carriers that can cross the blood-brain barrier and increase the medication's therapeutic efficacy are chitosan nanoparticles. Medicinal efficacy at the target site is measured using Auto Dock with the standard drug Remacemide, and the blood-brain barrier property of ginsenoside is assessed using QikProp software. This study focuses on the use of ginsenoside-loaded chitosan nanoparticles as a treatment strategy for HD. The powder ginsenoside was characterized using FTIR and UV spectroscopy. The ionic gelation method was used to prepare the nanoparticles, which were then characterized by SEM, particle size, zeta potential, drug entrapment efficiency, in vitro drug release, release kinetics, and in vitro enzyme inhibition studies. The phytoconstituents in the drug gave good blood-brain barrier property of having binding energy between -3 and 1.2. The optimized formulation F4 showed good entrapment efficiency and prolonged drug release for 24 hours.

**Keywords**: Huntington's Disease (HD), Blood-brain barrier (BBB), Chitosan nanoparticles, Ginsenosides, in vitro enzyme inhibition studies. (ACHE)

**PC-405**

## FORMULATION AND EVALUATION OF LIPOSOMAL HYDROGEL FOR THE TREATMENT OF DERMATITIS

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Dermatitis is a prevalent inflammatory skin condition that adversely affects patients' quality of life by causing discomfort, irritation, and increased susceptibility to secondary infections. Conventional topical antifungal therapies, including miconazole creams and ointments, are often limited by inadequate skin penetration, rapid clearance, frequent reapplication, and reduced patient adherence. To overcome these drawbacks, nanotechnology-based drug delivery systems such as liposomal hydrogels have gained attention due to their ability to enhance drug retention, stability, and therapeutic efficacy. In the present research, a miconazole-loaded liposomal hydrogel system was developed and systematically evaluated for the treatment of dermatitis. Miconazole-loaded liposomes, prepared by ethanol injection, provided a protective bilayer environment for the drug, enabling controlled release and improved skin permeability. Incorporating liposomes into a hydrogel matrix prolonged drug retention at the application site while maintaining optimal moisture balance for skin healing. The optimized formulation exhibited favorable physicochemical properties, including a particle size of ~128.31 nm, low polydispersity index (0.204), suitable pH range (5.84–7.35), and excellent spreadability (8.1 cm diameter). In vitro studies confirmed the formulation's ability to improve drug solubility, sustain drug release, enhance skin penetration, and maintain stability under varying conditions. The synergistic combination of liposomes and hydrogel minimized systemic side effects, reduced dosing frequency, and improved patient compliance. The research findings suggested that the miconazole-loaded liposomal hydrogel system represents a promising and patient-friendly alternative to conventional topical formulations, offering targeted, prolonged, and efficient antifungal therapy for dermatitis with minimized adverse effects.

**Keywords:** Miconazole, Liposome, Hydrogel, Dermatitis, Controlled release

**PC-406**

## PREPARATION, CHARACTERIZATION AND EVALUATION OF SOLID LIPID NANOPARTICLES LOADED RIVASTIGMINE

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This research aims to optimize the solid lipid nanoparticles using full factorial design to improve the delivery of Rivastigmine, which is used for the treatment of Alzheimer's disease (AD). Solid lipid nanoparticles (SLNs) are attracting the importance for drug developers due to their performance. The outcome of this research will lead to improvements in drug release and solubility of Rivastigmine for better therapeutic effect. Four different methods were used to prepare solid lipid nanoparticles of Rivastigmine. Glyceryl monostearate (GMS) was used as a lipid; Compritol 888, tween 80, and span 40 were used as surfactants, co-surfactants, and stabilizers, respectively. SLNs were evaluated for zeta potential, particle size, polydispersity index, surface morphology, Fourier Transform Infrared Spectroscopy (FTIR), and other parameter. Entrapment efficiency and drug loading were also estimated. Solubility study of rivastigmine in different solid lipids as well as the in-vitro drug release was studies. The particle size of SLNs was found to range between 138.22+ 0.01 nm and 172.79+ 0.23 nm. The zeta potential of the optimized formulation was found to be in the -24 + 0.01mV range, indicating a stable formulation. The Rivastigmine-SLNs showed significant retention in memory when compared with Rivastigmine solution (standard formulation) which may be attributed to the lipid nature and nanostructure of the delivery system that may probably result in more accumulation of drug in the brain to show better effect. The current study concludes that the micro emulsion cooling technique is the best method for patient compliance and stability with all desired characteristics parameters.

**Keywords:** Alzheimer's disease, Rivastigmine, Solid lipid nanoparticles, Micro emulsion cooling technique.

**PC-407**

## FORMULATION AND EVALUATION OF MOUTH DISSOLVING FILMS OF FLUNARIZINE DIHYDROCHLORIDE USING NATURAL POLYMERS

LAMEESA BANU VP

In the present research, mouth dissolving films of Flunarizine dihydrochloride were developed using natural polymers. The main objective of the study was to enhance the bioavailability and provide a rapid release dosage form of Flunarizine, which suffers from extensive first-pass metabolism and low solubility. Films were prepared by the solvent casting method using pullulan as the primary polymer and varying concentrations of sodium alginate, guar gum, taro gum, and xanthan gum. The prepared formulations were evaluated for surface pH, thickness, folding endurance, weight variation, disintegration time, in vitro release, and stability. FTIR studies confirmed no incompatibility between drug and polymers. Among all formulations, F1 (pullulan and taro gum) showed optimum physicochemical properties, with disintegration time below 10 seconds, acceptable thickness and weight variation, folding endurance above the required limit, drug content of 99.73%, and first-order release kinetics. The study concludes that pullulan and taro gum combination provides a promising natural polymer base for the development of effective buccal films of Flunarizine.




ISBN: 978-81-980623-8-3

**Keywords:** Flunarizine dihydrochloride, mouth dissolving films, pullulan, taro gum, natural polymers, drug release kinetics.

**PC-408**

**DESIGN AND OPTIMIZATION OF ANTIPSORIATIC DRUG-LOADED NANOSTRUCTURED LIPID CARRIERS FOR EFFECTIVE PSORIASIS MANAGEMENT**

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Drug delivery methods based on lipids may be able to capture hydrophilic and hydrophobic molecules, increase the bioavailability of medications that are not highly soluble in water, and shield them from premature deterioration. The novel second-generation lipid nanoparticle that functions as a bioactive carrier system is called a nanostructured lipid carrier (NLC). Both hydrophilic and hydrophobic drugs can be transported by nanostructured lipids, which are biocompatible drug carriers. NLCs have a large loading capacity, superior physical stability, good permeability, and are far less expensive than carriers based on polymers or surfactants. Since the majority of antipsoriatic drugs on the market today are BCS class II and IV medications and have solubility and permeability issues, bioavailability is the main factor. This might be fixed by creating NLCs loaded with roflumilast and pimecrolimus. The typical particle diameter for NLCs is between 10 and 1000 nm. Using the melt homogenization method in conjunction with ultrasonication, Roflumilast and Pimecrolimus loaded NLCs were successfully created. Approximately 2-3% of people worldwide suffer from psoriasis, with incidence rates differing greatly between areas and demographics. Some regions of Asia have rates as low as 0.4%, while other regions of Northern Europe claim rates as high as 11%. It is believed that psoriasis affects about 60 million people globally. The range of psoriasis prevalence in India is 0.44 percent to 2.8%. The formulation of the NLCs involved melt homogenization and ultrasonication, yielding nanoparticles with a mean size of 200–400 nm and a negative zeta potential of -26 mV to -30 mV. This confirmed that the nanoscale dimensions were appropriate for topical delivery and had good stability against aggregation. The study's significance lies in its capacity to improve permeability, bioavailability, avoid first-pass metabolism, boost patient compliance, and reduce dosage and size.

**Keywords:** Nanostructured Lipid Carriers, Roflumilast, Pimecrolimus, Melt Emulsification, and Psoriasis.

**PC-409**

**TRANSETHOSOMES: A NOVEL CARRIER FOR ENHANCED DERMAL DELIVERY OF CICLOPIROX OLAMINE FOR FUNGAL INFECTION**

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Now-a-days a tremendous research work is going on to overcome the barrier properties of the skin. Despite of major research and development efforts in this system and the advantages of these routes, low stratum corneum permeability limits the usefulness of topical drug delivery. Transethosomes were developed to improve the solubility, bioavailability and permeability. Ciclopirox olamine is a synthetic, broad-spectrum anti-fungal agent belonging to the hydroxypyridone , useful in the treatment of superficial fungal infections. A distinctive feature of the drug is that no single case of fungal resistance has been reported so far. Ciclopirox olamine loaded transethosomes were formulated by Cold method using different ratios of edge activators (oleic acid, Tween 80 and Poloxamer 407). The transethosomal formulations were evaluated for size, shape, entrapment efficiency and in-vitro drug release. The transethsomes appeared as spherical in shape and size range was found to be 185.0 to 461.5 nm. The entrapment efficiency was found in the range of 70.93 to 80.93% and in-vitro drug release in the range of 65.52 to 80.44 % at the end of 24 hrs. Transethosomes prepared with tween 80 and phospholipids in the ratio of 1: 0.3: 3 were found to be the most effective and were incorporated into 1% carbopol gel. The ciclopirox olamine formulation was loaded into topical gel by incorporating Carbopol 934 as a gelling agent. The formulated gel was evaluated for various physicochemical parameters like appearance, pH, spreadability, viscosity, in-vitro drug release and antifungal activity. The in-vitro drug release study was carried out using phosphate buffer saline pH 7.4 was found to be 71.66 % at the end of 12 hrs. This study has suggested that ciclopirox olamine loaded in transethosomes and incorporated in gel is the superior topical antifungal formulation compared to plain drug gel and marketed formulation.

**Keywords:** Ciclopirox olamine, Transethosomes, Edge Activator, Soya Phosphotidylcholine

**PC-410**

**DESIGN AND DEVELOPMENT OF NAIL LACQUER LOADED WITH SILVER NANO PARTICLES OF POLY HERBAL EXTRACT FOR SYNERGETIC ANTIFUNGAL ACTIVITY**

SHEELA VERMA

Nail fungus, also known as onychomycosis, is a common infection that can affect fingernails or toenails, causing them to become thick, discolored, and brittle. The infection often starts as a small white or yellow spot under the nail tip and can spread, causing the nail to thicken, change shape, and potentially detach from the nail bed. In the current research work, nail lacquer loaded with silver nanoparticles of alcoholic extracts of Curcuma longa (Turmeric), Carica papaya (Papaya), Ocimum tenuiflorum (Tulsi/Holy Basil), and Azadirachta indica (Neem) were prepared and evaluated for antifungal activity. Individually ethanolic extracts of above said herbal powders were obtained by maceration process. Silver nanopaticles were prepared from these extracts by silver nitrate reduction process. They were evaluated for particle size (PS), entrapment efficiency (EE), polydispersity index (PDI) and Zeta potential (ZP) individually. Various ratios of ethyl cellulose and eudragit RL 100 along with solvents such as ethanol, ethyl acetate and acetone were studied to optimize the composition of the plain Nail lacquer. Measured amount of each herbal nano particles were combined with optimized ratio of ethyl cellulose and eudragit RL 100 to obtain nail lacquer. The obtained formulation was evaluated for pH, Viscosity, spreadability, film thickness and antifungal activity. The results obtained for the above said test parameters for Silver nanoparticles of each herbal extracts, and nail lacquer were well within the acceptance limits. The antifungal activity of the formulation was evaluated in comparison with the reference standard of Fluconazole against Candida albican and results were found to be satisfactory. In conclusion the prepared nail lacquer loaded with silver nanoparticles of polyhedral extract has potential in treating Onychomycosis because of its promising antifungal activity.

**Keywords**: Nail lacquer, Silver nanoparticles, polyherbal, antifungal, Onychomycosis.

**PC-411**

**DESIGN AND EVALUATION OF A PH-TRIGGERED REBAMIPIDE IN SITU GEL: A SUSTAINED DRUG DELIVERY STRATEGY FOR DRY EYE DISORDER**

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In the present study, a Rebamipide-loaded ophthalmic in situ gel was formulated and evaluated for the treatment of dry eye syndrome. The objective was to enhance ocular bioavailability and prolong residence time by overcoming the rapid precorneal drainage of conventional formulations. The in situ gel was prepared by a pH-triggered method using Carbopol 940 and HPMC K4M. Thirteen formulations were designed by varying the polymer concentrations and optimized using Design Expert software. The formulations were evaluated for pH, viscosity, gelling capacity, sterility, in vitro release, and stability. The FTIR analysis confirmed no drug–polymer interaction. The optimized formulation containing 0.6 g Carbopol 940 and 0.4 g HPMC K4M exhibited a pH of 5.0, viscosity of 1274 cP, and a gelling time of 28 seconds. Stability studies over 3 months showed negligible change in viscosity (1274 → 1258 cP), pH (5.0 → 5.1), and gelling time (28 → 29 s). The in vitro release studies indicated sustained drug release over 8 hours. Therefore, the optimized Rebamipide-loaded in situ gel demonstrates potential as a novel ocular delivery system with enhanced bioavailability, prolonged residence time, and reduced dosing frequency, thereby improving patient compliance in the management of dry eye syndrome.




ISBN: 978-81-980623-8-3

**Keywords:** Rebamipide, in situ gel, Carbopol 940, HPMC K4M, dry eye

**PC-412**

**DEVELOPMENT, OPTIMIZATION AND CHARACTERIZATION OF BERBERINE HYDROCHLORIDE-LOADED TRANSETHOSOMAL GEL FOR ANTI-DIABETIC ACTIVITY**

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Berberine Hydrochloride is a natural alkaloid with established anti-diabetic potential; however, its clinical application is restricted due to poor solubility and limited permeability. To overcome these limitations, a transethosomal gel system was developed to enhance transdermal delivery and sustain drug release. Transethosomes were prepared by the cold method and optimized using a Box-Behnken design with phospholipid concentration, ethanol concentration, and ultrasonication time as variables. The optimized vesicles were evaluated for morphology, particle size, polydispersity index, and zeta potential. Carbopol 940 (0.5–2%) was used to prepare gel formulations, which were assessed for pH, viscosity, spreadability, extrudability, and in vitro release. The optimized gel was further studied for release kinetics, ex vivo permeation, and in vivo anti-diabetic activity in streptozotocin-induced diabetic rats. The optimized formulation showed a particle size of 241.9 nm, PDI of 0.229, and zeta potential of −24.7 mV. Among the gel formulations, 1.5% Carbopol (F4) exhibited the best performance with 81.65% drug release in 24 h, following zero-order kinetics with non-Fickian diffusion. Ex vivo studies demonstrated a permeation coefficient of 0.134 cm/h, while in vivo studies confirmed significant reduction in blood glucose, improved lipid profile, and favorable pancreatic histopathology compared to conventional gel. This study demonstrates that Berberine Hydrochloride-loaded transethosomal gel offers improved release, permeation, and anti-diabetic efficacy, making it a promising candidate for future clinical applications.

**Keywords:** Berberine Hydrochloride, Transethosomes, Anti-diabetic activity, Gel formulation, Box-Behnken design

**PC-413**

**DESIGN AND FABRICATION OF CHILD-FRIENDLY DOSAGE FORM BY QBD APPROACH: AN INNOVATIVE TASTE-MASKING STRATEGY FOR ENHANCED PEDIATRIC COMPLIANCE**

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In pediatric care, giving bitter drugs, such as diphenhydramine citrate, can be quite difficult. This study developed a pediatric-friendly medicated marshmallow formulation of Diphenhydramine citrate (DPH citrate) using a Quality by Design (QbD) approach to enhance taste masking and compliance. Taste masking was achieved by complexing DPH citrate with Cavasol W7HP (2-hydroxypropyl-β-cyclodextrin) in a 1:5 molar ratio. Implementation of QbD approach was done to defined QTPP and to identify CMA, CPP and CQA in the formulation. A $2^3$ factorial design optimized formulation parameters, focusing on taste evaluation and tensile strength. UV interference was eliminated using a dual-wavelength spectroscopy method. The optimized marshmallows released 506.7 ± 2.03 µg/mL of the drug at salivary pH, below the bitterness threshold and demonstrated a tensile strength of 0.069 ± 0.0012 g. Drug content was 98.68% ± 2.81, with rapid dissolution within 30 minutes. Advanced characterization like DSC and SEM, confirmed formulation quality and stability, making medicated marshmallows an effective, palatable solution for pediatric Diphenhydramine citrate administration.

**Keywords:** Pediatric formulation, Diphenhydramine citrate, Taste masking, Quality by Design (QbD), Medicated marshmallow.

**PC-414**

**"PHARMACEUTICAL DEVELOPMENT OF DIANOVA POP: A UNIQUE ANTIDIABETIC MEDICATED LOLLIPOP FOR PATIENT COMPLIANCE"**

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A medicated lollipop is a pharmaceutical dosage form that combines therapeutic drug substances with a confectionery delivery system, typically consisting of a hard candy matrix on a stick for oral administration. There are two types of lollipops: hard lollipops and soft lollipops. Poor medication adherence remains a significant challenge in diabetes management, with compliance rates as low as 50-60% for oral antidiabetic medications. Novel drug delivery systems that improve palatability and patient acceptance are urgently needed, particularly for pediatric and geriatric populations. Stevia, a natural non-caloric sweetener with sugar-free properties, is used as a base in antidiabetic medicated lollipops to provide sweetness without raising blood glucose levels. Stevia supports blood sugar management in diabetic patients while serving as a safe and palatable carrier for active pharmaceutical ingredients. DiaNova Pop represents a promising patient-centric approach to antidiabetic therapy, demonstrating bioequivalence to conventional formulations while significantly improving patient acceptability. The novel lollipop delivery system may enhance medication adherence, particularly in populations with swallowing difficulties or taste aversion. Further clinical studies are warranted to evaluate long-term compliance and glycemic control outcomes.

**Keywords:** Antidiabetic medications, patient compliance, novel drug delivery, medicated confectionery, pharmaceutical innovation.

**PC-415**

**"PHARMACEUTICAL DEVELOPMENT OF DIANOVA POP: A UNIQUE ANTIDIABETIC MEDICATED LOLLIPOP FOR PATIENT COMPLIANCE"**

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A medicated lollipop is a pharmaceutical dosage form that combines therapeutic drug substances with a confectionery delivery system, typically consisting of a hard candy matrix on a stick for oral administration. There are two types of lollipops: hard lollipops and soft lollipops. Poor medication adherence remains a significant challenge in diabetes management, with compliance rates as low as 50-60% for oral antidiabetic medications. Novel drug delivery systems that improve palatability and patient acceptance are urgently needed, particularly for pediatric and geriatric populations. Stevia, a natural non-caloric sweetener with sugar-free properties, is used as a base in antidiabetic medicated lollipops to provide sweetness without raising blood glucose levels. Stevia supports blood sugar management in diabetic patients while serving as a safe and palatable carrier for active pharmaceutical ingredients. DiaNova Pop represents a promising patient-centric approach to antidiabetic therapy, demonstrating bioequivalence to conventional formulations while significantly improving patient acceptability. The novel lollipop delivery system may enhance medication adherence, particularly in populations with swallowing difficulties or taste aversion. Further clinical studies are warranted to evaluate long-term compliance and glycemic control outcomes.

**Keywords:** Antidiabetic medications, patient compliance, novel drug delivery, medicated confectionery, pharmaceutical innovation.

**PC-416**

**FORMULATION OPTIMIZATION AND EVALUATION OF ACETYL KETO BOSWELLIC ACID WITH BASIL OIL NANOEMULGEL FOR ENHANCED TOPICAL ANTI-INFLAMMATORY AND ANTIOXIDANT ACTIVITY**

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Acetyl Keto Boswellic Acid (AKBA) has potent anti-inflammatory, anti-oxidant, and antiarthritic activities. Despite AKBA's strong therapeutic potential, its clinical utility is hindered by poor solubility, low bioavailability, and extensive first-pass metabolism. Given its




ISBN: 978-81-980623-8-3

lipophilicity, suitable molecular weight, and favourable half-life, transdermal delivery offers a promising alternative to enhance systemic absorption and bypass hepatic metabolism for improved therapeutic outcomes. Therefore, the present study focuses on the formulation and characterization of a transdermal nanogel incorporating AKBA and basil oil, aimed at enhancing its therapeutic efficacy, facilitating better penetration and high anti-inflammatory potential. The nanogel was formulated using a high-energy emulsification method and characterized for physicochemical properties including particle size, zeta potential, pH, viscosity, and spreadability. In vitro release studies demonstrated a sustained drug release profile, i.e., 84.69% of the drug released in 24 hours. Also, the AKBA NEGS showed good skin permeability, i.e., 45.44% of the drug permeated through the skin in 24 hours. The AKBA NEGs showed good anti-inflammatory and anti-oxidant activities as compared to the standard Ascorbic acid, as indicated by its promising results in reducing pro-inflammatory cytokines IL6 and TNF-α and free radical scavenging. The AKBA-loaded nanogel systems demonstrated enhanced pharmaceutical performance over conventional formulations. Their potential for transdermal delivery offers a promising strategy to overcome AKBA's bioavailability limitations and achieve sustained therapeutic effects. However, further in vivo and clinical studies are needed to validate long-term safety, efficacy, and skin permeation in humans.

**Keywords:** Boswellic acid, Basil oil, transdermal administration, Nanoemulsion, Design expert, Emulgel, anti-inflammatory, anti-oxidant

**PC-417**

## THE IMPACT OF 3D PRINTING ON DRUG FORMULATION AND PERSONALIZED MEDICINE

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3D printing has revolutionized pharmaceutical sciences by enabling the development of personalized drug formulations tailored to individual patient needs. Unlike conventional drug manufacturing, 3D printing allows precise control over drug composition, dosage, and release kinetics, leading to optimized therapeutic outcomes. This technology facilitates the fabrication of complex drug geometries, multilayered tablets, and combination therapies in a single dosage form, improving patient adherence and treatment efficacy. One of the key advantages of 3D printing in personalized medicine is its ability to produce customized medications based on a patient's genetic profile, disease state, and metabolic response. This approach minimizes adverse effects, enhances drug bioavailability, and enables dose adjustments without extensive reformulation. Additionally, 3D printing supports on-demand drug production, reducing dependence on large-scale pharmaceutical manufacturing and enabling localized drug fabrication in hospitals and pharmacies. Various 3D printing techniques, including inkjet, stereolithography, and fused deposition modelling, have been explored for pharmaceutical applications. The FDA-approved 3D-printed drug, Spritam®, highlights the clinical viability of this technology. However, challenges such as regulatory hurdles, material limitations, and scalability must be addressed to ensure widespread adoption. Despite these challenges, 3D printing holds immense potential to transform drug formulation and personalized medicine, paving the way for more efficient, patient-centric therapies.

**Keywords**: 3D printing, personalized medicine, drug formulation, pharmaceutical technology, precision healthcare.

**PC-418**

## REVERSING SENESCENCE TO ENHANCE TISSUE REPAIR: THERAPEUTIC POTENTIAL OF A SUSTAINED-RELEASE EPIGALLOCATECHIN GALLATE TRANSDERMAL PATCH IN CHRONIC WOUNDS

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Chronic wounds are often associated with oxidative stress and cellular senescence, which impair the natural healing process. Antioxidants like Epigallocatechin gallate (EGCG) hold promise as senolytic agents by reducing oxidative damage and reactivating senescent cells toward cell division. This study explores the therapeutic potential of a sustained-release EGCG transdermal patch, highlighting its ability to enhance antioxidant activity, restore cellular function, and accelerate wound healing compared to direct EGCG application. EGCG patches were formulated using hydroxypropyl methylcellulose (HPMC) and carboxymethyl cellulose (CMC). Comprehensive evaluations were carried out to determine physical characteristics, FTIR interactions, in vitro drug release, cytotoxicity, anti-senescence effects, and wound healing efficacy. A transgenic mouse chronic wound model was used to validate therapeutic outcomes, including histological and immunohistochemical assessment of senescence- and antioxidant-related markers. The transdermal patch exhibited a stable, translucent appearance with effective drug incorporation. Release studies revealed an initial burst followed by controlled, sustained EGCG release over 8 hours, driven by hydrogen bonding with excipients. This prolonged release enhanced antioxidant activity, reduced senescence, and restored proliferative capacity in vitro. In vivo, the patch showed significant wound contraction (67.46% at day 14) compared to direct EGCG (48.60%) and placebo patches (14.18%). Immunohistochemistry confirmed downregulation of senescence markers and upregulation of antioxidant defenses, consistent with a senolytic and wound-restorative effect. Sustained release of antioxidants like EGCG through a transdermal system offers a novel therapeutic strategy for chronic wounds by extending antioxidant protection, reversing senescence, and promoting effective tissue repair. Future studies should focus on formulation optimization and translational evaluation in clinical populations.

**PC-419**

## EFFECT OF PROCESS AND FORMULATION PARAMETERS ON THE OPTIMIZATION OF CUBOSOMES

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Cubosomes are liquid crystalline nanoparticles that are self-assembled with internal cubic phases that possess a great potential as nanocarriers for targeted and controlled delivery of drugs due to their unique structure. Cubosomes were formulated by using emulsification method followed by probe sonication. Different process & formulation parameters were varied to understand their effect on size, stability and morphology. The effect of process (stirring method, stirring time, sonication method, sonication frequency /and sonication time) and formulation parameters (concentration of GMO and Poloxamer 407) were analyzed. Mechanical stirring formed homogenized dispersion of cubosomes as compared to magnetic stirring. Probe sonication was found to be better than ultra-turrax homogenization, providing smaller particles. Stirring for 30min, 30% sonication frequency, and 15min sonication time were found to be best conditions to achieve nanosized cubosomes with maximum stability. Formulation parameters indicated that 2% glyceryl monooleate (GMO) and 1% Poloxamer 407 provided better formation of cubosomes with appropriate particle size. Optimized formulation showed particle size of 63 ± 5 nm, PDI was 0.14 ± 0.02, and the zeta potential was –33 ± 5 mV. Cubic nanostructures were confirmed by HR-TEM, and sharp Bragg peaks indicated Pn3m cubic phase by SAXS, demonstrating the desired internal crystalline structure. Optimized GMO and Poloxamer 407 concentrations prevent aggregation and provide colloidal stability by striking a balance between structural integrity and steric stabilisation. The selected process variables enabled the preparation of cubosomes with desired particle size and hence a robust platform for advanced drug delivery applications.

**Keywords:** Cubosomes, SAXS, HRTEM, nanostructured carriers, drug delivery

**PC-420**

## FORMULATION AND EVALUATION OF ANTIMICROBIAL PREPARATION AGAINST ANTIMICROBIAL-RESISTANT BACTERIA

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ISBN: 978-81-980623-8-3

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Antimicrobial resistance (AMR) represents a serious global health threat, driven by the overuse of antibiotics, leading to the emergence of multidrug-resistant (MDR) bacterial strains. This study aimed to formulate and evaluate an innovative antimicrobial suspension combining cefixime, a third-generation cephalosporin, with cow urine distillate (CUD), a traditional Ayurvedic bio-enhancer recognized for its antimicrobial and antioxidant properties. Cefixime show maximum absorption at 288 nm and 235 nm for CUD and compatibility by FTIR analysis. The optimized suspension exhibited pH of 5.4 ± 0.05, viscosity of 495 cP, sedimentation volume of 1.8 mL/hr and drug content of 93%, confirming stability for oral administration. In vitro antimicrobial testing against resistant strains of Escherichia coli and Klebsiella pneumoniae demonstrated zones of inhibition of 19 mm and 21 mm, respectively, compared to cefixime alone (15 mm and 17 mm). According to the results, cefixime's efficiency increased by the addition of cow urine distillate, allowing for lower dosages and fewer adverse effects. These finding establish the synergistic interaction between cefixime and CUD, enhancing antibacterial activity. The formulated suspension demonstrated stable physicochemical properties and superior antimicrobial efficacy. This study highlights the potential of integrating traditional bio-enhancers with modern antibiotics to overcome AMR, offering a cost-effective and accessible therapeutic alternative.
**Keywords**: Antimicrobial resistance (AMR), Cefixime, Synergistic formulation, Escherichia coli, Klebsiella pneumonia

**PC-421**

## FORMULATION AND DEVELOPMENT OF AN AVOCADO AND DARK CHOCOLATE BASED FUNCTIONAL SNACK BAR

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This study focuses on developing a nutrient-rich functional snack bar with avocado and dark chocolate as major components, supported by oat milk, honey, dates and nuts. The objective was to design a clean-label product combining healthy fats, antioxidants, natural sweeteners, and dietary fiber. The formulation was optimized for texture, taste, and nutritional balance. Avocado provided monounsaturated fats, dark chocolate supplied polyphenols, while dates and honey acted as natural binders. Nuts and oat milk enhanced protein and satiety. The optimized bar demonstrated desirable sensory attributes, stability, and consumer appeal, offering a wholesome and innovative health snack.
**Keywords:** Avocado, Dark chocolate, Oat milk, Dates, Honey, Functional snack bar

**PC-422**

## ADVANCING SKINCARE SOLUTIONS: A COMPREHENSIVE STUDY OF HUMECTANTS AND CALAMINE SYNERGY

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Skin hydration and barrier protection are fundamental aspects of dermatological health and cosmetic science. Humectants, both natural and synthetic, play a critical role in maintaining skin moisture by attracting and retaining water molecules. Calamine, on the other hand, is widely recognized for its soothing, anti-pruritic, and protective effects against skin irritation, rashes, and sunburn. This study explores the synergistic potential of combining calamine with humectants to develop innovative skincare formulations. The research aims to (i) evaluate the moisture-retaining efficiency of selected humectants, (ii) assess the compatibility and stability of calamine–humectant formulations, and (iii) analyze their potential benefits in conditions such as eczema, sunburn, and insect bites. Preliminary findings suggest that such combinations not only prolong hydration but also improve soothing action, offering a dual benefit of comfort and protection. As the demand for effective, safe, and consumer-friendly skincare products increases, this study highlights the promising future of calamine–humectant formulations. By bridging hydration and therapeutic relief, this research contributes to the development of next-generation skincare solutions with significant clinical and cosmetic applications.
**Keywords**- Humectant, Skin hydrations, Skin care Product, Calamine, Skin irritations.

**PC-423**

## NANOPARTICLE-BASED DRUG DELIVERY IN AMYOTROPHIC LATERAL SCLEROSIS(ALS): RILUZOLE-LOADED PLGA SYSTEMS FOR IMPROVED BLOOD-BRAIN BARRIER TRANSPORT

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ALS involves its neurological and clinical manifestations, while the objectives focus on understanding its pathophysiology, improving diagnosis, developing therapies, enhancing supportive care. These efforts aim to improve outcomes and quality of life for individuals affected by ALS. The blood-brain barrier acts as a natural obstacle for preventing delivery of drugs effectively reaching the brain to treat neurological disorders like amyotrophic lateral sclerosis (ALS). One of the FDA-approved medication for the treatment of ALS is derivative of 2-amino-6 [tri-fluoro-methoxy] benzo-thiazole. To enhance its therapeutic potential, researchers loaded drug, known as Riluzole (RLZ), into poly-(lactic-co-glycolic acid) (PLGA) nanoparticles using emulsification solvent diffusion technique.By utilizing design expert software, the prepared polymeric nanoparticles loaded with riluzole are optimized various formulation parameters. Following the assessment of 20 trials were conducted, among them three formulations selected for further investigation. Notably, the analyses revealed there is no significant interactions between Riluzole and excipients used for the formulation. Scanning electron microscopy(SEM) illustrated that nanoparticles exhibited a smooth texture and spherical morphology. Encapsulation efficiency ranges from 42.61 ± 3.61% to 60.02 ± 1.94%, depending on the drug-to-polymer ratios, spanning from 1:1 to 1:4. The data obtained from this study suggest the dosage form's reliable stability and applicability. It is appropriate for a wide range modes of administration from oral to IV injection, as the particle size range supports for the same.
**Keywords**: Polymeric nanoparticles, Blood-brain barrier, Amyotrophic Lateral Sclerosis, Neurodegenerative disorder, Entrapment efficiency.

**PC-424**

## FORMULATION, DEVELOPMENT AND CHARACTERIZATION OF TRANSDERMAL PATCH CONTAINING THE ETHOSOMES FOR THE TREATMENT OF MELASMA

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Melasma is a common dermatological disorder characterized by symmetrical, hyperpigmented patches on sun-exposed areas of the skin, particularly the face. Despite being non-life-threatening, it significantly affects the quality of life and remains therapeutically challenging due to its recurrent nature and limitations of conventional treatments. Tretinoin, a retinoid effective in treating melasma, faces transdermal delivery challenges owing to its classification as a BCS Class III drug, having high solubility but low permeability. To overcome these limitations, the present study aimed to develop and evaluate an ethosomal transdermal patch of tretinoin for enhanced skin delivery. Ethosomes, which are ethanol-rich phospholipid vesicles, were chosen for their superior ability to penetrate the stratum corneum and deliver both hydrophilic and lipophilic drugs. Tretinoin-loaded ethosomes were prepared using the thin-film hydration method and optimized using Central Composite Design, focusing on Phospholipon 90G and ethanol




ISBN: 978-81-980623-8-3

concentrations as key variables. The optimized formulation showed high entrapment efficiency (77.24%) and nanosized vesicles (88.9 nm). These ethosomes were incorporated into transdermal patches using polymers HPMC K15 and Eudragit L100 via solvent casting method. Characterization studies confirmed the patches were flexible, uniform, and stable. In-vitro and ex-vivo evaluations demonstrated sustained drug release and enhanced skin permeation compared to conventional formulations. Overall, the study concludes that ethosomal transdermal delivery significantly improves the permeation and therapeutic potential of tretinoin, offering a promising, patient-compliant alternative for the treatment of melasma.

**Keywords:** Melasma, hyperpigmentation, tretinoin, nanocarriers, ethosomes, skin permeation, transdermal drug delivery

**PC-425**

**FORMULATION AND DEVELOPMENT OF LIPOSOMES FOR HERPES ZOSTER**

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The present study focused on the formulation and optimization of capsaicin-loaded liposomes for transdermal delivery in the treatment of Herpes Zoster. Capsaicin, a potent TRPV1 agonist, was encapsulated using the thin film hydration technique with Phospholipon 90H and cholesterol to enhance skin permeability and reduce systemic side effects. A 32 factorial design was employed to optimize key formulation variables-Phospholipon 90H and cholesterol-based on entrapment efficiency and drug release. The optimized liposomes exhibited spherical morphology with a mean particle size of 218.5 ± 0.45 nm and a zeta potential of -14 ± 0.41 mV. The liposomes were incorporated into a Carbopol 934 gel base to develop a topical liposomal gel. In vitro diffusion studies revealed a sustained drug release from the liposomal gel (62.18 ±0.51% at 12 h) compared to plain CAP gel (88.74 ± 0.75% at 4 h). Ex-vivo diffusion and skin irritation studies confirmed enhanced skin permeation and safety. The liposomal gel also exhibited excellent physicochemical stability under accelerated conditions. This formulation holds promise for improved patient compliance and localized treatment of Herpes Zoster with reduced gastrointestinal side effects.

**Keywords:** Capsaicin, Liposomes, Transdermal gel, Herpes Zoster, Thin film hydration

**PC-426**

**FORMULATION AND DEVELOPMENT OF NONOSYSTEM FOR PSORIASIS**

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Psoriasis is a chronic, immune-mediated skin condition marked by excessive keratinocyte proliferation and persistent inflammation. Although topical treatments remain the first line of therapy, most conventional formulations are limited by poor skin penetration and undesirable systemic effects. To address these challenges, this study focused on developing a phytosomal gel containing ferulic acid, a natural antioxidant known for its strong anti-inflammatory and protective properties, for improved dermal delivery in psoriasis management. Phytosomes were prepared by varying the drug-to-phospholipid ratios and optimizing sonication parameters to obtain stable nanostructures. Characterization by Differential Scanning Calorimetry (DSC) and Transmission Electron Microscopy (TEM) confirmed the successful formation of discrete, thermally stable, and spherical phytosomal vesicles with nanoscale dimensions. The optimized gel exhibited high entrapment efficiency, controlled drug release, and enhanced skin permeability compared with conventional ferulic acid formulations. Importantly, in vitro anti-psoriatic studies using relevant skin cell models demonstrated that the phytosomal gel significantly reduced both inflammatory markers and keratinocyte hyperproliferation—two key hallmarks of psoriasis. These findings suggest that phytosome-based delivery systems can overcome the inherent limitations of natural compounds and conventional topical therapies. By improving stability, penetration, and sustained release, phytosomal gels may provide a more effective and safer alternative for psoriasis treatment. This approach not only enhances the therapeutic potential of ferulic acid, but also highlights phytosomes as a promising strategy for the topical management of chronic inflammatory skin diseases.

**Keywords:** psoriasis, phytosomal gel, ferulic acid, antioxidant, anti-inflammatory, skin permeability, Intrapment efficiency, controlled release, keratinocyte hyperproliferation.

**PC-427**

**FORMULATION, OPTIMIZATION AND EVALUATION OF MICONAZOLE NIOSOMAL GEL**

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Fungal infections of the skin are one of the often faced with dermatological diseases in worldwide. Topical therapy is an attractive choice for the treatment of the cutaneous infections due to its advantageous such as targeting of drugs to the site of infection and reduction of the risk of systemic side effects. This study was to investigate the feasibility of using niosome as a transdermal drug delivery system for Miconazole. Miconazole is an imidazole antifungal agent used in the treatment of candida infections, fungal infections. The aim of this present work is to formulate miconazole niosomes by two different methods (thin film hydration and modified ether injection method) and to evaluate optimized niosomes in carbopol gel (two factorial design methods). Miconazole niosomes were prepared by varying the cholesterol and surfactant ratios. Each formulation was evaluated for percentage of drug entrapment and for their vesicle size. Niosomal formulations were optimized by two level factorial using stat ease design expert 10 software. Eight runs were done with two methods from which most appropriate were selected by range of vesicle size (0.30µm) and maximum entrapment (87.9%). With the optimized formulation niosomal gel were prepared using carbopol 940 as gelling agent. Thin film niosomal gel showing 93.6% release after 7hrs. From this thin film hydration niosomes were selected for further kinetic studies and stability studies. Hence thin film hydration method is better when compared with modified ether injection method for miconazole niosomal gel application.

**Key words:** Niosomes; miconazole; topical therapy.

**PC-428**

**FORMULATION AND IN VITRO EVALUATION OF GELATIN-BASED DICLOFENAC GUMMIES: A NOVEL PEDIATRIC ORAL DOSAGE FORM**

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Diclofenac sodium is a bitter-tasting nonsteroidal anti-inflammatory drug (NSAID) with analgesic, anti-inflammatory, and antipyretic properties. However, its unpleasant taste, significant first-pass metabolism, and limited bioavailability reduce pediatric patient acceptability. This study aimed to develop a novel gelatin-based chewable gummy formulation designed to improve palatability, ease of administration, and pediatric compliance. The formulation was prepared using diclofenac sodium as the active ingredient, gelatin as a natural polymer gelling agent along with sucrose, sorbitol, citric acid, sodium benzoate, flavoring, and colorants. Two separate solutions were prepared: a 1:1 mixture of sorbitol and sucrose with a water-to-sorbitol ratio of 2:1, and a gelatin solution heated to 60°C. These were combined with excipients to form the gummies. Pre-formulation studies involved bulk characterization and solubility analysis, including determination of pKa and partition coefficient. Post-formulation evaluations included texture analysis, swelling index measurement, in vitro dissolution testing, and drug release kinetics assessment. Most formulations released 95% of the drug within 1 hour, following first-order kinetics consistent with immediate-release dosage forms. The diclofenac gummies demonstrated rapid disintegration, improved palatability, and effective drug release profiles, making them a promising pediatric dosage form that enhances treatment adherence and therapeutic outcomes.




ISBN: 978-81-980623-8-3

**Keywords:** Diclofenac sodium, Gelatin Gummies, pediatric dosage form, Palatability enhancement, chewable formulation.

**PC-429**

**MICRONEEDLE PATCHES: A NOVEL APPROACH FOR ANEMIA TREATMENT**

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Anemia is a serious health problem that affects many peoples around the world, specially in developing countries. Traditional treatments like oral iron tablets and intravenous injections often have problems such as low absorption, stomach pain, and poor patient compliances. Recently, microneedle patches has been looked at as a new and better way to treat anemia.These small patches contains tiny needles which can deliver iron or other drugs direct into the skin without much pain. It bypass the digestive system and helps to avoid common side effects. Also, it can be used by the patient themself, which make it more easy and increase the chance they will follow treatment. Research have shown that microneedle patches can increase iron level faster and safer than some traditional methods. They can also be used to give other anemia-related medicines like vitamin B12 or erythropoietin. But still, there are some challenges. Also, making the patches need special materials, technology, and careful handling during production and storage. Also, these patches can be keep in normal temperature which is helpful for village areas where fridge is not available.It also may help in giving not just iron but also other things like folic acid or B12. Some early researches showing that patients got better hemoglobin levels with less problems. In future, this may be good option for big health programs in poor countries. More studies is still needed but microneedle patches is looking like a very hopeful and useful way to treat anemia.

**Keywords :** Microneedle patches, Anemia treatment, Iron deficiency, Transdermal Drug Delivery, Novel therapeutic approach.

**PC-430**

**DEVELOPMENT OF A NATURAL WATER PURIFICATION TABLET USING INDIAN MULBERRY (MORINDA TINCTORIA) BARK, ACTIVATED CARBON, AND CLAY**

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Access to safe drinking water remains a global challenge, particularly in rural areas where conventional purification methods are often unavailable or expensive. This study proposes a novel, low-cost, and eco-friendly water purification tablet formulated using Indian Mulberry (Morinda tinctoria) bark powder, activated carbon, and clay. The bark powder, rich in natural antimicrobial compounds, synergizes with activated carbon and clay to remove microbial contaminants, turbidity, and chemical impurities. Tablets were prepared by blending the powders in optimized ratios (50:30:20) and compressing them into small, portable units. Evaluation parameters included solubility, physical stability, microbial reduction (total coliforms and E. coli), turbidity removal, and pH adjustment. Results demonstrated significant reduction in microbial load and turbidity, with the treated water exhibiting acceptable taste and pH, confirming the tablet's effectiveness as a safe drinking water solution. This innovative formulation leverages locally available natural resources and provides a practical approach for rural water purification, offering a sustainable alternative to chemical-based treatments.

**Keywords:** Morinda tinctoria, water purification tablet, natural antimicrobial, activated carbon, clay

**PC-431**

**SUSTAINABLE PHARMACEUTICAL DEVELOPMENT UTILIZING VIGNA MUNGO POLYMER MICROBEADS**

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This study explores the potential of Vigna mungo gum as a sustainable and innovative natural polymer for developing microbeads for the controlled delivery of vildagliptin, a widely used antidiabetic agent. Unlike conventional natural polymers, Vigna mungo gum offers unique biocompatibility, biodegradability, and an eco-friendly production process, distinguishing it as a superior candidate for drug delivery systems. Microbeads were prepared by combining Vigna mungo gum with sodium alginate and inducing gelation using calcium carbonate. Scanning electron microscopy (SEM) revealed a rough, porous microbead surface, advantageous for drug encapsulation and controlled release. Drug release studies demonstrated sustained release kinetics, highlighting the effectiveness of this formulation. These findings underscore the novelty of Vigna mungo gum as a promising platform for antidiabetic drug delivery, providing a sustainable alternative to existing polymer systems.

**Keywords:** Vigna mungo; biopolymer; microbeads; diabetes mellitus; ionotropic gelation.

**PC-432**

**INFLUENCE OF KLUCEL HF AND KOLLIPHER P407 ON CONTROLLED RELEASE FLOATING MATRIX TABLETS OF MEBEVERINE HCL FOR IRRITABLE BOWEL SYNDROME**

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In the current study, a drug named Mebeverine was used for the design of FDDS. One class of drug called an antispasmodic is mebeverine. It helps to relieve muscle spasms. It can help relieve unpleasant stomach cramps caused by irritable bowel syndrome (IBS) or other illnesses. We made mebeverine HCL floating matrix tablets by using the direct compression method with Klucel HF and Kollipher P407.. The matrix tablet formulation did not allow drug release of 12 hours in the formulation F1 - F3 that included klucel in it. The percentage of drug released ranged from 59.36 to 84.69%.In formulations F4–F6, which included Kollipher P407 63.55 to 87.33%, The drug release could not be extended for more than 12 hours using the matrix tablet formulations. The drug release was prolonged to 95.66% at 12 hours by the optimised F7 formulation, which contained klucel HF and Kollipher P407 in different ratios as rate-controlling polymers. All of the matrix tablet formulations had release exponents (n values) between 0.474 and 0.830, the drug release mechanism exhibited non-Fickian diffusion characteristics. This suggests that the release process involved a complex interplay of factors. In particular, the drug came out of the matrix tablets by a process called diffusion, which carried it over the polymeric matrix. Also, the peptides were released when the polymer matrix dissolved. FTIR and DSC analyses of the drug's Polymers optimised formulation F7 revealed that the formulation is fairly stable.

**Keywords:** Controlled release, Floating matrix tablets, Klucel HF, Kollipher P407, Mebeverine.

**PC-433**

**FORMULATION AND CHARACTERIZATION OF NATURAL LIPSTICK FROM HIBISCUS ROSASINENSIS EXTRACT**

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Synthetic dyes were extensively used to develop marketable.The Anthocynin that occurs in Hibiscus has attracted interest as a natural coloring material source to synthetic dye. Nevertheless, natural colorant usage in available is restricted because its stability to temperature, oxygen, pH, phyoto and colour deteriorated during storage is low. The aim of the present investigation was to develop lipsticks using Anthocynin and assess feasibility as a natural colourant for lipstick development and investigate its stability over one-month storage interval. Anthocynin in this study was isolated from fresh flowers of Hibiscus using water by compression method. Anthrocynin pigment obtained was utilized to formulate lipsticks with standard lipstick formula and the formulated lipsticks were kept under light or dark condition for one-month storage period for stability study. Physico-




ISBN: 978-81-980623-8-3

chemical attributes of the formulated lipstick such as breaking point, surface irregularities, spreadability, skin irritation test, perfume stability, uniformity and homogeneity were investigated and compared to marketable lipsticks. Stability of formulated lipstick determines to be stable under dark condition whereas color loss is higher for lipstick in light condition.However, because of low pigmentation from method, Anthocynin is recommended incorporate in to lip balm application. In this research study, Anthocynin has been proven to be ideal substitute for synthetic dye in cosmetics industry for lip balm application.

**Keywords:** Anthocynin, Hibiscus, Lipsticks

**PC-434**

**FORMULATION DEVELOPMENT AND EVALUATION OF UPADACITINIB LOADED NIOSOMAL GEL FOR THE TREATMENT OF ARTHRITIS**

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Arthritis is a chronic inflammatory disorder that requires long-term therapy and is often associated with gastrointestinal and systemic side effects when treated with oral drugs. Upadacitinib (UPA) is a selective Janus kinase (JAK1) inhibitor which is highly effective in the treatment of rheumatoid arthritis. However, when UPA is administered orally, it exhibits first-pass metabolism and certain toxicity. This study aims to overcome these limitations by formulating and developing an Upadacitinib niosomal gel for topical delivery. Niosomes were prepared using the thin film hydration method using Span 60 and Cholesterol at different concentrations and evaluated with respect to particle size, entrapment efficiency(%EE) and zeta potential (ZP) The estimated niosomes exhibited an average particle size of 167nm, an EE of 88.37%, and a ZP of -14 mV. The niosomes were then incorporated into a poloxamer 407 gel base to obtain a stable niosomal gel which was then evaluated to determine various physicochemical characteristics. The optimized niosomal gel had a pH of 7.3 which showed better skin penetration, spreadability, and viscosity. Furthermore, the drug content of the niosomal gel was determined to be 98.75%. This niosomal gel loaded with UPA showed prolonged action than oral formulations. This study suggests that UPA-loaded niosomal gel is potentially effective in reducing inflammation, along with the reduction in systemic exposure and associated side effects.

**Keywords:** Arthritis, Upadacitinib, Niosomes, Niosomal gel

**PC-435**

**NANOPARTICLE-BASED FORMULATIONS OF CORDYCEPIN: ENHANCING STABILITY AND PULMONARY TARGETING**

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The nucleoside analog cordycepin, which was isolated from Cordyceps militaris, exhibited remarkable therapeutic potential due to its antioxidant, anti-inflammatory, and immunomodulatory activities. However, its poor retention in the lungs, low bioavailability, and rapid enzymatic degradation significantly compromise its therapeutic utility against pulmonary diseases. Recent advances in nanoparticulate delivery system technologies like inorganic systems, polymeric nanoparticles, and lipid-based carriers have provided new opportunities for enhancing cordycepin's stability and targeted delivery to pulmonary tissues. This review addresses advanced formulation approaches, immunomodulatory mechanisms, and intracellular trafficking pathways with emphasis on their therapeutic effect in idiopathic pulmonary fibrosis (IPF), asthma, chronic obstructive pulmonary disease (COPD), and acute respiratory distress syndrome (ARDS). Nanoparticles enhance intracellular transport and minimize degradation by promoting receptor-mediated endocytosis, caveolae-mediated uptake, and macropinocytosis. In addition, nanoparticle-based systems target AMPK/mTOR and Nrf2-mediated antioxidant signaling and suppress key inflammatory processes such as NF-κB and NLRP3 inflammasome activation. Despite promising preclinical outcomes, there remain challenges with enhancing endosomal release, lung-specific targeting, and prolonged nanoparticle formulation safety. To efficaciously translate cordycepin delivery through nanoparticles into therapeutic uses for pulmonary conditions, this article integrates recent advancements and proposes potential future avenues of research.

**Keywords:** Cordycepin, pulmonary drug delivery, nanoparticles, lung-specific targeting, immunomodulation.

**PC-436**

**DEVELOPMENT OF LORNOXICAM NANOPARTICLES FOR ENHANCED SOLUBILITY AND BIOAVAILABILITY OPTIMIZED VIA HIGH PRESSURE HOMOGENIZATION**

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The aim of this work is to formulate lornoxicam nanoparticles via the emulsion diffusion method combined with high-pressure homogenization to enhance the solubility of this poorly water-soluble drug and improve its bioavailability. This study employs a robust approach by producing four nanoparticle formulations using Tween 80 as a stabilizer, subsequently processed by spray drying to yield finely dispersed particles optimized for tablet compaction. These formulations are comprehensively evaluated using XRPD to assess crystallinity, SEM for morphology, particle size distribution for uniformity, drug content assays for dosage accuracy, and in vitro dissolution profiling under physiological conditions. Nanoparticulated compacts are prepared via direct compression with various excipients while maintaining a consistent tablet weight to ensure manufacturability and weight uniformity. FTIR studies verify the absence of drug–excipient incompatibilities, confirming formulation stability. Pre- and post-compression evaluations demonstrate compliance with pharmacopoeial standards for hardness, friability, weight variation, and content uniformity. Among the formulations, F3 delivers the highest drug release of 98.64%, nearly matching the marketed product Mobic, which achieves 98.72% release within 60 minutes. These in vitro results confirm that combining high-pressure homogenization with spray granulation is an efficient method for developing nanoparticle formulations of BCS Class II drugs with enhanced solubility and accelerated dissolution rates. In conclusion, the F3 formulation of lornoxicam nanoparticle-based tablets demonstrates superior performance over conventional formulations, potentially improving patient compliance through enhanced dissolution, faster therapeutic onset, scalable manufacturability, and formulation quality.

**Keywords:** Formulation; FTIR studies; In vitro drug release; Lornoxicam; nanoparticles.

**PC-437**

**HYDROTROPY ASSISTED SOLUBILITY IMPROVEMENT AND DRUG FORMULATION STRATEGIES**

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Enhancing the solubility of poorly water-soluble drugs is a critical challenge in both the screening of new chemical entities and pharmaceutical formulation research. Several techniques are used to improve the aqueous solubility of poorly water-soluble drugs, with hydrotropic solubilisation being one of the prominent methods. A hydrotropic agent is a substance that enhances the solubility of hydrophobic compounds in water based solutions. It is one of the solubility enhancement techniques which enhance solubility in mani folds with the use of hydrotropes like sodium citrate, PEG-600, sodium benzoate, urea, niacinamide, etc. In the present study, efforts were made to increases that solubility of poorly soluble drug belonging semi-synthetic macrolide antibiotic category and develop and optimize fast-disintegrating tablets. Different combinations of sodium starch glycolate and cross carmellose sodium were used as super disintegrant. A two factors three levels 32 factorial design was used to optimize the formulation. Nine formulation batches were prepared accordingly. Two factors i.e. two independent variables viz. sodium starch glycolate and cross carmellose sodium, were taken with three levels (+1, 0, -1). All the active blends were evaluated for pre- compression parameters like angle of repose(20°), Hausner ratio(1.10), etc. and the tablets were evaluated




ISBN: 978-81-980623-8-3

for post- compression parameters (weight variations, hardness(3kg/cm2), friability, disintegration time(40sec) and invitro dissolution). The optimum Hydrotropic solid dispersion was further evaluated for XRD showing significant results.

**Keywords:** Hydrotropy, Solubility enhancement, factorial design, fast disintegrating tablets.

**PC-438**

**DEVELOPMENT AND EVALUATION OF NAIL DRUG DELIVERY SYSTEM OF ANTI-FUNGAL DRUG**

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The study develops a nail lacquer formulation for antifungal drug delivery to improve physicochemical properties that influence permeation through the nail plate. Effective topical treatment of onychomycosis requires achieving sufficient drug concentrations within and across the nail plate to reach local target sites. Therefore, the antifungal drug is combined with a suitable delivery method that enhances its diffusion into the nail bed to levels above the minimum inhibitory concentration (MIC) needed to inhibit fungal growth. The formulations are prepared using a simple mixing method and evaluated for non-volatile content, gloss, smoothness of flow, drug diffusion, and percentage drug content. Among various formulations, the F4 formulation contains 2% oxiconazole, 6% nitrocellulose, 1% ethyl cellulose, 15% salicylic acid, 10% propylene glycol, and 10% 2-H β-cyclodextrin. This formulation exhibits optimal non-volatile content, superior drug release, accurate drug content estimation, and effective zone of inhibition against fungal pathogens. F4 achieves 93.2% drug release within 12 hours, indicating efficient delivery. In vitro ungual permeation studies demonstrate a strong in vitro–in vivo correlation, confirming effective penetration through the nail barrier. Stability studies show that the formulation remains stable after one month at 40±2 °C. Thus, this nail lacquer system effectively enhances antifungal therapy for onychomycosis.

**Keywords:** Onychomycosis, nail lacquer, nail growth, stability.

**PC-439**

**DEVELOPMENT AND EVALUATION OF NOVEL COLON TARGETED ORAL IN SITU GELLING NANOSUSPENSION TO INTENSIFY ANTICANCER ACTIVITY AGAINST COLORECTAL CANCER CELLS**

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The anti-cancer medication methotrexate has a short biological half-life, limited solubility, and low bioavailability. The goal of this project is to create a methotrexate oral sustained release nanoformulation. Methotrexate To create a suspension, caragenan-coated particles were made and described. Using the drug released analysis, gel characterisation, particles size analysis, and Zeta potential, the ideal suspension was determined. The coated particles were enclosed in an aqueous hydrodynamic gel of eudragitS100 with carrageenan lambda or animated tamarind gum in excess. Interestingly, when the F5 formulations come into contact with 0.1 normal hydrogen chloride, the sustained released formulation had the best capacity to create a cohesive insoluble sedimented gel. Additionally, this formulation included methotrexate nanoparticles coated with carrageenan and eudragit s100, as well as nanosuspensions (86.7±2.00 nm). The formulation of methotrexate nanoparticles was authorized following antitumor evaluation against HCT-116 cells because to its contribution to the sustained released properties, sensitivity, and time-dependent efficacy. It is recommended to use the X-ray study examination on albino wistar rat, which shows successful delivery, as a long-acting therapy that could protect the drug and nanoparticles through the polymer coating of the released nano drug particles, in situ gel formation in the colonrectal region, and a PH selective and sustained released matrix.

**Keywords:** Methotrexate, Carrageenan, In-situ gel, Sustained released, colorectal cancer

**PC-440**

**FORMULATION AND EVALUATION OF SALICYLIC ACID CUBOSOMAL GEL**

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This study focuses on the formulation and evaluation of a cubosomal gel containing salicylic acid, offering a novel transdermal drug delivery approach for acne treatment. Transdermal gels are favored for their ease of application, non-toxicity, and effective skin permeation. Cubosomal dispersions were prepared using glyceryl monooleate as the lipid phase and poloxamer 407 as a non-ionic surfactant via the top-down method. The dispersions were characterized for morphology, particle size, zeta potential, entrapment efficiency, drug content, and in-vitro drug release. Among them, formulation D2 exhibited cubic structures with well-separated particles, a particle size of 235.4 nm, zeta potential of –17.2 mV, 70 ± 0.4% entrapment efficiency, 91.04 ± 0.07% drug content, and 87.33 ± 0.031% in-vitro drug release. D2 was incorporated into a gel base using gond katira, a natural gum. The resulting gel showed a pH of 5.4, transparent appearance, 400 g extrudability, 6.7 cm spreadability, 80 ± 0.9% drug content, and 68.31 ± 0.026% in-vitro drug release. Both the dispersion and formulated gel followed a sustained release pattern. The cubosomal gel demonstrated improved stability, controlled drug release, and enhanced therapeutic efficacy compared to conventional formulations. Gond katira further contributed to the gel's cosmetic appeal and functional properties. Overall, this work highlights cubosomes as a promising, patient-friendly, and clinically relevant strategy for transdermal delivery of anti-acne agents, paving the way for innovative dermatological treatments.

**Keywords:** Salicylic acid, Cubosomes, GMO, Transdermal gel, Acne therapy.

**PC-441**

**FORMULATION AND EVALUATION OF EFFERVESCENT DENTAL CARE TABLETS VIA DIRECT COMPRESSION**

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The objective of this research paper is to compile and summarize scientific data supporting techniques for mechanical oral hygiene that can help prevent periodontal diseases. This review article highlights recent developments in excipients used in the pharmaceutical industry's direct compression tablet production process. The formulated effervescent dental care tablet is rapid-acting, travel-friendly, and fluoride-free. The tablet formulation is based on the physicochemical properties of a mixture containing 4% polyethylene glycol 6000 and 0.1% sodium stearate fumarate, used as a lubricant for direct-compression vitamin C tablets. The maximum friability of the formulation was determined to be 0.922 for T4

**Keywords:** oral hygiene, periodontal diseases, polyethene glycol, sodium stearate, direct compression.

**PC-442**

**FLOATING–PULSATILE CALCIUM ALGINATE BEADS OF KETOPROFEN: A NOVEL CHRONOTHERAPEUTIC APPROACH**

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Chronotherapeutic drug delivery systems aim to synchronize drug release with circadian variations of disease symptoms. In rheumatoid arthritis, morning stiffness and pain require a dosage form that provides a defined gastric lag phase followed by rapid intestinal release. In this study, a multiparticulate floating–pulsatile drug delivery system of ketoprofen was developed using hollow calcium alginate beads. The beads were prepared by ionotropic gelation employing sodium alginate and acidified calcium chloride as cross-linking agent, designed to remain buoyant in gastric fluid and trigger time and site-specific release. The formulation was optimized to achieve a 6 hrs gastric lag phase with minimal drug release. The optimized beads exhibited high entrapment




ISBN: 978-81-980623-8-3

efficiency (94.68%), buoyancy for 6 hrs, and a biphasic release profile characterized by 11.09% release in acidic buffer followed by 97.78% release within 2 hrs in phosphate buffer. Evaluation included yield, particle size, swelling index, buoyancy, in-vitro drug release, and ex-vivo permeation. FT-IR, DSC, and UV analyses confirmed drug–polymer compatibility, while SEM revealed hollow spherical morphology. Release kinetics followed Higuchi and Kim–Fassihi models, suggesting diffusion-controlled pulsatile release with anomalous (non-Fickian) transport. Ex vivo permeation studies indicated satisfactory intestinal absorption. The study concludes that hollow calcium alginate beads of ketoprofen provide an effective floating–pulsatile release system suitable for chronotherapy of rheumatoid arthritis. This approach ensures site- and time-specific drug delivery, enhances therapeutic efficacy, improves patient compliance, and shows promise for industrial scalability.

**Keywords:** Floating–pulsatile system, Ketoprofen, Chronotherapy, Calcium alginate beads, Rheumatoid arthritis

**PC-443**

## FORMULATION AND EVALUATION OF FLOATING MICROSPHERES OF PANTOPRAZOLE SODIUM

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Floating microspheres are an effective oral drug delivery system designed to achieve prolonged and controlled release, improve bioavailability, and enhance gastric retention. These microspheres remain buoyant over gastric contents for an extended period due to their low density, thereby increasing the residence time in the stomach. The present study aimed to develop and evaluate floating microspheres of pantoprazole sodium. Microspheres were prepared using a modified quasi-emulsion solvent diffusion method with Eudragit RL 100 as the polymer. Six different formulations were developed and evaluated for percentage yield, particle size, drug loading capacity, in vitro buoyancy, surface morphology (by scanning electron microscopy), and drug release profile. Results indicated that increasing the concentration of Eudragit RL100 significantly influenced particle size, percentage yield, buoyancy, and drug release, with optimal outcomes achieved at a specific drug-to-polymer ratio. The findings suggest that pantoprazole sodium-loaded floating microspheres can be successfully formulated as a controlled release dosage form, offering reduced dosing frequency and an effective alternative to conventional formulations.

**Keywords:** Floating microspheres, Pantoprazole sodium, Buoyancy, In vitro

**PC-444**

## FABRICATION AND EVALUATION OF NOVEL ECO-FRIENDLY NATURAL SANITARY NAPKINS: A COMPARISON WITH COMMERCIAL PRODUCT

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The growing need for sustainable and health-conscious menstrual hygiene products has prompted the development of biodegradable alternatives to conventional sanitary napkins, which often contain plastics and synthetic chemicals. This project aimed to fabricate and evaluate eco-friendly sanitary napkins using natural fibers such as sugarcane bagasse and banana fiber, combined with antimicrobial herbal extracts including Curcuma longa (turmeric) and Azadirachta indica (neem). A multi-layered napkin was developed using a cotton top sheet, an absorbent core made of sugarcane bagasse or banana fiber, herbal powders for antimicrobial action, and a biodegradable backing layer. Performance evaluations included absorbency, wicking, retention capacity, and pathogen resistance, and were compared with commercial napkins. Sugarcane bagasse-based napkins exhibited the highest absorbency, while banana fiber provided better retention. Sugarcane bagasse napkin shows better antimicrobial activity then banana fibre napkin. Compared to commercial products, the ecofriendly napkins were safer and biodegradable. In conclusion, the developed herbal sanitary napkins offer a promising solution for effective and sustainable menstrual hygiene management, especially in low-resource settings. They address environmental concerns and promote women's health by utilizing natural, renewable materials with added antimicrobial benefits.

**Keywords:** Biodegradable sanitary napkins, natural fibres, sustainable menstrual hygiene, sugarcane bagasse, banana fiber

**PC-445**

## DESIGN AND OPTIMIZATION OF QUERCETIN AND GINGER-GREEN TEA EXTRACT LOADED MICROSPONGE GEL FOR ARTHRITIS

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Millions of people worldwide suffer from arthritis, a chronic inflammatory disease characterized by joint stiffness and pain. Conventional treatments are often limited by systemic side effects and poor bioavailability. This study aimed to design and optimize a topical gel based on microsponge technology incorporating quercetin, ginger, and green tea extract to overcome these limitations. Microsponge delivery systems offer several advantages for localized therapy, including improved stability, controlled drug release, and enhanced dermal penetration. Microsponges were prepared using the quasi-emulsion solvent diffusion method and loaded into a Carbopol-based gel. The formulations were evaluated for drug content, particle size, zeta potential, entrapment efficiency and gel's viscosity, pH, and in vitro drug release profiles. The optimized formulation exhibited a mean particle size of 61 nm and a stable zeta potential of 42.3 mV. Entrapment efficiency were found to be 89.3% for quercetin, 94.6% for ginger, and 77.19% for green tea extract. In vitro release studies shown that controlled drug release with gradual release reaching 94.8% for quercetin, 94.03% for ginger, and 91.56% for green tea. The gel exihibited viscosity of 3600 cps and a skin-compatible pH of 5, making it suitable for topical application. The present research work may be a promising approach for developing a patient-friendly and effective topical therapy for the treatment of arthritis.

**Keywords:** Microsponge, Innovative, Targeting, Sustainability, Drug Delivery

**PC-446**

## DEVELOPMENT AND OPTIMIZATION OF RISPERIDONE LOADED LIPID NANOCAPSULES FOR ENHANCED SOLUBILITY, SUSTAINED RELEASE, AND BIOCOMPATIBILITY

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Schizophrenia is a disabling and chronic psychiatric disorder that considerably reduces the quality of life of patients. The therapeutic efficacy of Risperidone (RSP) is limited by its poor oral bioavailability and relatively short elimination half-life. In the present investigation, lipid nanocapsules (LNCs) were used as a new carrier system to improve the solubility and systemic bioavailability of RSP. A preliminary oil screening was carried out, followed by optimization of the formulation based on a central composite design to identify relationships between formulation variables and key quality attributes. The optimized RSP-LNCs were rigorously examined for particle size, polydispersity index (PDI), zeta potential, encapsulation efficiency (%EE), and in vitro drug release. DSC and FTIR studies established successful loading of RSP into the nanocapsule matrix. The optimized formula had a mean particle size of 256.8 nm, PDI of 0.309, zeta potential of -48.1 mV, and encapsulation efficiency of 77.62%. In vitro dissolution showed a sustained release profile and about 94% cumulative drug release in 24 h. In vitro Cytotoxicity assay showed that the optimized RSP-LNCs had high cell viability at therapeutic levels, which was evidence of good biocompatibility. These results indicate that LNCs are a promising delivery system for enhancing the solubility, stability, and bioavailability of RSP with the potential to reinforce its therapeutic efficacy in schizophrenia treatment.

**Keywords:** Risperidone, Lipid Nanocapsules, Schizophrenia, Solubility, Cytotoxicity.

**PC-447**




ISBN: 978-81-980623-8-3

**formulation and evaluation of buccal films for a solubility enhanced anti-hypertensive agent**

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Felodipine, a BCS Class II antihypertensive agent, suffers from poor aqueous solubility and extensive first-pass metabolism, restricting its bioavailability. This study aimed to develop a buccal film of Felodipine, incorporating solid dispersion to enhance solubility and bypass hepatic metabolism. Solid dispersions were prepared by solvent evaporation with hydrophilic polymer HPMC E15 to achieve molecular-level dispersion. The optimized dispersion was incorporated into buccal films via solvent casting, ensuring uniform drug distribution, desirable mechanical properties, and rapid disintegration. Characterization confirmed drug-polymer interaction and amorphous conversion. FTIR spectra revealed absence of chemical incompatibility, DSC thermograms showed disappearance of the sharp melting peak of the drug, and XRD patterns indicated reduced crystallinity. Physicochemical evaluations, including thickness, folding endurance, tensile strength, surface pH, swelling index, drug content uniformity, and disintegration, confirmed suitability for buccal delivery. The optimized film exhibited a disintegration time of 28 seconds and released 95% of Felodipine within 10 minutes. Ex vivo studies showed cumulative drug permeation of 1204.8 µg/cm³ in 10 minutes, demonstrating effective transmucosal delivery. This innovative formulation offers a Promising strategy to overcome Felodipine's Solubility and bioavailability challenges, providing a scalable and patient-friendly strategy, offering improved therapeutic efficacy in antihypertensive therapy.

**Keywords:** Felodipine, Buccal films, Solid dispersion, Solubility enhancement, Bioavailability enhancement, Antihypertensive therapy.

**PC-448**

**TOPICAL DELIVERY OF GRISEOFULVIN USING NATURAL BIOENHANCERS: FORMULATION, CHARACTERIZATION AND IN-VITRO EVALUATION**

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The effectiveness of topical antifungal therapy is often constrained by poor skin penetration, particularly in thick keratinized tissues, the emergence of resistance, and incomplete eradication of infection. Bioenhancers of natural origin, though pharmacologically inert when administered alone, have demonstrated the ability to enhance drug permeability and bioavailability. While their role in improving oral drug delivery has been extensively studied, their potential applications in topical drug delivery remain underexplored. The study aims to develop a topical formulation of griseofulvin a antifungal agent for the treatment of dermatophytic infections of the skin, hair, and nails, with the herbal bioenhancer piperine to enhance skin penetration and therapeutic efficacy. Carbopol 934-based gels of griseofulvin with and without different amounts of piperine were prepared and evaluated for pH, viscosity, spreadability, drug content and ex-vivo studies. Before formulation, drug–excipient compatibility was confirmed by FTIR and UV analysis. The formulations showed translucent, non-gritty appearance, pH(around 6.1–6.5), viscosity(9500-11200cp), good spreadability and drug content (96.8-97.2%). Ex-vivo release study showed that the gel containing 1.0% piperine released about 82% of drug over 8 hours, compared to about 61% for the gel without piperine. In-vitro antifungal activity confirmed the enhancing effect of griseofulvin with piperine, yielding larger zones of inhibition against Trichophyton ruburum species. Stability studies indicated the formulation remained stable under different conditions. The incorporation of piperine markedly improved the topical therapeutic performance of Griseofulvin, highlighting the strategic potential of natural bioenhancers in optimizing antifungal formulations and extending their applicability to the enhancement of other topical antibacterial agents.

**Keywords**: Topical antifungal therapy, Griseofulvin, Piperine, Bioenhancer

**PC-449**

**FORMULATION DEVELOPMENT AND ASSESSMENT OF POLYHERBAL CREAM FOR THE MANAGEMENT OF FUNGAL SKIN INFECTIONS**

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Fungal skin infections are among the most common dermatological ailments worldwide, and the overuse of conventional antifungal drugs such as ketoconazole, fluconazole, and amphotericin B has contributed to resistance and limited efficacy. Polyherbal formulations, which combine multiple plant extracts known for antifungal properties, offer a promising natural and potentially synergistic alternative. This study aimed to formulate a novel polyherbal antifungal cream utilizing the medicinal properties of Azadirachta indica (neem), honey and lavender oil and to evaluate its physicochemical characteristics, stability, safety, and antifungal efficacy against common skin pathogens. Ethanolic extracts of Azadirachta indica (neem) leaves were obtained using Soxhlet extraction and analysed using UV-Visible spectrophotometry, FTIR, phytochemical screening, and thin-layer chromatography, confirming the presence of biologically active compounds such as flavonoids, alkaloids, terpenoids, and tannins. A series of cream formulation were prepared using oil-in-water emulsions and optimized using a 32 full factorial design to evaluate the effects of cetyl alcohol, stearic acid, and Tween 80 on key characteristics, including viscosity and spreadability. The optimized cream underwent rigorous evaluation for pH, homogeneity, washability, irritancy, drug content, and in vitro release using a Franz diffusion cell. Its antifungal activity was assessed against Candida albicans via the agar well diffusion method, demonstrating substantial zones of inhibition comparable to a standard clotrimazole cream. The study concludes that the polyherbal cream offers a stable, non-irritant, and effective natural alternative for managing fungal infections, with enhanced patient compliance and therapeutic potential. This formulation demonstrates the potential of integrating traditional herbal medicine into modern dermatological applications.

**Keywords:** Polyherbal, Azadirachta indica (neem), Antifungal cream, Clotrimazole.

**PC-450**

**DESIGN AND OPTIMIZATION OF PLGA-BASED PACLITAXEL NANOPARTICLE DRY POWDER INHALER FOR TARGETED PULMONARY DELIVERY IN LUNG CANCER**

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An efficient and selective delivery system for chemotherapy drugs in lung cancer is still a significant hurdle to overcome. An approach that looks particularly promising is the use of dry powder inhaler (DPI) formulations which allow for the localized delivery of anticancer drugs to the lungs. In this study, Paclitaxel DPI was formulated using PLGA-based paclitaxel nanoparticles, which were prepared via the emulsification–solvent evaporation method. The formulation was optimized with Design Expert® software, which evaluated the effect of core formulation and process parameters. The optimized nanoparticles showed a mean particle size of 178.4 ± 6.2 nm and a drug entrapment efficiency of 91.8 ± 2.1%. The DPI powders had good flow properties and dosing uniformity, and scanning electron microscopy showed that the particles had a smooth and spherical morphology. Drug release in vitro showed a sustained diffusion-controlled release pattern, with about 30% released at 24 h. The aerodynamic evaluation showed effective lung deposition, with a fine particle fraction (FPF) of 52.3 ± 3.1% and particles having an aerodynamic diameter less than 5 µm. In summary, the optimized PLGA-based Paclitaxel DPI offers advanced, tailored, pulmonary drug formulation technology.

**Keywords:** Paclitaxel; PLGA nanoparticles; Dry powder inhaler (DPI); Lung cancer therapy; Pulmonary drug delivery

**PC-451**

**DEVELOPMENT AND CHARACTERIZATION OF BUCCAL FILMS OF CEFPODOXIME PROXETIL FOR ENHANCED DRUG DELIVERY**




ISBN: 978-81-980623-8-3

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Drug delivery through the buccal mucosa provides an advantageous route as it bypasses first-pass metabolism and enhances therapeutic efficacy. Buccal films, being flexible and comfortable, offer better patient compliance compared to conventional tablets. In this study, buccal films of Cefpodoxime proxetil, an orally active ester prodrug that undergoes intestinal absorption and de-esterification to release a third-generation cephalosporin, were developed. The drug is widely indicated for respiratory, urinary, skin, and soft tissue infections caused by both gram-positive and gram-negative bacteria. Chitosan, Gelatin, and Pectin were employed as the primary polymeric substrates for film formulation. Preliminary pre-formulation studies, including infrared spectroscopy and solubility profiling were conducted. Seven formulations were prepared using the solvent casting method and evaluated for physicochemical parameters such as appearance, surface texture, weight variation, thickness, swelling index, folding endurance, surface pH, moisture loss, and moisture absorption. Mechanical properties including tensile strength and elongation at break were also assessed. In-vitro drug release studies were performed using USP dissolution apparatus type II in 400 mL phosphate buffer (pH 6.8) at 50 rpm and 37 ± 0.5 °C, with absorbance measured at 235 nm. Among the formulations, F6 exhibited the highest cumulative drug release of 98.91% within 390 minutes, and was selected as the optimized formulation. The optimized buccal film contained Chitosan, Hydroxypropyl Methylcellulose, Polyvinylpyrrolidone, and Propylene Glycol as a plasticizer. Further characterization including antimicrobial assay (agar diffusion), stability studies, and release kinetics confirmed the suitability of the optimized film, with all results falling within acceptable limits.

**Keywords:** Cefpodoxime proxetil, Chitosan, solvent casting method, in-vitro drug release, anti-microbial study.

**PC-452**

## FORMULATION AND EVALUATION OF PUNICALAGIN ANTICANCER NASAL SPRAY

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A Nasal spray formulation of Punicalagin, a polyphenolic compound from pomegranate (Punica granatum) was formulated and assessed. Since punicalagin has poor oral bioavailability due to its extensive first pass metabolism that leads to its conversion into urolithins its nasal delivery system was developed. This delivery system avoids hepatic first-pass metabolism and enhance systemic drug absorption. This allows the compound to directly target the upper respiratory tract, where it can exert its potent anti-inflammatory, antioxidant, antimicrobial and anticancer effects. The pure Punicalagin API was extracted and isolated successfully from Pomegranate peel raw powder. The Punicalagin was characterized for color, odor, melting point and potency by TLC and HPLC analysis. QbD methodology was employed to examine the extraction efficiency by using different solvents. A 32 experimental design was employed to get the best ratio of solvents and time for extraction. The results obtained after experimentation were subjected to statistical analysis, i.e., ANOVA. The statistical analysis revealed that the model for the design of the experiment was significant. The extraction efficiency study by QbD revealed that batch that has 100% water & 24 hrs extraction time was required to achieve maximum yield. A nasal spray formulation of Punicalagin was developed using Poloxamer, Sodium chloride, and Phenylethyl alcohol. Stability studies were performed & it was found that the prepared formulation is stable without any drug degradation. All the evaluation tests passed without observing any suspended particles. The developed formulation was further characterized for pH, viscosity, spray pattern, Plume geometry, permeability and assay.

**Keywords:** Punicalagin, Nasal spray, Quality by Design, stability studies, factorial design.

**PC-453**

## 3D PRINTED POLYMERIC MICRONEEDLE ARRAYS: INDIRECT FABRICATION, STRUCTURAL EVALUATION, AND TRANSDERMAL DELIVERY OF AN ANTIPSYCHOTIC DRUG

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Traditional drug delivery approaches such as oral tablets, nasal sprays, topical creams, and intravenous injections often encounter challenges, including poor patient compliance, variable bioavailability, and delayed therapeutic action. Transdermal patches have been explored as alternatives; however, their effectiveness is limited by poor diffusion through the stratum corneum. Microneedle Arrays (MNAs) present a transformative solution, enabling painless and efficient drug permeation across the skin barrier. This study focuses on the indirect fabrication of polymeric MNAs via 3D printing, designed specifically for the transdermal delivery of an antipsychotic drug. Master molds were fabricated using CAD-assisted 3D printing, ensuring precise control over microneedle length, base diameter, tip sharpness, and spacing. Polymeric casting into these molds resulted in robust microneedle patches with consistent architecture. Morphological analysis confirmed uniform needle geometry and sharpness critical for skin penetration, while mechanical testing demonstrated adequate fracture resistance and insertion strength without compromising patient comfort. The integration of an antipsychotic drug within these microneedles establishes a novel delivery platform with the potential to bypass first-pass metabolism, enhance bioavailability, and improve therapeutic efficiency in psychiatric disorder management. By combining 3D printing-enabled design precision with polymeric flexibility, this work underscores the significance of fabrication methodology and structural optimization in advancing microneedle technology for drug delivery. The approach demonstrates the promise of microneedle-mediated transdermal systems as a next-generation alternative to conventional formulations.

**Keywords:** Microneedle Arrays, 3D Printing, Indirect Fabrication, Morphological Evaluation, Antipsychotic agent

**PC-454**

## FORMULATION, EVALUATION AND OPTIMIZATION OF KOJIC ACID DIPALMITATE HERBAL BASED NANOEMULGEL FOR THE TREATMENT OF HYPERPIGMENTATION

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Hyperpigmentation is a common dermatological disorder caused by excess melanin synthesis, often treated with hydroquinone, which has significant side effects. Kojic Acid Dipalmitate (KAD), a stable derivative of kojic acid, offers a safer alternative but suffers from limited solubility and skin penetration. To overcome these challenges, a novel KAD nanoemulgel incorporated into a flaxseed-based herbal gel was formulated, optimized, and evaluated. The nanoemulsion was prepared using clove oil (20% w/v), Smix (Tween 80: Span 80, 70% w/v), and water (10% w/v), followed by incorporation into a gel base containing flaxseed extract (4% w/v) and Carbopol 940 (0.12% w/v). Optimization was achieved through pseudo-ternary phase diagrams and Box-Behnken statistical design. The optimized nanoemulsion exhibited nanosized droplets (10–80 nm), high drug content (up to 98.5%), low PDI, and excellent stability under refrigerated and ambient storage conditions. TEM analysis confirmed spherical morphology. The developed nanoemulgel demonstrated sustained in vitro drug release (82% in 24 h), efficient ex vivo permeation (79% in 24 h), and strong inhibition of melanin synthesis and tyrosinase activity in α-MSH-induced B16F10 melanoma cells, in a dose-dependent manner. Skin irritancy studies on Wistar rats confirmed the non-irritant nature of the formulation. The incorporation of flaxseed, with its antioxidant and anti-inflammatory properties, further enhanced biocompatibility and therapeutic efficacy. Overall, the KAD flaxseed-based nanoemulgel provides a safe, stable, and effective topical alternative to hydroquinone for the management of hyperpigmentation.




ISBN: 978-81-980623-8-3

**Keywords:** Hyperpigmentation, Flaxseeds, Kojic acid Dipalmitate, Nanoemulgel, Box-Behnken

**PC-455**

**PREPARATION, CHARACTERIZATION AND EVALUATION OF DRUG-DRUG COCRYSTAL TO ENHANCE THEIR UTILITY**

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Poor aqueous solubility remains a major challenge in pharmaceutical dosage form development, particularly for Biopharmaceutics Classification System (BCS) Class II drugs. While amorphous solids offer improved solubility, their stability limitations necessitate alternative strategies. Cocrystallization presents a promising approach by modifying physicochemical properties without altering the molecular structure or pharmacological activity. The present work focuses on developing and characterizing drug–drug cocrystals of Glibenclamide (antidiabetic) and Rosuvastatin calcium (antidyslipidemic) to enhance solubility and dissolution performance, with a potential advantage for combination therapy in diabetes-associated cardiovascular complications. Cocrystals were prepared using the solvent evaporation method at various molar ratios. Among the formulations, the 2:1 molar ratio (F4) exhibited superior solubility and dissolution compared to pure drugs. Structural characterization by PXRD and DSC confirmed the formation of a distinct crystalline phase, FTIR demonstrated strong intermolecular hydrogen bonding, SEM revealed significant morphological modifications, and zeta potential analysis indicated good dispersion stability. The findings establish that Glibenclamide–Rosuvastatin calcium cocrystals significantly improve solubility and dissolution, supporting drug–drug crystallization as a novel and effective formulation strategy for poorly water-soluble therapeutic agents.

**Keywords:** Glibenclamide, Rosuvastatin, Drug-Drug cocrystal, Solvent evaporation, Combination therapy

**PC-456**

**SMART MICRONEEDLE PATCH: AI DRIVEN BIOSENSING, BRIDGING PERSONAL CARE, SUSTAINABILITY AND ACCESSIBILITY**

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The evolution of medical devices is moving from simple monitoring tools to smart, patient friendly and sustainable therapeutic system. In this review we are focusing on developing smart microneedle patch with integrating biosensor, which uses AI to deliver drug when it is required with the aim of advancing personalized pharmacotherapy. The device combines graphene-based electrochemical biosensors for continuous monitoring of glucose, lactate, and electrolytes with AI algorithms that predict fluctuations and initiate on-demand drug release via biocompatible microneedle arrays. The device uses a mobile app that gives real-time feedback and connects patients with doctors through telemedicine. It offers smart features like predicting changes in health using biosensors, reminding patients to take medicines, and tracking their treatment. The patch is eco-friendly because it uses biodegradable materials and can be made with 3D printing, which also makes it affordable and customizable for different patients. The Patch focuses on four main domains like predictive intelligence, patient-centric usability, eco-conscious materials, and feasibility. We can conclude that, this device demonstrates a comprehensive framework for next-generation medical technologies. It holds the potential to revolutionize chronic disease management, reduce environmental burden, and set a new benchmark for futuristic, sustainable, and translational drug delivery systems.

**Keywords:** AI-driven Biosensor, Biocompatible Microneedle, Patient Centric, Translational Drug Delivery System.

**PC-457**

**FORMULATION AND EVALUATION OF ANTISUNBURN PREPARATION WITH NANOPARTICLES FROM CYNODON DACTYLON (L.) PERS. LEAF EXTRACT**

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Nanoparticles can be formed using Cynodon dactylon (Bermuda grass) by preparing an aqueous leaf extract, then adding a solution of metal ions (like silver nitrate) to it to initiate the reduction and stabilization of the ions into nanoparticles. The process relies on biologically active compounds such as polyphenols found in the plant extract, which act as reducing and capping agents, resulting in the formation of metal-based nanoparticles (e.g., silver or copper nanoparticles) that have shown potential for applications like antisunburn preparations due to their antioxidant and antibacterial properties. Evaluation parameters for Cynodon dactylon nanoparticles antisunburn preparations include nanoparticles characteristics (size, shape, stability, and zeta potential), formulation properties (pH, viscosity, spreadability, and washability), and in vitro and in vivo performance, such as antioxidant activity, photoprotective effects against UV radiation, and skin irritation studies to ensure safety and efficacy. The introduction of silver nanoparticles loaded with Cynodon dactylon shows potential as an efficient bioavailability enhancer for antisunburn preparations thus potentially lowering medication doses and adverse effects.

**Keywords**: Cynodon dactylon (L.) Pers. Silver nanoparticles, Antisunburn, Antioxidant, Photoprotective

**PC-458**

**TRIPLE ANTIOXIDANT NANOPARTICLE CREAM: POMOGRANATE EXTRACT, VITAMIN E AND RESVERATROL-LOADED HYALURONIC ACID FOR ANTIWRINKLES AND UV PROTECTION**

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Oxidative stress is the main cause of skin aging because it speeds up the breakdown of collagen, decreases its elasticity, and promotes the development of wrinkles. Natural antioxidants are known to be effective agents in reducing oxidative damage by neutralizing reactive oxygen species (ROS) and supporting dermal repair. Pomegranate extract, vitamin E, and hyaluronic acid exhibit skin-restorative properties that improve hydration, stimulate collagen production, and defend against oxidative stress, rendering them suitable for anti-aging formulations. The purpose of this study was to develop and evaluate a cream based on triple-antioxidant nanocarriers using a Design of Experiments (DoE) approach for process optimization. Nanoparticles were prepared by solvent evaporation method by using chitosan, resveratrol, methanol, polyvinyl alcohol, and sodium lauryl sulfate, followed by emulsification, centrifugation, and washing. Before incorporation into a cream base, important process parameters such as stirring speed were optimized to achieve the desired particle size distribution. The developed formulation was characterized for entrapment efficiency, drug loading, pH, and in-vitro release kinetics. Results indicated 90.81% entrapment efficiency, 90.88% drug loading, 96% cumulative drug release, pH of 6.0, and viscosity of 26,300 cP, confirming formulation stability and dermal compatibility. The present research work suggests that triple-antioxidant nanocarrier-based creams may be a promising approach for targeted anti-aging therapy and enhanced skin hydration.

**Keywords:** Nanoparticles, Antioxidants, Anti-aging, Dermal delivery, Nanocarriers.

**PC-459**

**EVALUATING THE EFFICACY OF COPPER SULPHATE TOOTHPASTE IN REDUCING DENTAL PLAQUE**

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As a cosmetic product, toothpaste is becoming more and more popular. Dental plaque is a widely recognized factor in the initiation and progression of a variety of oral diseases. Dental plaque is the diverse microbial community found on the tooth surface embedded in a matrix of polymers of bacterial and salivary origin; if it is permitted to build up,


ISBN: 978-81-980623-8-3

it will solidify into tartar. Tartar is a deposit of tooth plaque. The most frequent cause of dental plaque is Streptococcus mutans. This study involves the formulation, comparative physicochemical analysis and antibacterial efficacy of toothpaste containing copper sulphate. The primary action of this toothpaste is antiplaque activity. The formulation contains copper sulphate as antimicrobial agent along with calcium carbonate as abrasive, glycerol as humectant, sodium lauryl sulphate as foaming agent, carboxy methyl cellulose as thickening agent, propyl paraben as preservative by trituration method. Four formulations were formulated by varying the copper sulphate concentration. All the four formulations (F1, F2, F3 and F4) were evaluated for various parameters like colour, appearance, pH (8.37-8.460 spreadability (3.266cm2 - 4.066cm2), viscosity(52000-56000cps), abrasiveness foaming power (5.1-5.5) and stability studies. Toothpaste containing Copper sulphate was tested for antimicrobial activity against Streptococcus mutans with different concentrations of copper sulphate. Formulation three (F3) was stable and found to be most active against the bacteria as seen by zone of inhibition(2.9cm).

**Keywords:** Tooth Paste, Antiplaque, Copper sulphate, Streptococcus mutans

**PC-460**

## DEVELOPMENT AND OPTIMIZATION OF GASTRORETENTIVE FLOATING MICROSPONGES FOR TARGET DRUG DELIVERY SYSTEM

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Microsponges have emerged as a promising drug delivery system to enhance bioavailability, prolong release, and minimize adverse effects. The present study focused on the development and optimization of gastroretentive floating microsponges for site-specific absorption in the upper gastrointestinal tract, addressing limitations such as poor gastric stability and rapid plasma clearance. Microsponges were prepared by the quasi-emulsion solvent diffusion method using Eudragit as the polymer and polyvinyl alcohol (PVA) as the stabilizer. Optimization was carried out through a Box–Behnken design, using Eudragit concentration, PVA concentration, and stirring speed as independent variables. Morphological analysis revealed spherical, porous microsponges. DSC confirmed the amorphous state of the active compound, while FTIR indicated no interaction between the drug and polymer. The optimized formulation exhibited a particle size of 246.5 ± nm, polydispersity index of 0.313, and zeta potential of -59 mV. Entrapment efficiency was 88.04%, with 92.21% drug release and 84.68% buoyancy. The optimized microsponges were encapsulated into hard gelatin capsules and evaluated for micromeritic properties, disintegration time, and in vitro release. Overall, the developed microsponge based delivery system demonstrated effective gastroretention and controlled release, highlighting its potential for improved therapeutic performance.

**Keywords:** Microsponges, Floating, Entrapment efficiency, Buoyancy, Drug release.

**PC-461**

## FORMULATION AND DEVELOPMENT OF BUCCOADHESIVE DRUG DELIVERY SYSTEM FOR EFFECTIVE MANAGEMENT OF HYPERTENSION

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A full factorial design approach was employed to develop Bucco adhesive tablets for enhanced solubility and controlled drug release of a poorly water-soluble therapeutic agent. The formulation factors were systematically varied to study their influence on key responses, including swelling behavior and drug release characteristics. Preformulation studies using spectroscopic analysis confirmed the compatibility between the drug and excipients, ensuring stability throughout the development process. The powder blends were evaluated for essential precompression parameters such as bulk density, tapped density, and angle of repose to ensure good flow properties. The prepared tablets were then characterized for hardness, friability, swelling index, bioadhesive strength, and invitro drug dissolution to assess their performance and reliability. The findings revealed that the selected formulation variables had a significant impact on both swelling behavior and drug release profiles. The maximum swelling index bioadhesive strength and in vitro drug release were found to be 0.262 gm, 10.54 gm, and 93.08%, respectively. Among all the formulation batches, the F9 batch gave optimum results. Overall, the study demonstrated that systematic formulation design can successfully improve the solubility and controlled release of poorly water soluble drugs, offering a promising approach for enhanced therapeutic efficacy and patient compliance.

**Keywords**: Buccoadhesive, Factorial design, Solubility enhancement, Controlled drug release.

**PC-462**

## FORMULATION AND EVALUATION OF SILVER NANOPARTICLES OF BAUHINIA RACEMOSA LAM

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The present study focuses on the green synthesis, characterization and biological evaluation of silver nanoparticles (AgNPs) synthesized using the ethanolic extract of Bauhinia racemosa Lam leaves. Preliminary phytochemical screening confirmed the presence of alkaloids, flavonoids, glycosides, steroids, phenols, saponins and tannins, which acted as natural reducing and capping agents. Visual color change and UV–Visible spectroscopy (λmax 418–433 nm) confirmed successful nanoparticles formation. Characterization using dynamic light scattering (DLS), zeta potential analysis, SEM and XRD validated the formation of stable, crystalline and uniformly sized AgNPs (38.9–63.8 nm) with good colloidal stability. Drug content across batches ranged from 88.93% to 96.04%, and in-vitro drug release demonstrated sustained release behavior over 8 hours, with batch B8 exhibiting the highest cumulative release (94.2%). Cytotoxicity studies using the MTT assay on MCF-7 cell lines showed a concentration-dependent response, with an estimated $IC_{50}$ of ~95 µg/mL for the sample, compared to 6 µg/mL for 5-fluorouracil. Antimicrobial evaluation revealed significant antibacterial activity against E. coli, S. aureus, and B. subtilis and moderate antifungal activity against Candida albicans and Aspergillus niger. These results affirm the potential of Bauhinia racemosa-mediated AgNPs as promising candidates for biomedical applications, particularly in antimicrobial and anticancer therapy.

**Keywords:** Bauhinia racemosa Lam, Green synthesis, Silver nanoparticles, Cytotoxicity, Antimicrobial activity.

**PC-463**

## FORMULATION, DEVELOPMENT AND EVALUATION OF A NANOGEL BASED TOPICAL SYSTEM FOR EFFECTIVE ECZEMA THERAPY

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Eczema is a chronic skin disorder characterized by persistent inflammation and has reached near epidemic proportions. It is often the earliest manifestation of atopy and is challenging to manage due to its early onset in childhood. Clinical features include dryness, lichenification, itching, and erythematous skin. Current therapeutic strategies for eczema fall into three categories: basic care, topical therapy, and systemic therapy. However, these treatments have significant limitations, necessitating the development of novel approaches. Some drugs when administered orally are associated with several adverse effects such as infections, nausea, vomiting, loss of appetite, liver dysfunction, and leukopenia. Less common but serious side effects include hepatitis (liver inflammation), pancreatitis (inflammation of the pancreas causing pain), and allergic reactions manifesting as flu like symptoms or rash. To overcome these drawbacks altering the route of administration is a promising strategy. The present investigation aimed to develop a topical formulation in the form of a nanogel leveraging its nanoscale size for enhanced absorption and reduced systemic side effects. Niosomes were prepared using the coacervation phase separation method and optimized through a $3^2$ full factorial design, with entrapment efficiency and drug release as response parameters. Among the batches, N5 was identified as the




ISBN: 978-81-980623-8-3

optimized formulation demonstrating an entrapment efficiency of 83.76 ± 1.01% and a maximum drug release of 69.73 ± 1.17%. The optimized niosomal dispersion was then incorporated into a gel and evaluated for drug release, viscosity, spreadability, pH, and skin irritation potential.

**Keywords:** Eczema, Topical drug delivery, Niosomes, Nanogel, Entrapment efficiency, Drug release.

**PC-464**

## DEVELOPMENT AND CHARACTERIZATION OF BERGENIN NANOPARTICLES FOR THERAPEUTIC MANAGEMENT OF ADJUVANT-INDUCED ARTHRITIS

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In this research study, Bergenin loaded nanoparticles were prepared to improve the oral bioavailability of Bergenin. Bergenin is a colorless, crystalline, natural phenolic C- glycoside found in the plants of Bergenia species. It falls under Class IV of Biopharmaceutics Classification System with poor solubility and low intestinal permeability which limited its oral bioavailability. To improve its oral bioavailability it needed to be incorporated in a suitable polymeric nanoformulation. The Pre-formulation study of Bergenin included FTIR, melting point, calibration plot, pH determination, partition coefficient and XRD analysis. Bergenin nanoparticles were prepared using an emulsion solvent evaporation method. The prepared nanoparticles were evaluated for their particle size (246.9nm), PDI (0.356), drug entrapment (91%), drug loading (16.56%), Drug percentage (97%), drug release from polymeric nanoparticles (91%), SEM (spherical in shape), TEM, FT-IR, pXRD, DSC etc. The in-vitro and in-vivo (SD rats) study was performed to check the anti-arthritic activity of Bergenin nanoparticles against the standard, Indomethacin. Bergenin nanoparticles demonstrated significant anti-arthritic effect in diseased SD rats with no observed toxicity in animal model, suggesting its safety and efficacy. It is concluded that the method of preparation of Bergenin loaded PLGA nanoparticles was found to be simple and reproducible. The in-vitro and in-vivo studies further confirm the improved pharmacokinetic and pharmacodynamic profiles of Bergenin nanoformulation highlighting its enhanced anti-inflammatory /anti-arthritic activity.

**Keywords:** Bergenin, nanoformulation, antiarthritic activity, Pharmacokinetic and pharmacodynamics.

**PC-465**

## MULTIPLE-UNIT PELLET SYSTEMS (MUPS) : DEVELOPMENT OF STABILIZED PROLONGED RELEASE FORMULATIONS OF MIGLITOL FOR THE TREATMENT OF TYPE 2 DIABETES

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In this present investigation, Miglitol pellets were prepared using Wurster coating process using Fluid bed processor (FBP). The process involved in two steps such as drug loading and extended-release coating. The drug loading of Miglitol was coated on sugar spheres using HPMC E 5 as binder. The extended-release coating process was done using coating on drug loaded pellets using combination of Eudragit L 100 and S 100 at different ratio (22- 43 % of polymer coating). The pellets were compressed in to tablets (MUPS). Various formulation and process parameters were evaluated. The results of invitro dissolution showed the extended release of 8 hrs at lower polymer coating and the release was extended up to 15 hrs at higher polymer concentration. A combination of polymer such as 26 % of Eudragit RL 100 and 9 % of Eudragit RS 100 yields best initial rapid release such as 42 % during first hour and later 59 % was prolonged up to 13 hours. The release form coating of Eudragit RS 100 alone showed only 63 % in 12 hours. The release kinetics showed first order release with diffusion mechanism. Results accelerated stability study showed that the drug was stable up to 6 months at 40ºC at 75% RH. DSC of pure drug showed a sharp endothermic peak at 145.67 O C , similar endothermic peaks were observed win the prepared formation concludes no drug polymer interaction. FTIR study further confirms that no interaction of drug and excipients. Scanning electronic microscopy (SEM) study showed the spherical and smooth surface of the pellets. Therefore Multiple-Unit Pellet (MUPS) Systems can be successfully employed for the development of Miglitol prolonged release formulations.

**Keywords:** Miglitol, MUPS, Eudragit RL &RS 100, FBP, Stability

**PC-466**

## FORMULATION AND EVALUATION OF COMBINATION OF RESVERATROL AND CURCUMIN INTRANASAL NANOEMULSION FOR TREATMENT OF EPILEPSY

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The aim of this study was to develop a combination of resveratrol and curcumin nanoemulsion for intranasal administration in the treatment of epilepsy. The nanoemulsion was prepared using high-speed homogenization and probe sonication, with fractionated coconut oil as the oil phase, Cremophor and Pluronic 127 as the surfactant. The formulation was selected as optimized based on a particle size analysis, globule size determination and drug content were employed to optimized. The prepared combination of resveratrol and curcumin nanoemulsion was characterized for various parameters including particle morphology, particle size, polydispersity index (PDI), zeta potential, centrifugation, heating cooling cycle, drug content, pH, viscosity and in vitro drug diffusion. The results showed that the combination of resveratrol and curcumin nanoemulsion had a particle size of 181 nm, indicating its suitability for nasal drug delivery. The low PDI value of 0.368 indicated a narrow size distribution, and the pH of 6.5 was suitable for nasal administration. In conclusion, the prepared combination of resveratrol and curcumin nanoemulsion was found to be suitable for intranasal administration, offering the potential to enhance drug absorption and bioavailability. This formulation may have promising implications for the treatment of epilepsy and other related conditions.

**Keywords:** Resveratrol, Curcumin, Nanoemulsion, Epilepsy, Intranasal adminstration

**PC-467**

## BIOELECTRICAL PATCHES: A NOVEL APPROACH TO WOUND HEALING

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Bioelectrical patches represent an innovative and promising technology in modern wound healing, leveraging the body's natural electrical signals to accelerate tissue repair and regeneration. These patches deliver controlled electrical stimulation directly to the wound site, facilitating cellular activities such as migration, proliferation, and angiogenesis, which are crucial for efficient healing. Advances have led to the development of self-powered systems with piezoelectric or triboelectric materials, smart wearable patches equipped with sensors for real-time monitoring, and biodegradable designs that negate the need for manual removal. Clinical studies demonstrate significant benefits, including up to 30% faster healing, 85% complete wound closure, a 50% reduction in infection rates, and high patient satisfaction, with minimal adverse effects reported. Bioelectrical patches find applications in chronic wounds, surgical incisions, burns, sports, pediatric, geriatric, veterinary, and military medicine, highlighting their versatility across diverse clinical scenarios. Despite these advances, regulatory considerations remain a major factor influencing clinical adoption. The approval process requires rigorous demonstration of biocompatibility, safety, and efficacy, adherence to medical device standards, and reliable performance data. Emerging smart and biodegradable features present further regulatory challenges, including ensuring patch durability, sensor accuracy, and environmental safety upon degradation. Cost constraints and product standardization are also critical for widespread clinical acceptance. Ongoing collaboration among researchers, clinicians, and regulators will be essential for ensuring these innovations meet global regulatory standards and can be integrated into mainstream wound care.

**Keywords:** Bioelectrical patches, Wound healing, Electrical stimulation, Regulatory approval, Smart wearable technology.

**PC-468**


ISBN: 978-81-980623-8-3

**EXTRUSION SPHERONIZATION: A METHOD TO DEVELOP STABILIZED PROLONGED RELEASE SACUBITRIL FOR THE TREATMENT OF HYPERTENSION**

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The present study arrived to develop prolonged release Sacubitril for the treatment of hypertension. This study investigate the fesability of extrusion spheronization method and its optimization of process for stabilized, robust formulation of Sacubitril. The study includes the use of HPMC K 4 M , K 15 , K 100 and Eudragit NE 30 D (18-40 % of polymer content) as release rate controlling agent. The method of preparation involved is the preparation of wet mass of Sacubitril with diluent and rate controlling polymers. The prepared wet mass was passed through extruder to form the long extrudes. The prepared extrudes were spheronized to form spherical pellets. The pellets were finally dried at 40-45 O C. Effect of various formulation variables such as the diluent and polymer proportion was studied. Effect of various process variables such as speed of extruder and rotation of spherodizer on pellet formation was studies. The prepared pellets were evaluated for various physico chemical properties. The dissolution study showed a drug release extended up to 12-16 hrs depends on the polymer proprtion and type of polymer. The release kinetics showed zero order release with diffusion mechanism. DSC of pure drug showed a sharp endothermic peak at 156 O C , similar endothermic peaks were observed win the prepared formation concludes no drug polymer interaction. FTIR study further confirms that no interaction of drug and excipients. Scanning electronic microscopy (SEM) study showed the rough surface of the pellets. Therefore, extrusion spheronization method can be successfully employed for the development of Sacubitril prolonged release formulations.

**Keywords:** Sacubitril, pellets, HPMC, Eudragit NE 30 D, extrusion spheronization

**PC-469**

**FORMULATION DEVELOPMENT AND EVALUATION OF MICROWAVE ASSISTED GRAFTED CASHEW GUM AS SUSTAINED RELEASE MATRIX**

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Recent advancements in pharmaceutical technology emphasize the design of sustained release systems to enhance therapeutic efficacy. Polymers, particularly graft copolymers, play a pivotal role in such formulations. Microwave-assisted grafting offers an efficient and rapid method for preparing graft copolymers without the need for initiators. In this study, cashew gum, a natural polysaccharide, was grafted with acrylamide to develop sustained release matrix tablets of dapagliflozin a selective SGLT-2 inhibitor used in the management of type 2 diabetes mellitus. Dapagliflozin was characterized for its physicochemical properties including UV absorption, melting point, solubility, partition coefficient, and spectral analysis, confirming its purity and lipophilic nature. The graft copolymerization of cashew gum with acrylamide was successfully optimized for grafting efficiency and percentage conversion. Structural confirmation was performed using FTIR and SEM analysis. Matrix tablets were prepared by direct compression, and all pre- and post-compression parameters were within pharmacopoeial limits. In vitro dissolution studies in 0.1N HCl and phosphate buffer (pH 6.8) demonstrated that the optimized formulation (F4) exhibited sustained release behavior. Kinetic modeling revealed that drug release followed the Higuchi model, indicating a diffusion-controlled mechanism. Overall, microwave-assisted grafting of acrylamide onto cashew gum provides a simple and reproducible approach for the development of sustained release dapagliflozin tablets, offering improved glycemic control and better patient compliance in type 2 diabetes management.

**Keywords:** Graft copolymerization, Microwave-assisted method, Sustained release, Matrix tablets, Higuchi model.

**PC-470**

**DEVELOPMENT AND EVALUATION OF MUCOADHESIVE BUCCAL PATCHES OF VENLAFAXINE HCL**

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The present research work aimed to prepare and evaluate mucoadhesive buccal patches of Venlafaxine HCl. The buccal patches were prepared using combinations of HPMC E15 ethyl cellulose and PVP in different ratios, employing a solvent casting technique. FT-IR studies were performed to investigate the drug-excipient interaction. The prepared polymeric patches were characterized for various physiochemical parameters, including film thickness, weight uniformity, folding endurance, surface pH, swelling index, drug content, in-vitro release. The physiochemical parameters of buccal patches were found satisfactory. However, swelling and folding endurance increased with increasing polymer concentrations. The weight of the patches ranged from 105.4±1.66 to 147.6±2.39 mg, while the thickness varied between 0.42±1.33 and 0.59±1.20 mm with standard deviation values. The surface pH of every formulation was within 0.5 units of neutral pH, ensuring compatibility with the buccal mucosa. The swelling index ranged from 55.25±2.59 % to 74.33±1.95% w/w, and the folding endurance was between 82 ± 0.33 and 108 ± 0.65, indicating good mechanical strength. In-vitro release study showed that buccal patches with HPMC E15, ethyl cellulose and PVP exhibited a higher release (99.69±1.23%) in F8 compared to other formulations and have been considered as an optimized formulation. The study successfully developed mucoadhesive buccal patches of Venlafaxine HCl with desirable physicochemical properties, enhanced drug release, and promising therapeutic potential, suggesting their suitability for effective buccal drug delivery.

**Keywords:** Mucoadhesive Buccal Patches, Venlafaxine Hydrochloride, Solvent Casting Technique, In-vitro Release.

**PC-471**

**MRNA-LIPID NANOPARTICLE DRUG DELIVERY POSING CHALLENGES TO REGULATORY AGENCIES**

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mRNA-lipid nanoparticle (LNP) drug delivery presents significant regulatory challenges due to the novel and complex nature of these formulations. LNPs serve as carriers that protect and deliver mRNA therapeutics across biological barriers to target cells, but their unique physicochemical properties and components complicate regulatory evaluation. Key challenges include defining the classification of LNP lipid components as either active substances or novel excipients, as regulatory agencies differ in their approaches. This inconsistency impacts requirements for manufacturing, characterization, toxicity testing, and documentation. Furthermore, regulatory bodies require thorough demonstration of product quality, batch consistency, and safety profiles amid variability in lipid composition and particle size. The rapid development cycles for mRNA vaccines, such as those for COVID-19 variants, pose additional challenges in adapting existing regulatory frameworks designed for traditional biologics. There is a pressing need for harmonized guidelines on chemistry, manufacturing, and controls (CMC), with an emphasis on early engagement between developers and regulators to streamline approval pathways. Regulatory strategies must integrate risk-based approaches addressing the complexity of LNP formulations, accompanied by rigorous analytical characterization of critical quality attributes. Special regulatory pathways may also facilitate expedited review for mRNA-LNP therapies. Overall, overcoming these regulatory hurdles is essential for advancing the clinical translation and commercialization of mRNA-LNP therapeutics while ensuring patient safety and product efficacy.

**Keywords:** mRNA lipid nanoparticles, Drug delivery, Integration, Regulatory challenges, Novel excipients.

**PC-472**


ISBN: 978-81-980623-8-3

**NUTRACEUTICAL IMPOTANCE OF PHYLLANTHUS EMBLICA IN DIETARY SUPPLIMENTS**

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Phyllanthus emblica L. (popular known as amla or Indian gooseberry) is an ephemeral tree belonging to the Euphorbiaceae family. Amla has an important role in the traditional medicine of India to reduce anxiety and burning sensation in skin and eyes, improve anemic condition, favor the health of the male reproductive system and reproduction, facilitate digestion, improve liver health, and also exert a tonic effect in the cardiovascular system . Phyllanthus emblica L. (also popularly known as amla) is a tree native to the India and Southeast Asia regions that produces fruits rich in bioactive compounds that could be explored as part of the increasing interest in naturally occurring compounds with biological activity. Thus, this review aims to highlight the nutritional aspects, rich phytochemistry and health-promoting effects of amla. Scientific evidence indicates that polyphenols are central components in fruits and other sections of the amla tree, as well as vitamin C. The rich composition of polyphenol and vitamin C imparts an important antioxidant activity along with important in vivo effects that include improved antioxidant status and activity of the endogenous antioxidant defense system. Other potential health benefits are the anti-hyperlipidemia and antidiabetic activities as well as the anticancer, anti-inflammatory, digestive tract and neurological protective activities. The promising results provided by the studies about amla bioactive compounds support their potential role in assisting the promotion of health and prevention of diseases.

**Keywords:** Polyphenols, Ascorbic acid, Antioxidant activity, Cardiovascular protection, Hyperlipidemia.

**PC-473**

**DEVELOPMENT AND CHARACTERIZATION OF AQUASOMAL DRUG DELIVERY SYSTEM FOR TARGETED DELIVERY OF PACLITAXEL AGAINST COLORECTAL CANCER**

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Oral drug delivery is the most convenient and preferred route of administration; however, drugs like paclitaxel face challenges due to poor solubility, instability, and extensive first-pass metabolism. To overcome these limitations, aquasomes—nano-sized self-assembling carriers with a ceramic core and sugar coating—were explored for enhancing paclitaxel's oral bioavailability and colorectal targeting. Calcium phosphate dihydrate cores were prepared using colloidal precipitation by sonication and subsequently coated with different polyhydroxyl oligomers (sucrose, maltose, lactose, trehalose, and cellobiose) to form aquasomes. Paclitaxel was loaded onto these carriers through adsorption followed by lyophilization. The formulations were characterized using SEM, FTIR, DSC, anthrone assay, and in-vitro release studies. Trehalose- (TA) and cellobiose- (CA) coated aquasomes exhibited the highest drug loading, with TA showing superior compatibility, spherical morphology, and enhanced release profile. Enteric coating of the optimized TA formulation (ETA) was performed to achieve colorectal targeting. ETA demonstrated controlled drug release for up to 480 minutes and retained stability of functional groups as confirmed by FTIR and DSC analyses. Cytotoxicity studies against HCT116 colorectal cancer cells revealed potent anticancer activity, while three-month stability tests confirmed the absence of physical or chemical degradation. In conclusion, trehalose-coated aquasomes (TA) proved to be the most effective formulation for paclitaxel delivery, combining favorable morphology, drug loading, stability, and dissolution characteristics. Enteric-coated TA (ETA) further improved therapeutic potential by enhancing colorectal targeting and sustaining release, thereby establishing aquasomes as a promising nanocarrier system for the oral delivery of poorly soluble anticancer drugs.

**Keywords:** Paclitaxel, Oral bioavailability, Aquasomes, Cytotoxicity, HCT116 colorectal cancer cell line

**PC-474**

**ADVANCING GLASS IONOMER CEMENT: MECHANICAL, REMINERALIZING AND ANTIMICROBIAL INNOVATIONS TOWARD CLINICAL BIOACTIVITY AND REGULATORY EXCELLENCE**

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Glass ionomer cement (GIC) serves as a foundational material in restorative dentistry, recognized for its durable chemical adhesion, fluoride-releasing capability, and excellent biocompatibility. Despite these merits, conventional GICs face limitations related to brittleness and suboptimal mechanical strength, which restrict their broader clinical utility. Current advancements aim to convert GICs from passive restorative fillers to multifunctional bioactive platforms by refining composition, enhancing physical properties, and assessing clinical outcomes. Experimental approaches are centered on optimizing the powder-to-liquid ratio, controlling particle size distribution, and conducting standardized micro-hardness testing including the incorporation of remineralization agents and time-dependent strength evaluations. Antimicrobial efficacy studies focus on the diverse mechanisms of GIC action, therapeutic potential, and comparative analyses against other dental materials, all performed within the context of rigorous safety assessments. Research and product development are guided by key regulatory frameworks such as ISO 9917-1:2017 for dental cements, ICH Q3D for elemental impurities and FDA biocompatibility standards, ensuring safe and effective use. Notable innovations include the integration of remineralizing and antimicrobial additives, the use of GIC as a vehicle for localized drug delivery, and advances in chemical bonding and anti-cariogenic functions. Both laboratory and clinical performance analyses underscore the importance of correlating test data with long-term therapeutic outcomes, supporting regulatory clearance and expanded clinical adoption.

**Keywords:** Glass Ionomer Cement, Mechanical Strength Enhancement, Remineralization Agents Antimicrobial Activity

**PC-475**

**DEVELOPMENT AND EVALUATION OF A CO-DELIVERY SYSTEM FOR INTRANASAL ADMINISTRATION OF ANTIEPILEPTIC AGENTS**

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In the current research, a single liposome containing two antiepileptic drugs, Lamotrigine (LTG) and Levetiracetam (LEV), was formulated by the thin film dehydration-rehydration method. The objective behind the research was to develop a single delivery system for the delivery of two AEDs via the intranasal route for effective targeting of the brain, which may be effective in anti-epileptic poly-therapy. The formulation was evaluated for different parameters to confirm their effectiveness. The formulation was evaluated for its drug content, entrapment efficiency, particle size, and percentage drug release. The actual amount of drug present in the formulation of LTG and LEV was found to be 90.39 ± 0.46 % and 89.67 ± 0.28 % respectively. Entrapment efficiency for both the drugs LTG and LEV was found to be 87.40 ± 0.39 % and 85.91 ± 0.53 % respectively. The in-vitro drug release study of co-loaded liposomes was carried out using a diffusion cell apparatus for 12 hrs. The percentage of drug release at 12 hr for LTG and LEV was found to be 73.66 ± 3.24 and 76.82 ± 1.62, respectively. The formulated co-loaded liposomes were also evaluated for their particle size using Laser Particle Size Analyser was found to be 422 ± 2.65 nm. Therefore, it may conclude that the co-loaded liposomes of LTG and LEV have been successfully formulated, and can be an effective delivery system to deliver two AEDs by the Intranasal route.

**Keywords:** Lamotrigine, Levetiracetam, Antiepileptics, Co-loaded liposomes

**PC-476**

**DESIGN, FORMULATION AND OPTIMIZATION OF SOLID LIPID NANOPARTICLES FOR BRAIN TARGETING AND BIOAVAILABILITY ENHANCEMENT OF ANTIRETROVIRAL DRUGS**

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ISBN: 978-81-980623-8-3

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HIV drug formulation challenges include achieving sustained, high drug concentrations in viral reservoirs, overcoming poor drug bioavailability and degradation, ensuring patient adherence through palatable and easy-to-administer forms, addressing drug resistance, managing side effects like weight gain, improving targeted delivery, and increasing the global access to affordable and appropriate formulations, especially for children. Solid Lipid Nanoparticles (SLNs) enhance HIV drug delivery by improving the stability, bioavailability, and targeting of antiretroviral drugs, especially those that are poorly water-soluble. The lipid-based SLN structure protects drugs from proteolytic degradation, facilitates absorption via the lymphatic system, and enables controlled drug release. Specific HIV drugs like efavirenz and ritonavir have been successfully encapsulated in SLNs, showing increased peak plasma concentration and potential for targeting HIV reservoirs. In our study we have developed Solid lipid nanoparticles (SLN) of efavirenz and delaveridine by high pressure homogenization technique using optimised procedure by design of experiments and evaluated for particle size, polydispersity index (PDI), zeta potential and entrapment efficiency. The optimized SLN formulation was incorporated in thermo-sensitive in-situ gelling system. The efavirenz SLN based gel was evaluated for various parameters like gelation temperature, pH, viscosity, transmittance, mucoadhesive strength, Spreadability, in-vitro and ex-vivo release studies, and the in-vivo pharmacokinetic studies.

**Keywords:** Solid lipid Nanoparticles, High pressure homogenization, Design of Experiments , In-situ gel, Nose-to-brain, Brain targeting

**PC-477**

## FORMULATION AND EVALUATION OF TRANDOLAPRIL EFFERVESCENT FLOATING TABLETS

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The present study involves preparation and evaluation of floating microspheres of an anti-hypertensive drug Trandolapril as a model drug for prolongation of gastric residence time using both gas forming agents like sodium bicarbonate The effervescent microspheres were prepared by Inotropic gelation technique using polymer sodium alginate along with Ethyl celluloseand HPMC K4M.The microsphere was evaluated for angle of repose, bulk density, tapped density, Carr's index, Hausner's ratio, percent yield and drug entrapment. The shape and surface morphology of prepared microsphere were characterized by scanning electron microscopy.In-vitro drug release studies were performed by using USP Dissolution test apparatus (type I) at 37 +_0.5o c and 50 rpm speed. To study release behaviour kinetic analysis were performed on the optimised formulation. The dissolution data were fitted to zero order, First order, Higuchi model and Peppas model. The prepared microspheres exhibited prolong release and remained buoyant for more than 12 hrs. The optimised formulation (F6) showed good percent yield, drug entrapment and drug release.

**Keywords:** Floating microspheres, Trandolapril, Effervescent systems, GRDDS.

**PC-478**

## FORMULATION OF INTRANASAL SLN FOR ENHANCED BRAIN DELIVERY IN ALZHEIMER'S DISEASE

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The progressive neurodegenerative disease known as Alzheimer's disease (AD) is signified by behaviour abnormalities, cognitive decline, and memory loss. Because therapies cannot pass through the blood-brain barrier (BBB) efficiently, resulting in restricted brain bioavailability and systemic side effects, clinical outcomes are still inadequate even with the availability of numerous treatments. The goal of the current work was to create and assess a novel intranasal solid lipid nanoparticles (SLN) system for the brain-targeted administration of the antioxidant N-acetyl-L-cysteine (NAC) and the cholinesterase inhibitor rivastigmine hydrogen tartrate (RHT). The compatibility of RHT and NAC with particular lipids and surfactants was validated by preformulation studies. A Box-Behnken Design was used to optimize the RHT-NLCs for particle size and entrapment efficiency after they were created by hot melt emulsification and ultrasonication.The optimized formulation demonstrated an entrapment efficiency of 80.66% and a particle size of 154.7 nm. The effective encapsulation of the drug with stable physicochemical properties was validated by FTIR, DSC, and XRD studies. Studies performed in vitro and ex vivo showed improved nasal permeability and prolonged drug release. When compared to the free drug, RHT-SLNs significantly improved the cognition and memory of rats with $AlCl_3$-induced AD, according to behavioural studies. The results confirm that intranasal administration of RHT-loaded SLNs in combination with NAC is a successful method for improving brain delivery and Alzheimer's disease treatment effectiveness.

**Keywords:** Alzheimer's disease, antioxidant, intranasal delivery, Blood-brain barrier, Neuroprotection

**PC-479**

## DEVELOPMENT AND IN VITRO EVALUATION OF MEDICATED CANDY AS A NOVEL APPROACH FOR TB TREATMENT FOR PAEDIATRICS

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Tuberculosis (TB) therapy faces significant compliance challenges, particularly in children. This study focused on formulating and evaluating a child-friendly, palatable medicated hard candy of isoniazid to improve tolerability, compliance, and adherence. Eight formulations (F1–F8) of isoniazid hard candy were developed using the heat and congealing method with different polymer blends of Hydroxypropyl methylcellulose (HPMC-K100), Methyl cellulose, and Sodium Carboxymethylcellulose (Na-CMC). Pre-formulation studies confirmed the identity and purity of the drug, with a melting point of 170.3°C and maximum absorbance (λmax) of 263 nm. Fourier-transform infrared spectroscopy (FT-IR) verified "in-use" compatibility of isoniazid with selected excipients. The formulated candies were physically hard, red in color, and demonstrated acceptable tolerability and palatability. Mechanical property testing showed adequate hardness (15.6–18.3 kg/cm²) and low friability (0.12–0.35%). In-vitro release studies indicated that most formulations followed the Korsmeyer-Peppas release model, with high correlation coefficients ($R^2 \approx 0.9997$). Release exponent (n) values were greater than 1, suggesting a super case-II transport mechanism. Overall, the study demonstrated successful formulation of stable medicated isoniazid candies with desirable properties in terms of taste, appearance, strength, and drug release profile. Such a dosage form has potential to enhance paediatrics compliance in TB therapy. However, further studies are required to evaluate the in-vivo distribution, tolerability, and acceptance of isoniazid hard candy in children with TB.

**Keywords:** Isoniazid, Tuberculosis (TB), Medicated Candy, Paediatric, heat & congealing method

**PC-480**

## ENHANCEMENT OF SOLUBILITY AND DISSOLUTION OF RESVERATROL BY SOLID DISPERSION TECHNIQUE

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In the current research, the Resveratrol (RES) and chitosan-myristic acid complex were used for the formulation of solid dispersion (RES-SD). The objective behind the research was to examine solubility of RES. The RES-SD in stoichiometric ratio was prepared by dissolving both RES and chitosan-myristic acid complex in a 5ml of a mixture of ethanol:water (1:1), prepared by kneading technique. RES-SD4 formulation with ratio (1:6) was selected as optimized batch based on high drug content (98.02 % w/w). The aqueous solubility of RES-SD4 was found to be increased (71.344 µg/mL). RES-SD4 formulation was confirmed by solid state




ISBN: 978-81-980623-8-3

characterization using SEM, DSC, FTIR and PXRD. Dissolution pattern of pure RES, PM and RES-SD formulations in vitro in phosphate buffer pH 6.8 was studied, the pure RES exhibited only ~13.63 % release at the end of 2h testing period and prepared RES-SD formulations were found to show an enhanced rate and extent of dissolution with increasing water-soluble ratios of carrier. Formulation RES-SD4 demonstrate an enhanced dissolution release rate at around 90%, with similar testing period. The optimized formulation, RES-SD4 showed an excellent release rate in first one hour at about 67.12% and thereafter, this release rate continued to increase and reached to a maximum at about 98.02% (in pH 6.8) over the end of 2h testing period. Thus, RES-SD4 formulation showed enhanced solubility and dissolution of RES.

**Keywords:** Resveratrol, Chitosan, Myristic acid, Solid dispersion

**PC-481**

**HYALUROSOMES OF CAFFEINE FOR DUAL PHARMACEUTICAL AND COSMECEUTICAL APPLICATION: A COMPREHENSIVE ANALYSIS USING BOX–BEHNKEN DESIGN**

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Innovative strategies for enhancing the transport of bioactive compounds with pharmaceutical and cosmetic applications have been made possible by nanotechnology. Among its many biological effects include lipolysis, antioxidant activity, central nervous system stimulation, and anti-cellulite properties. Caffeine is a hydrophilic xanthine derivative. Its quick clearance and low permeability, however, restrict its use in pharmaceuticals and cosmetics. Hyalurosomes, lipid vesicular nanocarriers functionalized with hyaluronic acid (HA), were created and improved for dual applications utilizing the Box–Behnken Design (BBD) in order to overcome these constraints. Hyalurosomes loaded with caffeine were made via thin-film hydration followed by sonication. with responses including particle size, polydispersity index (PDI), and entrapment efficiency, Box–Behnken Design was used to enhance important formulation parameters such phospholipid concentration, HA content, and sonication time. Using transmission electron microscopy for morphology, UV-Vis spectrophotometry for entrapment efficiency, and dynamic light scattering for particle size and zeta potential, the improved formulation was described. Initial findings showed that the nanosized vesicles (~120–180 nm) had a negative zeta potential, high entrapment efficiency, and a uniform distribution (PDI < 0.3), indicating good stability. Studies on in vitro release showed that caffeine has a 24-hour sustained release profile. Incorporation into a hydrogel base further improved applicability and potential dermal retention. Studies on stability, ex vivo skin penetration, and antioxidant evaluation are ongoing and will shed more light on long-term efficacy and clinical significance. All things considered, caffeine-loaded hyalurosomes provide a potential dual-purpose nanocarrier technology that combines the moisturizing and targeting qualities of HA with the therapeutic properties of caffeine.The caffeine-loaded hyalurosomes effectively combined the therapeutic potential of caffeine with the moisturizing and permeation-enhancing properties of HA. Pharmaceutical relevance was evident from controlled release and improved bioavailability, while cosmeceutical benefits included enhanced hydration, anti-aging, and anti-cellulite effects.

**Keywords:** Caffeine, hyalurosomes, hyaluronic acid, Box–Behnken Design

**PC-482**

**FORMULATION & EVALUATION OF FAMOTIDINE TRANSDERMAL PATCHES BY USING NATURAL POLYMERS**

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The objective of the present study was to formulate and evaluate transdermal patches of Famotidine using different polymers to enhance bioavailability and maintain a controlled drug release. Famotidine, a histamine H2-receptor antagonist with low oral bioavailability due to first-pass metabolism, is a suitable candidate for transdermal drug delivery. Transdermal patches were prepared by the solvent casting method using various polymers such as Guar gum, Xanthan gum, and Acacia in different ratios. The prepared patches were evaluated for their physicochemical parameters including thickness, weight variation, folding endurance, drug content, moisture uptake, and in vitro drug release. The results showed that the type and concentration of polymer significantly influenced the patch characteristics and drug release profile. Among all formulations, the patch containing Xanthan gum and Guar gum in an optimized ratio exhibited desirable release kinetics and mechanical properties, making it a promising candidate for effective transdermal delivery of Famotidine.

**Keywords:** Transdermal Patch, Solvent Casting Method, Guar gum, Xanthan gum, Acacia.

**PC-483**

**TARGETED INTRANASAL DELIVERY OF AGMATINE VIA LACTOFERRIN-FUNCTIONALIZED CHITOSAN NANOPARTICLES FOR ALZHEIMER'S THERAPY**

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Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by cognitive deterioration and memory deficits, with therapeutic outcomes constrained by inadequate drug penetration across the blood–brain barrier (BBB). This study reports the formulation and evaluation of lactoferrin-conjugated, agmatine-loaded chitosan nanoparticles (Lf-Ag-CS NPs) as an intranasal delivery platform to enhance brain targeting in AD therapy. Nanoparticles were fabricated via ionic gelation and functionalized with lactoferrin through EDC/NHS-mediated carbodiimide coupling to facilitate receptor-mediated transcytosis. Optimized Lf-Ag-CS NPs exhibited a mean particle size of 337.4 nm, polydispersity index of 0.308, zeta potential of –26.6 mV, agmatine entrapment efficiency of 71–82.6%, drug content of 35.50–41.30 ± 0.50%, coupling efficiency of 79.2%, ex vivo permeation of 97.29 ± 1.3% at 5 h, and mucoadhesion potential of 57.63%, supporting efficient nasal mucosal transport. In vivo pharmacodynamic evaluation in an $AlCl_3$-induced AD rat model demonstrated that $AlCl_3$ exposure significantly impaired cognitive performance and elevated anxiety-related behaviors. Intranasal administration of agmatine solution produced minimal improvement, while non-conjugated agmatine–chitosan nanoparticles yielded moderate recovery. Lf-Ag-CS NPs markedly enhanced memory indices and attenuated anxiety behaviors, with outcomes approaching those of healthy controls, as determined by Elevated Plus Maze, Open Field Test, and Novel Object Recognition paradigms. These findings indicate that lactoferrin conjugation substantially improved brain bioavailability via receptor-mediated transcytosis and enhanced mucosal retention. Intranasal administration enabled direct nose-to-brain delivery, circumventing the BBB and minimizing systemic exposure. Collectively, Lf-Ag-CS NPs represent a promising, non-invasive therapeutic approach for the management of AD.

**PC-484**

**DEVELOPMENT OF FLUCLOXACILLIN AND CURCUMIN LOADED SMART HYDROGEL THROUGH DESIGN OF EXPERIMENTS**

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Wound healing is a complex biological process comprising hemostasis, inflammation, proliferation, and remodeling, where timely restoration of tissue integrity is critical. Smart hydrogels, with their three-dimensional polymeric networks and high-water content, provide a moist environment, enhance drug retention, and enable controlled release, making them highly suitable for wound management. The present study focused on the development of a smart hydrogel loaded with Flucloxacillin (BCS Class II, antibacterial) and Curcumin (BCS Class IV, anti-inflammatory and wound-healing agent) to achieve synergistic effects.




ISBN: 978-81-980623-8-3

The hydrogel was prepared by physical crosslinking using Poloxamer 407 as a thermo-responsive polymer, polyvinyl alcohol (PVA) as a gelling agent, sodium alginate as a crosslinker, and ethanol as a co-solvent. Formulations were evaluated for pH, drug content, entrapment efficiency, viscosity, gelation time, and in-vitro drug release, while a Design of Experiment (DoE) approach was applied to optimize formulation parameters. The optimized hydrogel showed a viscosity of 7524 cP, entrapment efficiency of 81.44%, and skin-compatible pH of 5.16. In-vitro studies revealed sustained release, with the dual-drug system performing better than single-drug formulations. The results suggest that this smart hydrogel can be a promising wound care option, as its combined antibacterial and anti-inflammatory effects promote faster healing and lower infection risk. Furthermore, the thermo-responsive gelation of the smart hydrogel enables site-specific controlled delivery, indicating potential for improved therapeutic efficacy in managing acute and chronic wounds.

**Keywords:** Wound healing, Smart hydrogels, Curcumin, Flucloxacillin, Design of Experiment.

**PC-485**

**DESIGN AND OPTIMIZATION OF PALBOCICLIB MUCOADHESIVE BUCCAL PATCHES FOR ORAL CANCER THERAPY**

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An innovative mucoadhesive buccal patch for palbociclib, an anticancer drug, was designed and developed to treat oral cancer. The primary goal was to improve drug bioavailability and therapeutic effectiveness by leveraging the buccal route to bypass the hepatic first-pass metabolism and enable targeted drug delivery, thereby reducing systemic toxicity to healthy cells. The study used a Quality by Design (QbD) approach, starting with the identification of Critical Quality Attributes (CQAs) and the selection of suitable excipients, specifically a mixture of polyvinyl alcohol (PVA), hydroxypropyl methylcellulose (HPMC E15), and carboxymethylcellulose sodium (NaCMC). Drug-excipient compatibility was confirmed through FTIR and DSC analyses, which showed no significant chemical interactions. Preliminary batches were prepared and evaluated for characteristics like weight variation, thickness, folding endurance, surface pH, swelling index, and mucoadhesive strength. The formulation was then optimized using a Box-Behnken Design (BBD) to study the influence of the polymer concentrations on the mucoadhesive strength and in vitro drug release. The optimized F7 batch demonstrated high mucoadhesive strength (46 ± 1.43 g) and a significant cumulative drug release of 95.03 ± 0.22% within five hours.In conclusion, this research successfully developed a mucoadhesive buccal patch for palbociclib with desirable properties for targeted and sustained delivery in oral cancer therapy, demonstrating a promising alternative to conventional treatments.

**Keywords:** Mucoadhesive Buccal patch, Palbociclib, Oral cancer, QbD, Target drug delivery.

**PC-486**

**DEVELOPMENT OF AN INNOVATIVE SMART PHARMACEUTICAL PACKAGING SYSTEM USING THERMOCHROMIC PIGMENT FOR REAL-TIME TEMPERATURE MONITORING**

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Proper storage of pharmaceutical products is critical to maintain their safety, efficacy, and shelf life. Many drugs, especially temperature-sensitive formulations like insulin, vaccines, and antibiotics, degrade when exposed to high temperatures. However, most current packaging systems lack a user-friendly method to visually indicate such temperature breaches to patients or healthcare workers. This project introduces a novel, cost-effective, easy to use and dual-mode smart packaging system utilizing thermochromic pigments coated with polymeric coating that respond visibly to temperature changes, this label shows both the reversible and irreversible color change. This smart packaging proactively alerts users to any breach of recommended storage conditions during storage, transportation or use, ensuring enhanced drug safety. Not only It has visual dual-color alert mechanism but also the integration of a QR code-based interactive layer. Upon scanning the QR code, users are guided through a short video or message explaining the color meaning, product safety status, and instructions for next steps. This transforms traditional packaging into a "talking" or smart-communicating packaging system. The materials are inexpensive, non-toxic, and can be easily integrated into pharmaceutical labels, blister packs, or outer cartons as simple visual patches. This innovation aims to bridge the critical gap between drug safety and user awareness, improving public health outcomes through smart, patient-friendly design.

**Keywords:** Thermochromic pigments, QR code, Temperature Monitoring, Smart packaging system.

**PC-487**

**INNOVATIVE FORMULATION AND EVALUATION OF SUMATRIPTAN FAST DISSOLVING TABLETS THROUGH $3^2$ FACTORIAL DESIGN**

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In this study, the objective aims to develop and analyse fast-dissolving tablets (FDTs) of sumatriptan using super disintegrants primojel and crospovidone by direct compression technique in each case tri concentrations of super disintegrant ( 3,4 and 5 % ) where used in the preparation of FDT's.The tablets prepared were analysed for disintegration rate, disintegration time, hardness, friability, and drug concentration. The following conclusions are derived from the obtained results. A 3-level-2-factorial experimental design is chosen to specify the percentage of the independent variables primojelcrospovidone that were included in the formulation of sumatriptan Fast Dissolving Tablets. All FDTs prepared disintegrated with in 34 sec. Among the nine formulations F9 gave 100% drug release 6 min. All of the prepared FDTs led sumatripan to dissociate rapidly. In each instance , the levels of super disintegrant increased along with the sumatriptan's rate of disintegration. A series of equations were generated for disintegration time (DT), percent drug disintegrated in 10 min (PD10) . Y1= 74.00 - 7.83 X1 -22.67 X2-2.75 X1X2 +1.50X12 -6X22 (DT) , Y2=96.22 + 3.17X1 +5.33 X2 -2.50 X1X2 +1.71X12 -4.33 X22 (PD10m). The findings indicate that a higher concentration of super disintegrants results in a shorter disintegration time for the dosage form, and that a suitable selection of X1 and X2 levels can alter the drug release pattern. To check the validity of equation DT was selected for 40 sec and PD10 for 98.00. The Final Formula DT Values and PD10 were found to be 39 sec and 98.64 % indicating the validity of equation. Thus sumatriptan tablets could be successfully prepared using primojel and Crospovidone using $3^2$ Factorial Design.

**Keywords:** Sumatriptan, $3^2$ Factorial Designs, Fast Dissolving Tablets.

**PC-488**

**SOLUBILITY AND DISSOLUTION RATE ENHANCEMENT OF LOPINAVIR BY SOLID DISPERSION AND SOLID LIPID MICROPARTICLE TECHNIQUES**

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The present investigation is mainly focused on enhancing the solubility of poorly soluble drug Lopinavir by formulating it as solid dispersions and solid lipid microparticles. Solid lipid microparticles are prepared by using Glyceryl monostearate, Phospholipon 90 H, Lipoid S 100, Compritol ATO 888 by solvent evaporation and homoenisation. Solid dispersions of Lopinavir were prepared by using Soluplus and KollidonVA64, glyceryl monostearate (GMS), Phospholipon 90 H, Lipoid S 100 as carriers by solvent evaporation method and kneading method. Further, solid lipid microparticles and solid dispersions were subjected to in vitro dissolution tests in order to study the drug release profiles of Lopinavir. Rapid drug release of Lopinavir was achieved with the lipid microparticles and solid dispersions prepared with the different types of excipients. The optimized formulations were further characterized by




ISBN: 978-81-980623-8-3

XRD, DSC, SEM, and FTIR analysis to find out drug and excipients interactions. These studies revealed that the formulations were stable.

**Keywords:** Solid Lipid Microparticles, Soluplus and KollidonVA64, Glyceryl Monostearate (GMS), Phospholipon 90 H, Lipoid S 100.

**PC-489**

**DESIGN AND IN-VITRO EVALUATION OF FAST DISSOLVING FILMS CONTAINING DOXYLAMINE SUCCINATE**

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The present study deals with the formulation of fast dissolving films of Doxylamine succinate is an antihistaminic commonly used for the prevention and treatment of Nausea and Vomiting in pregnancy. Doxylamine is a Histamine H1 antagonist with pronounced sedative properties. It is used in allergies, antiemetic, and hypnotic. Doxylamine has also been administered in veterinary applications and was formerly used in Parkinsonism. The concept of fast-dissolving drug delivery emerged from the desire to provide patient with more conventional means of taking their medication. In the present research work, various trials were carried out using film forming agents such as maltodextrin, gum karaya and xanthan gum to prepare an ideal film. Emulsion evaporation method was used for the preparation of films. The prepared films were evaluated for weight uniformity, drug content, film thickness, folding endurance, dispersion test and curling. The in vitro dissolution studies were carried out using simulated salivary fluid (pH 6.8 phosphate buffers). About 98% of the drug was found to be released from the film prepared with the drug excipient interaction studies carried out by differential scanning calorimetry analysis and Fourier transform infrared studies and the results revealed that there were no major interactions between the drugs and excipients used for the preparation of films.

**Keywords:** Emulsion evaporation method, fast dissolving films, gum karaya, maltodextrin, of Doxylamine succinate, xanthan gum.

**PC-490**

**DUAL-LIGAND FUNCTIONALIZED LIPID NANOPARTICLES FOR EFFICIENT DNA TRANSFECTION IN BREAST CANCER THERAPY**

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Lipid nanoparticles (LNPs) have emerged as efficient non-viral carriers for gene delivery due to their high loading capacity, biocompatibility, and low immunogenicity. In this study, DNA-loaded LNPs were engineered for targeted delivery to HER2-positive breast cancer cells. Targeting was achieved through trastuzumab (Herceptin®), a monoclonal antibody directed against the extracellular domain of HER2, in combination with folate to overcome intrinsic trastuzumab resistance and enhance cellular uptake. Dual-targeted LNPs encapsulating plasmid DNA encoding fluorescent reporter proteins (tdTomato or EGFP) were prepared using folate-conjugated PEGylated lipids, followed by surface conjugation with thiolated Herceptin. At an N/P ratio of 6, the resulting nanoparticles were small, uniform, and exhibited a slightly negative potential. In vitro studies using breast cancer cell lines (MCF7, MDA-mb453, SKBR3) revealed that nanoparticle uptake correlated with HER2 expression levels and was significantly enhanced with dual targeting. Transgene expression was consistently higher in dual-targeted systems compared to single-targeted controls. Furthermore, in vivo zebrafish xenograft models demonstrated superior targeting and transfection efficiency under physiological conditions. These findings highlight the potential of dual-targeted LNPs as a promising strategy for improved gene delivery in HER2-positive breast cancer.

**Keywords:** Trastuzumab, Herceptin Folate, Targeting Lipid nanoparticles, DNA gene delivery

**PC-491**

**NIOSOMAL NANOCARRIERS OF MEBEVERINE HYDROCHLORIDE: EFFECT OF POLOXAMER AND SOLUPLUS ON STABILITY AND DRUG RELEASE**

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Mebeverine hydrochloride (MBHCl) is an antispasmodic that needs to be administered frequently due to its short half-life and low oral bioavailability. In order to improve drug entrapment, stability, and sustained release, niosomal formulations were created utilising Span 60, cholesterol, poloxamer 188, and Soluplus in different ratios. Span 60: Cholesterol ratios ranging from 1:0.5 to 1:1.5% were used to develop eight formulations. Poloxamer 188 was added as a stabiliser at 0.1–0.3 parts, and Soluplus was used as a surface coating at 0.05–0.2 parts. The thin film hydration technique and probe sonication were used to prepare the niosomes. Particle size, polydispersity index, zeta potential, entrapment efficiency (EE%), and in vitro drug release were all assessed for the formulations. Good colloidal stability was indicated by zeta potential values in the range of -25 to -40 mV and particle sizes ranging from 120 to 240 nm with PDI <0.25. Higher cholesterol ratios and the presence of Soluplus enhanced entrapment efficiency, reaching up to 78% EE. DSC thermograms showed decreased drug crystallinity, indicating effective encapsulation within the niosomal bilayers, whereas FTIR spectra verified the lack of chemical interaction between MB HCl and excipients. In contrast to the quick release from pure drug solution, in vitro release tests in phosphate buffer (pH 6.8) showed persistent release of MBHCl over a 12-hour period. The ideal combination of high entrapment, nanosize stability, and extended release was offered by the optimized formulation (Span 60: Cholesterol 1:1, Poloxamer 0.2, Soluplus 0.1). These results imply that niosomes made with a poloxamer/Soluplus modification and Span 60-cholesterol backbones constitute a viable nanocarrier technology to enhance the therapeutic efficacy of mebeverine HCl.

**Keywords:** Mebeverine hydrochloride, Niosomes, Poloxamer 188, Soluplus, Thin film hydration, entrapment efficiency.

**PC-492**

**INFLUENCE OF NATURAL POLYMERS ON ZOLMITRIPTAN ORAL FAST DISSOLVING FILM FORMULATIONS: A NEW APPROACH TO MIGRAINE TREATMENT**

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Migraine is a debilitating neurological disorder often accompanied by symptoms like nausea, vomiting, and difficulty swallowing, which limit the effectiveness of traditional oral medications. Fast dissolving oral films (FDFs) offer a convenient, water-free drug delivery method ideal for such patients. This study developed and evaluated zolmitriptan-loaded FDFs using natural polymers—Gum Karaya and Gum Olibanum—along with glycerin as a plasticizer, and citric acid and stevia as stabilizers. Films were prepared via solvent casting and assessed for thickness, weight uniformity, folding endurance, and drug content. In vitro drug release using a Franz diffusion cell (pH 6.8 buffer) revealed that the optimized formulation (Z7) achieved 98.99% drug release within 5 minutes. FTIR analysis confirmed no drug–excipient interaction, and DSC analysis demonstrated thermal stability of the components. The combined use of natural gums enhanced solubility, mechanical strength, and dissolution rate. Overall, zolmitriptan FDFs offer a promising, fast-acting alternative for effective migraine management.

**Keywords:** Zolmitriptan, Oral fast dissolving films, Solvent casting method, polymers and plasticizers

**PC-493**

**DEVELOPMENT AND CHARACTERIZATION OF WOODFORDIA FRUTICOSA AND B-SITOSTEROL MEDIATED SILVER NANOPARTICLE GEL FOR SYNERGISTIC THERAPEUTIC EFFECT**

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Silver nanoparticles (AgNPs) are widely used in healthcare due to their strong antimicrobial and anti-inflammatory activities, making them promising candidates for wound healing applications. The present study focuses on the green synthesis of AgNPs using Woodfordia fruticosa gel




ISBN: 978-81-980623-8-3

and β-sitosterol, followed by the formulation of a nanoparticle-based gel for enhanced therapeutic efficacy. A 1 mM silver nitrate solution was prepared by dissolving 16.99 mg in 100 ml of distilled water and utilized along with β-sitosterol and Woodfordia fruticosa gel for nanoparticle synthesis. The obtained AgNPs were characterized by UV–visible spectrophotometry and scanning electron microscopy (SEM) to confirm formation and morphology. Further evaluation of zeta potential and electron microscopy was performed to assess stability and physicochemical properties. The AgNPs were incorporated into a gel formulation, which was subsequently evaluated for its potential wound-healing application. The synthesis process successfully produced stable AgNPs mediated by natural compounds. Characterization confirmed nanoparticle formation with favorable morphology and size. Zeta potential analysis indicated good stability, while SEM validated the structural features of the nanoparticles. The formulated gel demonstrated desirable properties suitable for topical application.The study demonstrates the successful green synthesis and formulation of a silver nanoparticle gel using β-sitosterol and Woodfordia fruticosa. This biocompatible approach reduces toxicity concerns while enhancing wound-healing potential through synergistic antimicrobial and anti-inflammatory effects, highlighting its promise in biomedical applications.

**Keywords:** Silver nanoparticles β-sitosterol,Woodfordia fruticosa,Zeta potential analysis.

**PC-494**

**FORMULATION AND EVALUATION OF MEDICATED BIODEGRADABLE SURGICAL SUTURES BY USING NATURAL FIBERS**

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The optimized F3 formulation was developed using a combination of three polymers i.e Hydroxy propyl Methylcellulose (HPMC), Chitin and Alginate - incorporated with natural cotton fibre (cellulose) as the base material. This formulation exhibited excellent physicochemical and mechanical properties, including controlled thickness, high tensile strength, minimal swelling and ensuring structural integrity. Drug content analysis confirmed high encapsulation efficiency (98.9%), while in vitro release studies demonstrated sustained drug release of Azithromycin and Mefenamic Acid, enhancing therapeutic potential. Sterility testing validated its microbial safety, and Scanning Electron Microscopy (SEM) analysis revealed a well-defined surface morphology, essential for biomedical applications. These findings suggest that the F3 formulation is a promising candidate for advanced wound healing and surgical applications.

**Keywords:** Biomedical Applications, Surface Morphology, Scanning Electron Microscopy (SEM), Tensile Strength, Encapsulation Efficiency.

**PC-495**

**PACKAGING STRATEGIES FOR STABILITY ENHANCEMENT OF SENSITIVE ANTIBIOTIC FORMULATIONS: A COMPREHENSIVE REVIEW**

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The stability and efficacy of sensitive antibiotics are significantly influenced by packaging systems and environmental factors. With increasing concerns about antimicrobial resistance, optimizing existing antibiotic formulations through advanced packaging strategies has become crucial for maintaining therapeutic effectiveness and extending shelf life. This review examines current approaches to packaging and stability optimization for sensitive antibiotic formulations, focusing on environmental barrier technologies, advanced packaging materials, and stability; indicating analytical methods that preserve antibiotic potency throughout the product lifecycle. A comprehensive analysis of pharmaceutical packaging technologies, stability testing protocols, and regulatory guidelines was conducted, examining both traditional and innovative approaches to antibiotic preservation. Major environmental degradation pathways including hydrolysis, oxidation, photodegradation, and microbial contamination were evaluated in the context of packaging solutions.

**Keywords:** Antibiotic stability; sensitive antibiotics; packaging optimization; packaging strategies; active packaging; shelf-life extension.

**PC-496**

**DEVELOPMENT AND IN VITRO CHARACTERIZATION OF FLOATING TABLETS CONTAINING OLMESARTAN MEDOXOMIL**

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In this current research, aimed to make floating Olmesartan medoxomil tablets that remain long in the stomach and gradually release drug within the time. This aids in the constant level of drug in the body. The release of the drug was controllable by using various polymers such as Hydroxy Propyl Methyl Cellulose (HPMC), Carbopol, and Hydroxy Propyl Cellulose (HPC). Olmesartan medoxomil is a drug used to treat elevated blood pressure. It falls in a category of medication known as angiotensin II receptor blockers. It is a prodrug hence it is broken down to its active form (Olmesartan) inside the stomach. It is further not metabolized and does not combine with liver enzymes (CYP450). Because of this, making it into a floating tablet is useful. These tablets have an ability to limit the side effects and enhance the efficacy of the drug by facilitating the slow release. The hardness of the prepared tablets was measured, friability (breakability), the content of the drug was determined, its floating, release of a drug, its swelling ability, and stability were also tested.

**Keywords:** Olmesartan medoxomil, High Blood Pressure, Floating tablet, Gastroretentive Drug Delivery

**PC-497**

**FORMULATION DEVELOPMENT AND INVITRO ASSESSMENT OF SPARFLOXACIN TABLETS**

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Sparfloxacin represents the fourth step in the development of the quinoline antibacterial agents. The antibacterial spectrum of sparfloxacin is wider than those of the third step quinolones having limited activity against staphylococci, pneumococci, and mycoplasma. Sparfloxacin is 10-20 times more potent than ciprofloxacin, ofloxacin and lomefloxacin against commonpathogens. It is a synthetic broad spectrum antimicrobial agent for oral administration. It is very sparin glysoluble in waterlike other flouroquinolone agents.The very poor aqueous solubility and wettability of the sparfloxacin give rise to difficulties in pharmaceutical formulations of oral dosage forms and may lead to poor bioavailability. To overcome these drawbacks, increasing the aqueous solubility is an important goal and hence in the present investigation, sparfloxacin was formulated as solid dispersion systems and physical mixtures with the aim to improve its pharmaceutical properties like aqueous solubility, dissolution rate and oral bioavailability.

**Keywords:** Sparfloxacin, Solubility enhancement, Dissolution rate, Oral bioavailability

**PC-498**

**INDUSTRIAL SCALE-UP AND OPTIMIZATION OF NANOEMULSION GEL FOR TOPICAL DELIVERY**

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The present study was designed to develop, optimize, and industrially scale-up a nanoemulsion-based gel for topical delivery. A Quality by Design (QbD) approach was adopted to identify critical material attributes (CMA) and critical process parameters (CPP) that influence product performance, including droplet size, zeta potential, viscosity, and stability. Using an I-Optimal mixture design, the nanoemulsion system was optimized for clarity, stability, and particle size, and subsequently incorporated into a Carbopol 940 gel matrix to enhance viscosity, bioadhesion, and skin compatibility. The optimized formulation




ISBN: 978-81-980623-8-3

exhibited improved drug release, ex vivo permeation, and in vivo safety compared with conventional topical preparations. To demonstrate industrial feasibility, the batch was successfully scaled up ten-fold (800 g), with critical CPPs such as aqueous phase addition rate and homogenization speed carefully controlled. Scale-up batches retained consistent critical quality attributes relative to laboratory batches, with droplet size (~217 nm), zeta potential (~26 mV), viscosity, and bioadhesive strength meeting specifications. Stability studies conducted under ICH guidelines confirmed the robustness of the formulation, with no evidence of phase separation, degradation, or structural changes during storage.This work demonstrates successful translation of nanoemulsion gel development from laboratory to production scale, validating its potential as a reliable, safe, and scalable platform for topical delivery applications.

**Keywords:** Nanoemulsion Gel, Scale-Up, QbD, Critical Quality Attributes, Technology Transfer, Topical Delivery.

**PC-499**

**NANOCRYSTAL FORMULATION OF CARBAMAZEPINE USING HIGH-SPEED HOMOGENISATION FOR IMPROVED SOLUBILITY**

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In this study, an high speed homogenisation followed by lyophilisation was developed to produce nanocrystals of carbamazepine (CBZ), a poorly water soluble drug, for solubility rate enhancement of CBZ include compaction with HPMC-K100, Poloxamer-188, Ethyl cellulose formation of nanosuspension followed by lyophilisation with highly hydrophilic carrier such as mannitol to prevent particle agglomeration in powdered state. Nanocrystals were characterized in terms of drug content, particle size & zeta potential and saturated solubility were investigated and compared to the pure drug CBZ to verify the theoretical hypothesis on the benefits of increased surface area. Crystalline state were evaluated by scanning electron microscope (SEM) and x-ray powder diffraction (XPRD) analysis. Through this study, nanocrystals formulation can improve the bioavailability of the carbamazepine by improving its solubility when compare to pure drug. Hence it was concluded that nanocrystallisation was a good approach to enhance the solubility property of carbamazepine by High speed homogenization method. The method being simple and easily scaled up, this approach should have a general applicability to many poorly water-soluble drug entities.

**Keywords:** Poorly water-soluble drug carbamazepine, high speed homogenisation, nanosuspension, lyophilisation, nanocrystal.

**PC-500**

**FORMULATION DEVELOPMENT AND EVALUATION OF INTRANASAL NANOEMULSION OF AGMATINE FOR THE TREATMENT OF EPILEPSY**

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Epilepsy is a chronic neurological disorder characterized by recurrent, unprovoked seizures that result from abnormal and excessive neuronal discharges in the brain. Despite the availability of several antiepileptic drugs, many patients continue to experience uncontrolled seizures due to poor bioavailability, drug resistance, and systemic side effects. Therefore, the development of alternative drug delivery systems is essential to improve therapeutic outcomes. The aim of this study was to develop agmatine sulphate nanoemulsion for intranasal administration in the treatment of epilepsy. The nanoemulsion was prepared using an aqueous titration method and probe sonication, with olive oil as the oil phase, span 80 and tween 80 as the surfactants. The formulation was optimized based on a pseudoternary phase diagram, and D-optimal design was employed to optimize the independent variables (oil, Smix, and water) and the dependent variables (drug content and viscosity). The optimization data were analysed using Design-Expert software 13. The prepared agmatine sulphate nanoemulsion was characterized for various parameters including stability, particle morphology, particle size, polydispersity index (PDI), zeta potential, centrifugation, heating cooling cycle, drug content, pH, viscosity, in vitro drug diffusion, ex vivo permeation, and ex vivo biocompatibility studies using excised goat nasal mucosa. The results showed that the agmatine sulphate nanoemulsion had a particle size of 265.4 nm, indicating its suitability for nasal drug delivery. The low PDI value of 0.240 indicated a narrow size distribution, and the pH of 6.4 was suitable for nasal administration. The nanoemulsion exhibited high permeation, without any morphological toxicity observed on the excised goat nasal mucosa. In conclusion, the prepared agmatine sulphate nanoemulsion was found to be suitable for intranasal administration, offering the potential to enhance drug absorption and bioavailability. This formulation may have promising implications for the treatment of epilepsy and other related neurological conditions.

**Keywords:** Agmatine, Nanoemulsion, Pseudoternary phase diagram, Epilepsy, Intranasal administration

**PC-501**

**DESIGN AND EVALUATION OF CONTROLLED RELEASE FLOATING MICROBALLOONS OF STAVUDINE**

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The Aim of this study was to formulate and evaluate stavudine floating microballoons for Controlled drug release. Initially drug loaded low density granular pellets were prepared with HPMCE 5 and by using isopropyl alcohol as a granulating fluid. Further the low density granular Pellets were subjected to microencapsulation by emulsion evaporation technique using ethyl cellulose and Eudragit S100 as coating polymers and 1%PEG as aqueous phase. The prepared microballoons were characterized for their particle size analysis, angle of repose and for compressibility index. The in vitro release studies were performed in 0.1NHCl as acidic medium. The prepared microballoons were free flowing and spherical in shape. From all the formulations F5E and F5F can be considered as a promising controlled release floating microbaloons of stavudine providing first order release over a period of 12 hours, with minimum floating Lag time of 1 minute. It was found that the drug: polymer, the stirring speed, the concentration of surfactant were the most significant variables which influenced the size of the stavudine microbaloons under the applied experimental condition.

**Keywords:** Stavudine, HPMC E 5 Controlled Release, Eudragit S 100.

**PC-502**

**FORMULATION AND EVALUATION OF NANOEMULGEL USING COW URINE DISTILLATE FOR PSORIASIS**

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Psoriasis is a chronic inflammatory skin disease characterized by oxidative stress, immune dysregulation, and hyperproliferation of keratinocytes. This study aimed to develop a novel nanoemulgel formulation incorporating cow urine distillate (CUD) for the topical treatment of psoriasis, leveraging its antioxidant and anti-inflammatory properties, as well as its immunomodulatory and wound-healing capabilities. However, CUD presents certain limitations such as susceptibility to oxidation, unpleasant odour and taste, and challenges in patient compliance. To address these issues, developing a novel, stable, and patient-friendly formulation is essential. A nanoemulgel system was designed by combining nanoemulsion technology with a gel matrix to enhance skin permeation, drug retention, and sustained release. Castor oil served as the oil phase due to its compatibility with CUD, while Span 80 acted as a surfactant, Carbopol 940 as a gelling agent, and triethanolamine adjusted the pH. Preliminary studies included characterization of CUD, solubility analysis, and FTIR spectroscopy to ensure compatibility with excipients. Using Design-Expert software and a Central Composite Design, 15 batches were formulated to optimize variables, including surfactant concentration, gelling agent, and sonication time. Optimized batch F14 exhibited




ISBN: 978-81-980623-8-3

favourable properties, with a pH of 5. 90 ± 0. 03, spreadability 47. 94 ± 0. 06 g- cm/s, viscosity 8823. 33 ± 25. 17 cP, and sustained drug release (80. 80.21 ± 0. 26% in 8 hours). Nanoemulgel droplet size was 487. 9 nm with a PDI of 0. 155 and zeta potential- 21. 5 mV, indicating stability. Drug content was 82. 92 ± 0. 77%. No irritation was observed in skin irritation tests on Swiss albino mice. Histopathological analysis revealed that nanoemulgel-treated groups showed greater recovery of psoriatic symptoms compared to CUD alone. Overall, the CUD-based nanoemulgel demonstrated superior therapeutic efficacy, safety, and potential for effective topical management of psoriasis.

**Keywords:** Cow urine distillate (CUD), Nanoemulgel, Psoriasis, Sustained drug release.

**PC-503**

## HYDROPHILIC POLYMER BASED SOLID DISPERSION: IMPROVES SOLUBILITY, DISSOLUTION AND PERMEABILITY OF RESVERATROL USING FUSION METHOD

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Resveratrol (trans-3,5,4'-trihydroxystilbene) is a naturally occurring polyphenolic compound with antioxidant, anti-inflammatory, cardioprotective, anticancer, and neuroprotective activities. However, its clinical utility is limited by poor aqueous solubility, rapid metabolism, and low oral bioavailability, classifying it as a BCS Class II drug. This study formulated solid dispersions (SDs) of resveratrol using hydrophilic polymer Poloxamer 188 via fusion method to enhance solubility, dissolution rate, and permeability. Five formulations (SD1-SD5) were developed using 100 mg resveratrol with increasing Poloxamer 188 concentrations, achieving drug-to-polymer ratios of 1:1 to 1:5. The fusion technique involved melting the polymer and incorporating drug under controlled temperature and stirring, followed by solidification and size reduction. Physicochemical characterization using FTIR, DSC, PXRD, and SEM confirmed resveratrol amorphization and uniform dispersion within the polymer matrix. Results demonstrated that Poloxamer 188-based solid dispersions effectively enhanced resveratrol's solubility, dissolution, and permeability. The optimized SD3 formulation presents a promising strategy for developing improved oral dosage forms of poorly water-soluble compounds, improving therapeutic efficacy and patient compliance. This solvent-free fusion method significantly contributes to overcoming formulation challenges associated with hydrophobic drug molecules like resveratrol.

**Keywords:** resveratrol, solubility, fusion method.

**PC-504**

## FORMULATION AND EVALUATION OF FILM-FORMING SOLUTION OF FERULIC ACID FOR THE TREATMENT OF ATOPIC DERMATITIS

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In the present research, a film-forming solution (FFS) of Ferulic Acid (FA) was developed for the treatment of Atopic Dermatitis (AD). The objective of the study was to evaluate the potential of FFS in enhancing drug penetration, providing sustained release, and improving patient compliance in comparison to conventional topical therapies. The formulation process involved the selection and characterization of suitable film-forming polymers along with preformulation studies of FA, including organoleptic evaluation, solubility, UV, and FTIR analysis, followed by the preparation and evaluation of FA-loaded FFS. A total of thirteen formulations were prepared, among which optimized Batch 1, exhibited the highest spreadability (65 g·cm/sec), the shortest drying time (2.3 minutes), and a skin-compatible pH of 5.65±1.25. The viscosity of Batch 1 was recorded as 296±1.4 cps at 10 rpm, indicating good uniformity and film-forming ability. In vitro drug diffusion studies using Franz diffusion cells demonstrated maximum cumulative drug release of 72±0.26% at 5 hours (Batch 1), while the lowest release was observed with Batch 4 (65±0.76%). Ex vivo permeation studies on excised skin further confirmed the permeation ability of FA, 40.1±0.18% release at 5 hours. FTIR analysis confirmed the absence of drug–polymer interaction, and the transparent films obtained upon application indicated excellent cosmetic acceptability. The results demonstrated that polymer type and excipient composition significantly influenced physicochemical properties and drug release behaviour. Thus, FA-based FFS can be considered a safe, effective, and patient-friendly topical drug delivery approach for the management of atopic dermatitis.

**Keywords:** Ferulic Acid, Film-forming solution, Atopic dermatitis, Topical delivery

**PC-505**

## DEVELOPMENT AND EVALUATION OF NIZATIDINE FLOATING NANOSPHERES WITH GASTRORETENTIVE PROPERTIES FOR PEPTIC ULCER TREATMENT

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The use of nanospheres in therapeutic formulations to improve bioavailability, extend drug release, and lessen side effects has attracted considerable interest. The aim of this study was to create and enhance nizatidine gastroretentive floating nanospheres for prolong action. Using PVA as stabilizer, gastroretentive floating ethylcellulose nanospheres filled with nizatidine were created via solvent evaporation. DSC and FTIR were used to characterise the resulting nanosphere. Additionally, the drug release, entrapment efficiency, particle size, and floating behaviour were evaluated. Using ethylcellulose and sonication duration as independent factors, a 32-factorial design was used to optimise the manufactured nanosphere. The creation of spherical nanospheres with a somewhat porous surface was verified by the morphological analysis of the optimised formulations. DSC was used to characterise the nanospheres, and the results showed that nizatidine was present in the nanospheres in an amorphous form. FTIR did not show any chemical interaction between the medication and the polymer. The ideal mixture, with a particle size of 145±10.53 nm, a polydispersity index of 0.265, and a nanosphere Zeta Potential of -11 mV, was discovered. In ethylcellulose, the entrapment efficiency was determined to be 91.72%. The drug release from the nanospheres was observed to be 79.15±1.65% in gastrointestinal simulated fluid after 12 hours of modulation. The resulting nanospheres exhibit a prolonged release of the medicine and stay buoyant in the gastric fluid for a longer period of time inside the stomach.

**Keywords:** Gastroretentive floating nanospheres, Nizatidine, Anti-Ulcer activity, DSC, FTIR.

**PC-506**

## UNVEILING YOGURT BASED HYDROGELS THAT MIMICS HUMAN TISSUE AND BOOST HEALING

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Hydrogels are three-dimensional, hydrophilic polymeric networks capable of absorbing large amounts of water, making them suitable candidates for wound healing applications. Yogurt-based hydrogels represent an innovative and bio-inspired approach due to the natural composition of yogurt, which is enriched with lactic acid bacteria, proteins, and bioactive metabolites. These components impart antimicrobial, antioxidant, and anti-inflammatory activities that accelerate wound closure, reduce infection risk, and support overall skin repair. When incorporated into hydrogel matrices, yogurt-derived biomolecules mimic the extracellular matrix (ECM) by creating a moist and porous environment that promotes keratinocyte and fibroblast proliferation, angiogenesis, and collagen deposition—key processes in tissue regeneration. The biodegradable and flexible structure of these hydrogels further enhances cellular adhesion and proliferation while maintaining oxygen diffusion at the wound site. In addition, their potential to deliver probiotics and bioactive molecules in a controlled manner provides synergistic therapeutic benefits, making them multifunctional wound dressings. Physicochemical evaluations, including swelling index, rheological behavior, and porosity studies, confirm their structural stability and biocompatibility. Compared with synthetic dressings, yogurt-based hydrogels are cost-effective, sustainable, and eco-friendly alternatives with added biological activity.




ISBN: 978-81-980623-8-3

Recent findings highlight their dual function as both a structural scaffold and a bioactive therapeutic system capable of improving healing outcomes. Overall, yogurt-based hydrogels hold significant promise as next-generation biomaterials that combine natural bioactivity with tissue-mimicking properties. By pairing probiotic delivery with ECM-like support, they offer a novel and multifunctional strategy for wound healing and human tissue regeneration.

**Keywords:** Yogurt-based hydrogels, wound healing, tissue regeneration, biocompatible biomaterials, probiotic delivery, extracellular matrix mimicry.

**PC-507**

**FORMULATION AND EVALUATION OF NANO-EMULGEL FOR THE TREATMENT OF HYPERHIDROSIS**

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Hyperhidrosis, a condition marked by excessive sweating, adversely affects daily life and requires more effective topical therapies with improved patient adherence. Aluminium chloride, a well-known astringent and antiperspirant, is widely prescribed as a first-line treatment. However, conventional formulations such as solutions and creams are often associated with poor dermal penetration, high irritation potential, and reduced patient acceptance. To overcome these limitations, the present study aimed to formulate and evaluate a nano-emulgel for enhanced topical delivery of aluminium chloride. Nanoemulsions were prepared using liquid paraffin as the oil phase, stabilized by Span 20 and Tween 80 as surfactant and co-surfactant, through high-speed stirring followed by probe sonication. The optimized nanoemulsion was subsequently incorporated into a Carbopol 940 gel base to yield a nano-emulgel with improved viscosity and spreadability. The developed formulations were evaluated for physical appearance, homogeneity, grittiness, viscosity, pH, and spreadability. Among the various batches, formulation F3 exhibited the most desirable properties, including smooth texture, excellent homogeneity, optimal skin-friendly pH (6.7), and suitable viscosity (1025.67 cps). Differential Scanning Calorimetry confirmed the crystalline nature of aluminium chloride, while in vitro studies demonstrated improved drug release and enhanced permeation through skin layers. The results indicated that the aluminium chloride-loaded nano-emulgel effectively combined the penetration-enhancing properties of nanoemulsions with the rheological advantages and patient-friendly features of gels. The optimized formulation showed controlled drug release, prolonged skin retention, and minimized irritation, suggesting its potential as a safe and effective option for hyperhidrosis management.

**Keywords:** Nanoemulgel, Aluminium chloride, Hyperhidrosis, Probe sonication, Topical drug delivery, Controlled release

**PC-508**

**HUMAN BRAIN- ON -A-CHIP FOR MODELING NEUROLOGICAL DISORDERS AND EVALUATING BLOOD- BRAIN BARRIER-PENETRATING THERAPIES**

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As preclinical experiment finds face obstacle to patient for successful treatment of brain diseases. So, revelant models to elucidate mechanism of brain pathogenesis, cell-cell intractions, predict drug responses which are urgent need in patients. And to know BBB functions. We examined a Brain- Chip of human cortical parenchyma and BBB in one model. We utilized human Astrocyte , pericyte , human induced pluripotent stem cell (hipsc)-derived cortical neurons , hipsc derived microglia. As a result , dust model recapitulate invivo-relevant responses highlighting the Brainchips sensitivity to capture cell- specific contribuction in human diseases pathology further tested BBB crossing of human transferrin receptor antibodies. We conclude that Brain Chips is time efficient model to support therapeutic development and provide mechanistic insights into brain diseases

**Keywords:** microfluidics brain-chip; physiologically relevant responses; cell- specific contributions; screening of BBB -crossing therapeutic

**PC-509**

**A NEEDLE-FREE FUTURE: IMPLANTABLE DEVICE INNOVATION IN HYPOGLYCEMIA TREATMENT**

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Effective management of diabetes mellitus depends on insulin delivery systems capable of maintaining near-normal blood glucose while minimizing acute complications such as hypoglycemia and diabetic ketoacidosis, along with long-term vascular damage. Conventional strategies, including multiple daily injections and continuous subcutaneous insulin infusion (CSII), though widely used, often fail to achieve optimal glycosylated hemoglobin (HbA1c) levels. Moreover, CSII, despite its aim to simulate physiological insulin release, is associated with limitations such as device malfunction, metabolic variability, and risk of hypoglycemia. Other delivery tools, including pens, jet injectors, and access ports, mainly improve patient convenience without offering substantial therapeutic advancement. Artificial pancreas systems show promise but remain restricted to controlled research environments and are not yet practical for routine use. Emerging implantable insulin delivery devices and closed-loop systems integrating intraperitoneal glucose sensing and insulin infusion have attracted growing attention. Intraperitoneal delivery ensures faster glucose detection and insulin absorption compared to subcutaneous methods, thereby providing superior postprandial regulation and more stable glycemic control. Prototype devices, comprising fully implantable glucose sensors, insulin reservoirs, and adaptive control algorithms, have demonstrated encouraging outcomes in preclinical and early clinical studies, including enhanced sensing accuracy, reduced response delays, better postprandial control, and improved patient quality of life. However, several challenges must be addressed before clinical adoption. These include ensuring long-term stability of glucose sensors, material biocompatibility, prevention of catheter obstruction, infection control, and durability of insulin formulations. Despite these hurdles, the integration of advanced biosensors, programmable pumps, and intelligent feedback mechanisms offers the potential to achieve a truly implantable artificial pancreas. With sustained research, optimization, and long-term trials, such innovations may redefine diabetes care by enabling safer, needle-free, and physiologically adaptive insulin therapy.

**Keywords:** Artificial pancreas, implantable insulin pumps, intraperitoneal sensing, closed-loop delivery, glycemic regulation.

**PC-510**

**FORMULATION AND EVALUATION OF FAST DISSOLVING ORAL THIN FILMS OF NARATRIPTAN AND PIROXICAM FOR THE MANAGEMENT OF MIGRAINE**

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Migraine is a common and debilitating neurobiological condition characterized by recurring headaches frequently accompanied by gastrointestinal, autonomic, and neurological symptoms. This study aims to develop fast-dissolving oral thin films (FDOTFs) that enable the drug to directly enter systemic circulation, thereby bypassing first-pass metabolism, for the management of migraine. FDOTFs are prepared using the solvent casting method. The oral film formulation was optimized using a 22 factorial design. The objective behind the study was to examine and evaluate the FDOTFs. The evaluation process involved characterizing the formulation, which included thickness, weight variation, moisture content, content uniformity, surface pH, and a disintegration test. A total of nine batches were prepared (F1 to F9), and the film thickness ranged from 0.07mm to 0.21mm. in terms of weight, F3 is the lightest (40.66), while F9 is the heaviest (68.66). All formulations have surface pH values close to neutral (between 6.67 and 6.93). The oral thin film showed a disintegration time in the range of 22±1.63 to 30±1.63 minutes. The moisture content ranged from 4.95% to 13.40%. The study successfully developed and optimized fast-dissolving oral thin films for migraine management, demonstrating uniform thickness,




ISBN: 978-81-980623-8-3

neutral surface pH, and acceptable moisture content. These findings suggest that FDOTFs can provide a promising alternative for quick drug delivery and improved patient compliance.

**Keywords:** Migraine, fast dissolving oral thin film, Acute migraine therapy, Solvent casting method

**PC-511**

**FORMULATION DEVELOPMENT AND EVALUATION OF SELF-EMULSIFYING GASTRORETENTIVE DRUG DELIVERY SYSTEM FOR EFFECTIVE MANAGEMENT OF H. PYLORI INFECTION**

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Clarithromycin is a key antibiotic used in the treatment of Helicobacter pylori infection, but its poor solubility, instability in gastric conditions, and limited bioavailability restrict its therapeutic effectiveness. Formulating a gastroretentive self-emulsifying drug delivery system (SEDDS) offers a strategy to overcome these limitations by enhancing solubility, prolonging gastric residence, and improving drug release. The study aimed to formulate, develop, and evaluate a gastroretentive SEDDS of clarithromycin to improve its solubility, stability, gastric retention, and therapeutic efficacy in the management of H. pylori infection. The SEDDS mixture was prepared by adding appropriate quantities of oil, surfactant, and co-surfactant with the drug, the mixture was homogenized for uniform mixing. The optimized SEDDS exhibited a droplet size of 59.33 nm, zeta potential of –27.3 mV, and spherical droplet morphology confirmed by TEM. In-vitro drug release reached 96.45 ± 0.24% in 145 minutes. The solidified gastroretentive tablets (Batch F7) showed good flow properties, high mucoadhesive strength (25.5 g), prolonged gastric residence time (7.5 h), and sustained drug release (89.6% over 12 h). The formulated gastroretentive SEDDS tablets of clarithromycin successfully enhanced solubility, stability, gastric retention, and sustained release, thereby improving bioavailability and therapeutic potential against H. pylori infection.

**Keywords:** Clarithromycin, Gastroretentive drug delivery, Self-emulsifying drug delivery system (SEDDS), Helicobacter pylori, Mucoadhesion

**PC-512**

**CUBOSOMAL ANTIHYPERLIPIDEMIC FORMULATION FOR CO-DELIVERY OF ROSUVASTATIN AND FENOFIBRATE: IN-VITRO AND IN-VIVO CHARACTERIZATION**

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Hyperlipidemia is characterized by elevated lipid levels, which are a significant risk factor for cardiovascular disease. The present study aimed to develop and evaluate a cubosomal nanodrug delivery system for the co-administration of Rosuvastatin and Fenofibrate for the treatment of hyperlipidemia. These drugs face limitations of poor solubility, rapid metabolism, and low bioavailability, which the cubosomal system seeks to overcome. Cubosomes were formulated using glyceryl monooleate as the lipid matrix and Poloxamer 407 as the stabilizer through a top-down homogenization technique. Formulations were optimized by Design Expert software, targeting particle size and entrapment efficiency. The characterized cubosomes exhibited a particle size of 119.4 nm with a positive zeta potential of +43.6 mV, indicating good stability, and demonstrated sustained drug release in vitro. Entrapment efficiencies were 93% for Rosuvastatin and 95% for Fenofibrate. In vivo pharmacodynamic studies in hyperlipidemic rats revealed a significant reduction of total cholesterol, triglycerides, LDL, and VLDL levels with a concomitant increase in HDL, outperforming conventional drug formulations. Specifically, treated rats showed near normalization of lipid profiles: total cholesterol reduced to 78.33 mg/dL, triglycerides to 91.33 mg/dL, LDL to 27.40 mg/dL, VLDL to 18.27 mg/dL, and HDL increased to 31.7 mg/dL. Histopathological examination confirmed safety and improved liver architecture. This study highlights the potential of cubosomal delivery systems to enhance the bioavailability and therapeutic efficacy of antihyperlipidemic drugs, offering a promising platform for improved management of hyperlipidemia.

**Keywords:** Cubosomes, Rosuvastatin, Fenofibrate, Antihyperlipidemic, Nanodrug Delivery.

**PC-513**

**DEVELOPMENT OF RESVERATROL LIPOSOMES: A NANOCARRIER APPROACH FOR SENOSTATIC ACTIVITY**

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Aging is a multifactorial biological process associated with the progressive decline of physiological systems and an increased risk of chronic diseases such as cancer, cardiovascular disorders, diabetes, and neurodegenerative conditions. A major contributor is cellular senescence, a stress-induced state of permanent growth arrest that promotes tissue dysfunction through the senescence-associated secretory phenotype (SASP). Resveratrol, a natural polyphenol found in grapes, berries, and red wine, exhibits strong antioxidant, anti-inflammatory, cardioprotective, and neuroprotective properties. However, its therapeutic potential is limited due to poor solubility, low bioavailability, rapid metabolism, and instability. This study aims to develop and characterize resveratrol-loaded liposomes as biocompatible nanocarriers to enhance solubility, stability, and delivery efficiency, and to evaluate their potential as senostatic nanotherapeutics. Resveratrol was determined to be ethanol soluble with a melting point of 253°C, and drug-excipient compatibility was established using FTIR analysis. Optimization using a Box-Behnken Design resulted in an optimized liposomal formulation (F6) of particle size 0.522 µm. Zeta potential was also increased from 30.9 mV (uncoated) to -64.3 mV (coated), reflecting higher stability. Entrapment efficiency was also enhanced by the coating. In vitro release studies showed sustained release of Resveratrol from liposomes, with the chitosan-coated formulation showing slow and controlled release for 6 hours. The DPPH assay proved significant dose-dependent antioxidant activity of Resveratrol. In conclusion, the use of liposomal encapsulation with chitosan coating is a valid method to increase the oral delivery, stability, and therapeutic efficiency of Resveratrol, a potential anti-aging treatment.

**Keywords:** Resveratrol, aging, senostatic activity, oral delivery, liposomes, chitosan coating.

**PC-514**

**FORMULATION AND EVALUATION OF MUCOADHESIVE NANOPARTICLES OF VENLAFAXINE AND ARIPIPRAZOLE FOR TREATMENT RESISTANT DEPRESSION**

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Treatment-resistant depression presents a significant clinical challenge due to the limited efficacy of conventional oral antidepressants, often hindered by poor brain bioavailability and systemic side effects. This study explores the development of mucoadhesive nanoparticles as a novel intranasal delivery system aimed at enhancing therapeutic outcomes in TRD. The objective behind the research was to formulate and evaluate a nasal, mucoadhesive nanoparticle-based drug delivery system aimed at enhancing brain-targeted delivery of antidepressant agents for treatment-resistant depression (TRD). The mucoadhesive nanoparticles were prepared by ionic gelation method using chitosan as mucoadhesive polymer and sodium tripolyphosphate (STPP) as cross-linking agent and evaluated for relevant parameters like mucoadhesion, entrapment efficiency, release kinetics. Particle size of prepared nanoparticles were found to be 189±1.08nm which is suitable for nasal administration. Entrapment efficiency of VNLF was found to be 58±0.83% to 76±1.24% and ARP was 70±0.89% to 85±1.0%. The DSC analysis of VNLF-ARP nanoparticles showed disappearance of sharp endothermic peak of crystalline drugs and were replaced by broad transition between 178 to 202°C with reduced enthalpy values, it represents both the drugs were transformed into an amorphous state.




ISBN: 978-81-980623-8-3

In vitro release of VNLF-ARP nanoparticles showed VNLF exhibited faster drug release as compared to ARP. The ex-vivo drug release found that drugs release from both drugs increases with time interval. These findings suggested that chitosan-based mucoadhesive nanoparticles offer a promising intranasal delivery approach for enhancing brain-targeted drug delivery in treatment-resistant depression, potentially improving therapeutic efficacy while minimizing systemic side effects.

**Keywords:** Treatment Resistant Depression, nanoparticles, ionic gelation method, chitosan, sodium tripolyphosphate, Venlafaxine, Aripiprazole, blood brain barrier, mucoadhesion

**PC-515**

## FORMULATION AND EVALUATION OF TRANSDERMAL PATCH OF SILDENAFIL CITRATE

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The objective of this study was to formulate and evaluate a transdermal patch of sildenafil citrate to enhance its bioavailability, reduce first-pass metabolism, and provide sustained release. Sildenafil citrate, a phosphodiesterase type 5 inhibitor, is commonly used in the treatment of erectile dysfunction but faces limitations related to its oral bioavailability and short half-life. Transdermal drug delivery offers an alternative route of administration that can bypass the gastrointestinal tract and liver metabolism, thereby improving therapeutic outcomes. The sildenafil citrate patches were prepared using different polymers hydroxypropyl methylcellulose, and plasticizers polyethylene glycol to optimize the release characteristics. The patches were evaluated for various physiochemical properties, including thickness, weight uniformity and drug content. In vitro drug release studies were conducted using a Franz diffusion cell to determine the release profile of sildenafil citrate. The result showed that the patches exhibited a controlled release over 24 hours, with a significant increase in drug permeation across the skin compared to conventional oral formulations. The stability studies indicated that the patches were stable under accelerated conditions, with no significant degradation of sildenafil citrate. The formulation demonstrated potential for effective transdermal delivery, providing a novel approach for sustained release sildenafil therapy, which could improve patient compliance and therapeutic efficacy.

**Keywords:** Sildenafil citrate, Hydroxypropyl, Phosphodiesterase

**PC-516**

## ENHANCEMENT OF SOLUBILITY OF BCS CLASS II DRUG BY USING SELF-NANO EMULSIFYING DRUG DELIVERY SYSTEMS

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The current research focuses on enhancing the solubility of Itraconazole (ITZ) by formulating a Nanoemulsion drug delivery system i.e. Self Nano Emulsifying Drug Delivery Systems(SNEDDS). Excipient selection for the SNEDDS formulation, including oils, surfactants, and co-surfactants, was based on drug solubility and emulsification efficiency. The Saturation Solubility of the Itraconazole was evaluated in various fixed oils such as Peppermint oil, Cinnamon oil etc using Shake Flask Method. Among the various oils tested, cinnamon oil has shown better solubility when compared to the other oils. Among the different surfactants and co-surfactants tested for solubility, highest solubility was reported in Tween 20 followed by Tween 60 (surfactants) tested and polyethylene glycol followed by propylene glycol (co-surfactants). To optimize the formulation, the study focused on variables such as particle size (nm), self-emulsification time (seconds), and percentage drug release. Ternary software was used to generate 3D response surface plots for analysis. The final L-SNEDDS formulations were assessed for particle size and zeta potential. The optimized L-SNEDDS formulation significantly improved Itraconazole (ITZ) solubility compared to the pure drug. The characterization of the L-SNEDDS revealed a particle size of 192.2 ± 2.41 nm, a self-emulsification time of 24 ± 2 seconds, and a cumulative drug release of 86.73 ± 1.57% in 60 minutes. Optimization of L-SNEDDS revealed enhanced solubility of Itraconazole by reducing the Particle size, demonstrating the potential of this formulation approach for improving drug solubility.

**Keywords:** Solubility, Itraconazole, SNEDDS, Co-surfactant.

**PC-517**

## IN SILICO, IN VITRO, AND IN VIVO ASSESSMENT OF TERPENE COMPOUND NANOEMULSION AS A NOVEL THERAPEUTIC AGENT AGAINST BREAST CANCER

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This study explores the antitumor properties of 2-carene, a terpene compound, and its nanoemulsion formulation against breast cancer models. We employed a multi-faceted approach, including in silico and molecular dynamic simulation studies, to assess the anticancer activity of 2-carene against breast cancer receptors. The nanoemulsion was prepared using a monoterpenoid compound isolated from Catharanthus roseus essential oil and characterized using various techniques, including scanning electron microscopy, Fourier transform infrared spectroscopy, and dynamic light scattering. Our results showed that the nanoemulsion exhibited significant cytotoxicity (54.31%) against MDA-MB-231 cancer cell lines and induced apoptosis in DMBA-induced breast cancer models. Furthermore, the nanoemulsion treatment improved antioxidant enzyme levels and reduced serum inflammatory markers. Histopathological evaluation revealed notable improvements in cancer-induced tissue damage. Overall, our findings demonstrate the promising anticancer potential of 2-carene and its nanoemulsion formulation, warranting further investigation into their therapeutic applications.

**Keywords:** 2-carene, nanoemulsion, MDA-MB-231 cell line, DMBA-induced model.

**PC-518**

## FORMULATION AND EVALUATION OF ACACIA NILOTICA FRUIT TABLETS FOR ITS ANTI-ARTHRITIC POTENTIAL: A SCIENTIFIC VALIDATION OF TRADITIONAL USE

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Rheumatoid arthritis (RA) is a chronic autoimmune disorder characterized by joint inflammation and disability. Although conventional therapies such as NSAIDs and DMARDs provide symptomatic relief, their long-term use is associated with adverse effects, highlighting the need for safer alternatives. The present study aimed to formulate and evaluate herbal tablets of Acacia nilotica fruits to scientifically validate their traditional use. The fruit powder was standardized as per WHO guidelines, and phytochemical screening confirmed the presence of flavonoids, tannins, and glycosides. In vivo evaluation using the Complete Freund's Adjuvant-induced arthritis model demonstrated a significant reduction in paw oedema and joint swelling, along with improvement in haematological parameters. Cytokine analysis further revealed decreased TNF-α and IL-6 and elevated IL-10 levels, confirming strong anti-inflammatory and immunomodulatory effects. Tablets prepared with suitable excipients complied with pharmacopeial quality standards and were found safe in acute toxicity studies. These findings establish Acacia nilotica fruits as a promising, safe, and economical alternative for the management of rheumatoid arthritis.

**Keywords:** Acacia nilotica, rheumatoid arthritis, herbal tablets, anti-inflammatory, cytokines.

**PC-519**

## FORMULATION AND EVALUATION OF DOMPERIDONE CHEWABLE TABLETS

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Chewable tablets have an advantage over conventional tablets as well as liquid dosage forms in geriatric and pediatric patients as well as pregnant




ISBN: 978-81-980623-8-3

women to prevent morning sickness. They enhance both the therapeutic efficacy and the bioavailability. Domperidone chewable tablets were formulated so that compliance in the drug in children is achieved by improving the solubility and dissolution. Domperidone chewable tablets were prepared by employing wet granulation. Examination of the tablets was undertaken about general appearance, size, shape, color, odor, taste, hardness, friability, weight variation, disintegration, and content uniformity. The key is dissolution testing to discover the percentage of drug released and in the developed formulation. Mechanism of action and some tablet- making defects, for example capping, lamination, picking, sticking, and mottling, are discussed under the root cause of the problems. Examples of some chipped or edged product forms are antacids, aspirin for kids, and chewable vitamins.

**Keywords:** Domperidone chewable tablets, pediatric patients, liquid dosage.

**PC-520**

**DEVELOPMENT AND CHARACTERIZATION OF ETORICOXIB-LOADED MICROSPHERE FOR CONTROLLED DRUG DELIVERY**

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Microspheres are versatile carriers in controlled drug delivery systems, capable of improving bioavailability, ensuring site-specific delivery, and reducing adverse effects. The incorporation of biodegradable polymers, such as sodium alginate and chitosan, enables safe and efficient sustained release formulations with improved patient compliance. Etoricoxib, a selective COX-2 inhibitor with poor aqueous solubility and gastrointestinal side effects when administered conventionally, was selected for formulation into microspheres to enhance its therapeutic efficacy and bioavailability. The present study aimed to formulate and evaluate Etoricoxib-loaded microspheres using the ionic gelation method. Sodium alginate and chitosan served as drug carriers, while calcium chloride acted as the cross-linking agent. The prepared microspheres were evaluated for particle size, entrapment efficiency, swelling index, in-vitro drug release, and stability. Preformulation studies confirmed the drug's compliance with Indian Pharmacopoeia standards. Among the formulated batches, the optimized formulation (F4) demonstrated favorable physicochemical properties, including uniform and spherical particle size distribution, high drug entrapment efficiency, and excellent swelling behavior. In-vitro release studies revealed sustained drug release, with formulation F4 achieving 97.20% cumulative release within 8 hours, aligning with the desired controlled release profile. Stability testing under accelerated conditions (40 °C) exhibited no significant drug degradation, indicating good formulation stability. In conclusion, Etoricoxib microspheres prepared by ionic gelation using sodium alginate and chitosan represent a promising controlled drug delivery system. This formulation offers sustained release with improved therapeutic efficacy, reduced dosing frequency, minimized side effects, and enhanced patient compliance.

**Keywords:** Microspheres, Etoricoxib, Sodium Alginate, Chitosan, Controlled Drug Delivery

**PC-521**

**FORMULATION, OPTIMIZATION AND EVALUATION OF RESVERATROL NOVAL NANOSPONGE**

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Nanosponges are drug delivery system containing of nano sized sponges build in with active drug constituents. Newly this technology has progressive management of many diseases which involve targeted delivery. The current study fascinated on the development of a novel strategy to enhance the bioavailability of resveratrol, due to its dissolution rate-limited absorption, though it is a class II drug, results in poor oral bioavailability. Nanosponges were statistically developed by full 33 factorial design using Design of Experiment 13.0 software considering concentration of polymer, stabilizer and stirring time as independent variables and particle size, % entrapment efficiency and percentage yield as experimental responses by utilizing the modified Emulsion solvent diffusion technique. Drug polymer compatibility study was performed by FTIR and DSC. Optimized formulation showed 92.34 Percentage yield, 92.5 % entrapment efficiency, 181.4 nm particle size and –33.7 mV of zeta potential and % Drug release. The data from in vitro release study showed burst release for initial 2 h followed by slow and sustained release up to 12 hours, which followed a diffusion-controlled release mechanism by the Higuchi model. Scanning electron microscopy study showed uniformly discrete spherical particles with porous surface without any agglomeration. Stability study demonstrated no significant changes in particle size, entrapment efficiency and in vitro release, which indicated that the nanosponge formulation was stable.

**Keywords:** Resveratrol Nanosponge, , Full 33 factorial design, invitro drug release, Higuchi model, targeted delivery.

**PC-522**

**STUDIES ON THE IMPACT OF VARIOUS STABILIZERS ON THE PHYSICOCHEMICAL PROPERTIES OF HYDROCHLOROTHIAZIDE NANOCRYSTALS**

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Hydrochlorothiazide (HCTZ), a commonly prescribed thiazide diuretic, exhibits poor water solubility and low intestinal permeability, limiting its oral bioavailability. This study aimed to enhance the physicochemical and biopharmaceutical properties of HCTZ by formulating nanocrystals using various stabilizers—HPMCAS, HPMC E5, HPMC K100M CR, Kollidon 30, Kollidon VA 64, and Poloxamer 108—via the antisolvent precipitation method. The resulting nanocrystals were characterized for particle size, zeta potential, drug content, solubility, crystallinity, and morphology using standard analytical techniques (FTIR, PXRD, DSC, SEM, and 13C SSNMR). In vitro dissolution and permeability studies, along with short term stability assessments, were conducted. HPMCAS-stabilized nanocrystals demonstrated the smallest particle size (212.1 nm) and the most negative zeta potential (−29.6 mV), indicating excellent stability. Kollidon VA 64 significantly enhanced saturation solubility (~20 fold), while Kollidon 30 showed superior dissolution in both acidic and phosphate media. Enhanced permeability was observed with HPMC E5 and Kollidon VA 64 in simulated gastric and intestinal fluids, respectively. Stability studies revealed that formulations with HPMCAS and Poloxamer 108 maintained their physicochemical properties under stress conditions. Overall, the study highlights the critical role of stabilizer selection in developing effective nanocrystal formulations to improve the solubility and bioavailability of poorly soluble drugs like HCTZ.

**Keywords:** Hydrochlorothiazide, Solubility, Dissolution, Permeability, Nanocrystals

**PC-523**

**DEVELOPMENT AND ASSESSMENT OF AN IN-SITU GEL BASED ON CARBOXYMETHYL TAMARIND GUM FOR OCULAR DRUG ADMINISTRATION**

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Ocular bioavailability remains a challenge in ophthalmic drug delivery. The use of an in-situ gel-forming system, which is administered as a drop into the eye and undergoes a sol-gel transition in the cul-de-sac, may be used to overcome the poor bioavailability and therapeutic response displayed by conventional ophthalmic solutions due to rapid precorneal elimination of the drug. In the present research work, efforts were made to prepare the sustained release in situ gel containing Moxifloxacin Hydrochloride using polymers such as gellan gum, CMTG, and sodium Alginate for the treatment of ocular infections. The prepared in situ gel formulations were evaluated for In vitro gelation time, clarity, pH




ISBN: 978-81-980623-8-3

measurement, gelling capacity, drug content estimation, rheological study, in vitro release study, antimicrobial study & mucoadhesion study. In the in vitro results it was observed that the percentage release of the drug from the developed formulations F5(99.5%), F6 (97.18%), F9 (95.57%), Formulation F5 showed more sustained release compared to other formulations and showed the desired zone of inhibition values against staphylococcus aureus. The optimized formulation of in situ gel was stable and provided sustained release of drug within a period of 24 h. It is thus concluded that developed formulation is a viable alternative to conventional eye drops by virtue of its ability to enhance bioavailability through its longer precorneal residence time and ability to sustain drug release.

**Keywords:** ocular drug delivery, In situ gel, CMTG, gellan gum

**PC-524**

**LIPOSOMAL LOADED TOPICAL FORMULATION FOR SKIN REJUVENATION THERAPY**

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Liposomes are one of the most commonly used nanocarrier, due to active transport of hydrophilic & lipophilic drugs effectively. This study explores the development and assessment of a liposome-loaded topical formulation designed for skin rejuvenation therapy. Liposomes containing glutathione, a potent antioxidant, were prepared using dried thin film hydration method, encapsulating it within a bilayer composed of soya lecithin and cholesterol. This liposome were integrated into carbopol based gel matrix to produce a liposome loaded topical formulation for external application on skin. Liposome were prepared in 6 batch using different concentration of soya lecithin and cholesterol while the amount of drug glutathione is same. The research evaluated the formulation's physical properties, pH, viscosity, spreadability, invitro permeation, and stability across varied conditions & also evaluate the particle size and zeta potential for liposomal conformation. The result showed that the liposomal gel exhibited smoothness, uniformity, and a pH level compatible with skin's natural balance, facilitating enhanced permeation of glutathione through the skin for all formulations. The formulation demonstrated robust stability, maintaining its chemical and physical characteristics under diverse storage conditions. But formulation 3 shows better stability and entrapments compare to others. These findings suggest that the developed liposome-loaded topical formulation shows potential for effective skin rejuvenation therapy, necessitating further investigation and clinical validation.

**Keywords:** Liposomes, Skin Rejuvenation, Glutathione, Topical Formulation, Stability Studies.

**PC-525**

**CONTINUOUS MANUFACTURING OF AN NSAID OLEOGEL VIA TWIN-SCREW PROCESSING: FORMULATION DEVELOPMENT AND PERFORMANCE EVALUATION**

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This study developed and optimized a topical diclofenac sodium oleogel using twin-screw processing (TSP), a continuous manufacturing technology that enables scalable and reproducible production. A Box–Behnken Design was employed to optimize key processing parameters and lecithin concentration. The oleogel was characterized for yield, texture, viscosity, spreadability, pH, drug content, and in vitro release, with structural analysis confirming amorphous drug dispersion and excipient compatibility. The optimized formulation (DOE-TSP-O) exhibited uniform physical properties, high drug loading, and sustained release without causing skin irritation. In vivo studies demonstrated significantly enhanced permeation, analgesic, and anti-inflammatory effects compared to conventional hydrogels, along with marked suppression of TNF-α, IL-6, and NFκB p65 expression. The formulation also maintained stability for over three months under long-term storage conditions. Overall, DOE-TSP-O represents a promising next-generation topical therapy for pain and inflammation, combining superior efficacy and stability with the manufacturing advantages of TSP.

**Keywords:** Continuous manufacturing, Twin screw processor, NSAIDs, Topical delivery

**PC-526**

**DEVELOPMENT AND CHARACTERIZATION OF POLYSACCHARIDE BASED NATURAL HYDROGEL FOR ENHANCED SKIN PROTECTION**

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A hydrogel is a three-dimensional network of hydrophilic (water-attracting) polymers that can absorb and retain large amounts of water while maintaining their structural integrity. This study presents the development of a novel skin protectant gel formulated with a hydrogel matrix reinforced by nanocellulose derived from banana peels through sulfuric acid treatment and by pectin derived from sweet lemon and guava via simple extraction method. The cellulose extracted from banana peels is transformed into nano-cellulose via controlled acid hydrolysis. Phytochemical screening of herbal extracts were carried out for tannins, saponins etc . Physico chemical characterizations like determination of pH , loss on drying etc are carried out . Research evaluated the formulations physical appearance, extrudability, homogeneity, PH, skin irritation, smoothness, spreadability, stability studies, stickiness, viscosity, washability. Results indicate that the formulation with smooth in texture, homogenous, identical PH of the skin, good washability, non -irritant, and the formulations show dose dependant antibacterial efficacy. Polysaccharide based natural hydrogels are emerging as effective materials for skin protection due to their bio compatibility, moisture retention properties and bioactivity. The findings offer that the polysaccharide based natural hydrogel containing banana peel extract, guava fruit extract, sweet lemon peel extract, turmeric, and aloe vera shows great potential for antiaging and skin rejuvenation, personalized skin protection and further clinical studies and research.

**Keywords:** polysaccharide, skin protection, hydrogel, antimicrobial activity

**PC-527**

**PREPARATION AND EVALUATION OF PHYTOSOMES FOR– A COMBINATIONAL APPROACH OF CURCUMIN AND GREEN TEA EXTRACT**

NAVYA AN

Phytosomes is a novel technique introduced by Indena that combines a standardized herbal extract and phospholipid in a preferably equal ratio to provide better absorption and enhancing bioavailability. The objective of the proposed study is to prepare, optimize, and characterize phytosomes of Curcumin and Green tea extract. The solvent evaporation method was used to prepare phytosomes. Design Expert software version 12 was used to evaluate the impact of soya lecithin concentration, Stirring time, and Stirring Speed on various dependent variables, such as particle size and entrapment efficiency. The evaluation parameters were % practical yield, FTIR, entrapment efficacy, DSC, particle size, Drug Content, SEM, and In-vitro release studies. The phytosomes were successfully designed and optimized for particle size, and entrapment efficiency of 296.01 nm, 90.76% of curcumin, and 87.0121% of green tea extract, respectively. Scanning electron microscopy demonstrated predominantly slightly spherical shapes. The yield varied from 77.21±0.12 to 94.61% and the drug content of 95.83 ± 0.17% for curcumin and 91.54 ± 0.45% for green tea extract. It was observed that the formulation showed an optimum release of 96.1% for curcumin and 94.2% for green tea extract over a period of 8hours. The study successfully developed and optimized phytosomes of curcumin and green tea extract with high entrapment efficacy, desired particle size, and improved in vitro release profiles. These results suggest that phytosomes formulation can significantly enhance the bioavailability and controlled release of herbal extracts.

**PC-528**

**Standardization, Evaluation And In-Silico Studies Of Three Bioactive Natural Colouring Agents**

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Colour is considered to be the primary feature perceived by the senses that represent a crucial role for centuries in the acceptability of foods to enhance their actual appearance and quality. Plant pigments, the




ISBN: 978-81-980623-8-3

impeccable natural source of colour, display enormous potential to substitute many of the synthetic colorants. Chlorophylls, carotenoids, anthocyanins, and betalains are the extensive classes of natural colours contributing wide-ranging colour shades to foods. There are good perspectives for the inclusion of plant pigments in the food industry. Natural dyes are less toxic, less polluting, non-carcinogenic and non-poisonous. The work focusses on, an ecofriendly and cost-effective extraction of three natural colorants obtained from Caesalpinia sappan, Clitoria ternatea and Selenicereus undatus which can be used as pharmaceutical excipients, food colorants, and cosmetics, etc. Apart from that the natural color itself has its own therapeutic activity therefore, the rational use of these colors along with the synthetic drugs will impart not only the coloring effect for the formulation but it can make an additive effect along with the therapeutic action of the drug. HPTLC evaluation of these colour extracts indicated the presence of the reference standard quercetin in Clitoria flower and Sappan wood extracts as 87.68 mcg/mg and 72.64 mcg/mg respectively. The amount of reference standard gallic acid in dragon fruit extract is found to be 38.46 mcg/mg. The colour extracts CSWC (C. sappan wood color extract), CTFC (C. ternatea flower colour extract) and SUFC (S. undatus fruit colour extract) showed an LC50 value of 7943.3, 6534.5 and 5623.4 mcg/ml respectively as compared with FCF color 15985,14720 (3981.07mcg/ml), Brilliant blue FCF (3771.7mcg/ml), Carmoisine (1989.57 mcg/ml) respectively in the brine shrimp lethality assay method (BSLA). The percentage yield obtained for CSWC, CTFC, and SUFC are 90.5, 94.25 and 95.35 respectively. In-silico molecular docking studies revealed that quercetin present in CSWC, CTFC and gallic acid present in SUFC showed significant binding affinity against COX-2, DPP-4 and SOD respectively.

**Keywords:** CSWC, CTFC, SUFC, HPTLC, In-silico docking COX-2, DPP-4, SOD, BSLA

**Pc-529**

**Development And Characterization Of Emulgels Containing Andrographolide For Improved Dermal Delivery Against Epidermoid Cancer**

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The present study aimed to develop and evaluate nano-sized andrographolide-loaded glycerogels for their potential application in skin cancer therapy with improved permeation. Nano-sizing of andrographolide was achieved through sonication followed by solvent evaporation, and the optimized formulation was subjected to comprehensive physicochemical evaluations, release kinetics, particle size analysis, ex-vivo permeation studies, biocompatibility tests, cytotoxicity assays against A431 cell lines, cell cycle analysis, skin irritability assessments, and in-vivo cellular uptake studies. The optimized nano-emulgel exhibited in-vitro drug release of 92.5 ± 0.5% following Higuchi kinetics, while ex-vivo permeation studies demonstrated approximately 90% drug release within 24 hours, with 10% retention in the epidermal layer, confirming superior skin permeation and retention properties. Overall, the enhanced permeability and retention along with histopathological studies observed with nano-glycerogel formulations of andrographolide suggest a promising novel phytotherapeutic approach for the treatment of skin cancer.

**PC-530**

**FORMULATION AND EVALUATION OF ROSUVASTATIN PEGYLATED SOLID LIPID NANOPARTICLES USING BOX BHENKEN DESIGN - A PRELIMINARY IN-VITRO STUDY**

ROOPASHREE B

Hypercholesterolemia is a major cause of cardiovascular diseases, demanding effective therapeutic interventions. Rosuvastatin, a potent HMG-CoA reductase inhibitor, is widely prescribed but suffers from poor aqueous solubility and low oral bioavailability. Nanocarrier-based systems such as solid lipid nanoparticles (SLNs) can overcome these limitations by enhancing solubility, stability, and controlled release. Further, PEGylation prolongs systemic circulation and minimizes immune clearance, improving therapeutic efficiency. This study aimed to develop and optimize rosuvastatin-loaded PEGylated SLNs (PEG-SLNs) using a Box–Behnken design (BBD). SLNs were prepared by solvent evaporation and modified with PEG-2000. The influence of lipid, surfactant, and Phospholipid concentrations on particle size and entrapment efficiency was systematically analyzed. Optimized PEG-SLNs showed an average size of ~301 nm with entrapment efficiency above 95%. SEM confirmed spherical morphology with smooth surfaces, while ATR-FTIR and DSC analyses verified drug–excipient compatibility. In-vitro diffusion studies demonstrated sustained release, with PEG-SLNs achieving 96.54% cumulative release over 8 hours versus 87.24% for plain SLNs. Drug release followed Zero-order and Higuchi models, indicating a non-Fickian diffusion mechanism. PEGylation improved encapsulation, release control, and circulation stability, making PEG-SLNs superior to conventional SLNs. Rosuvastatin-loaded PEG-SLNs were successfully formulated and optimized using BBD, yielding stable nanoparticles with high entrapment efficiency and sustained release. PEGylation enhanced drug delivery properties and prolonged circulation, offering a promising strategy to improve rosuvastatin bioavailability and therapeutic performance in hypercholesterolemia management.

**Keywords:** Solid lipid nanoparticles, PEGylation, Hypercholesterolemia, Rosuvastatin, Sustained release, Box–Behnken design.

**PC-531**

**DESIGN, DEVELOPMENT AND EVALUATION OF COMBINATORIAL DRUG (DICLOFENAC SODIUM AND CURCUMIN) LOADED COLLOIDOSOME**

HEMANTH V

Colloidosomes are hollow microcapsules formed by the self-assembly of colloidal particles at liquid interfaces, offering exceptional mechanical stability, tunable shell permeability, and multi-drug loading capacity. This study aimed to design alginate–$CaCO_3$ colloidosomes capable of co-delivering diclofenac sodium and curcumin, targeting sustained anti-inflammatory therapy through a single delivery system. Colloidosomes were fabricated via a water-in-oil emulsification technique using virgin coconut oil as the continuous phase, sodium alginate as the polymeric shell, and $CaCO_3$ microparticles as stabilizers. Diclofenac sodium and curcumin were incorporated in a methanolic solution before gradual addition of the aqueous alginate phase. The prepared systems were characterized for morphology, particle size, encapsulation efficiency, drug content, thermal compatibility (DSC), and in-vitro release kinetics. The formulation yielded spherical colloidosomes with narrow particle size distribution and high encapsulation efficiencies for both drugs. DSC thermograms confirmed molecular dispersion of the drugs without any incompatibility. In-vitro release profiles revealed a controlled and sustained release over 8 h, with cumulative releases of ~96% for diclofenac sodium and ~94% for curcumin, fitting predominantly zero-order kinetics—indicating constant drug release independent of concentration. The dual-drug-loaded alginate–$CaCO_3$ colloidosomes successfully integrated hydrophilic and hydrophobic agents into a stable, controlled-release platform. These findings establish the potential of such colloidosomes as an efficient and versatile delivery vehicle for combination therapy in inflammatory disorders, warranting further in-vivo investigation.

**Keywords:** colloidosomes, alginate–$CaCO_3$, diclofenac sodium, curcumin, dual drug delivery, sustained release

**PC-532**

**DEVELOPMENT AND COMPARATIVE EVALUATION OF ASPIRIN LOADED PHARMACOSOMES BY SOLVENT EVAPORATION AND ETHER INJECTION METHODS**

PUNITHA G

Pharmacosomes represent an innovative drug delivery system in which drug molecules are chemically linked to phospholipids. This approach enhances drug solubility, bioavailability, and stability, while minimizing drug leakage. Aspirin, a widely used non-steroidal anti-inflammatory drug (NSAID), faces challenges due to its poor water solubility and gastrointestinal side effects. Delivering aspirin via pharmacosomes may improve its therapeutic efficacy and reduce adverse effects. Aspirin-loaded pharmacosomes were prepared using two distinct techniques: solvent evaporation (SE) and ether injection (EI). Both methods were optimized employing a Central Composite Design (CCD) framework, focusing on lecithin concentration (ranging from 50 to 500 mg) and




ISBN: 978-81-980623-8-3

temperature (30 to 60 °C) as the independent variables. The key response variables evaluated were particle size (PS, nm) and encapsulation efficiency (EE, %). Characterization of the optimized formulations was performed using Differential Scanning Calorimetry (DSC), Fourier-Transform Infrared Spectroscopy (FTIR), Scanning Electron Microscopy (SEM), and in vitro drug release studies. Both preparation methods yielded nanosized pharmacosomes with particle sizes ranging from 109 to 147 nm and high encapsulation efficiencies between 88% and 98.6%. Lecithin concentration exerted a significant influence on particle size ($p < 0.05$), while temperature notably affected outcomes primarily in the SE method. The optimized formulation produced by solvent evaporation exhibited a particle size close to 128 nm, an encapsulation efficiency of 98.6%, and sustained drug release extending up to 12 hours, with a slightly higher cumulative release compared to the ether injection method. Structural and thermal analyses confirmed the formation of stable aspirin–phospholipid complexes without any evidence of drug degradation. Comparative evaluation demonstrated that the solvent evaporation technique produces smaller, more stable pharmacosomes with superior encapsulation efficiency and prolonged drug release relative to the ether injection method. Consequently, solvent evaporation appears to be a more promising approach for preparing aspirin pharmacosomes, potentially enhancing oral drug delivery and patient adherence.

**Keywords:** Pharmacosomes, aspirin, solvent evaporation, ether injection, encapsulation efficiency, drug delivery optimization.

**PC-533**

## EVALUATION OF SEMISOLID DOSAGE FORMS USING IVRT AND IVPT STUDY: A NOVEL APPROACH FOR OPTIMIZING TOPICAL FORMULATIONS

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The development of semisolid dosage forms, such as creams, gels, and ointments, has become increasingly popular due to their ease of application, improved patient compliance, and targeted therapeutic effects. However, the evaluation of these formulations poses significant challenges due to their complex composition and variable release characteristics. Recent trends in pharmaceutical research have focused on the development of in vitro testing methods, including In Vitro Release Testing (IVRT) and In Vitro Permeation Testing (IVPT), to assess the performance of semisolid dosage forms.IVRT is a widely accepted method for evaluating the release of active pharmaceutical ingredients (APIs) from semisolid dosage forms, while IVPT is used to assess the permeation of APIs through biological membranes, such as skin.A recent study demonstrated the application of IVRT and IVPT to evaluate the release and permeation characteristics of a topical formulations.The study highlights the importance of using IVRT and IVPT in combination to provide a comprehensive understanding of the release and permeation characteristics of semisolid dosage forms. This approach enables the development of optimized formulations with improved therapeutic efficacy and reduced variability. Furthermore, the use of IVRT and IVPT can help to reduce the need for in vivo studies, accelerate the development process, and decrease the costs associated with the development of semisolid dosage forms.

**Keywords:** semisolid dosage forms, in vitro release testing, in vitro permeation testing, IVRT, IVPT, topical formulations, cream, gel, ointment, release characteristics, permeation characteristics.

**PC-534**

## ENHANCED ANTIBACTERIAL ACTIVITY OF MEROPENEM METALLIC NANOPARTICLES AGAINST MDR MICROORGANISMS

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Antimicrobial resistance poses a serious threat to global health, urging innovative drug delivery approaches. This study focuses on the synthesis of metallic nanoparticles of Meropenem (Mero-M NPs) using probe sonication with silver (Ag), copper (Cu), and zinc (Zn) as metal ions. Characterization via UV-Vis spectroscopy confirmed the formation of Mero-M NPs by a shift in the absorption peak compared to Meropenem. FTIR spectroscopy revealed changes in the functional groups of the nanoparticles, further supporting their formation. XRD analysis indicated the crystalline nature of both Meropenem and the synthesized nanoparticles. FESEM images confirmed the presence of nanoparticles with varying shapes depending on the metal ion used. EDX analysis confirmed the elemental composition of the nanoparticles. Silver nanoparticles showed a size of 121 nm with moderate stability, while copper and zinc nanoparticles demonstrated improved zeta potential -25.8mV. Antibacterial studies against E. coli, K. pneumoniae, A. baumannii and S. aureus revealed that Mero-Ag NPs exhibited superior antibacterial activity compared to standard Meropenem and other formulations. Stability assessments (color, FTIR, particle size, and zeta potential) under various conditions confirmed nanoparticle integrity. Acute toxicity studies supported the safety of Mero-Ag NPs. These findings suggest that metallic nanoparticles, particularly those incorporating silver, can significantly enhance Meropenem's therapeutic efficacy against resistant pathogens.

**Keywords:** Antimicrobial resistance, Meropenem, metallic nanoparticles, antibacterial, silver, probe sonication.

**PC-535**

## FORMULATION AND DEVELOPMENT OF ORAL DOSAGE FORM OF PANCHGAVYA GHRITA FOR TREATMENT AND MANAGEMENT OF DIABETES MELLITUS

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Panchgavya Ghrita (PGG), a classical Ayurvedic formulation composed of five cow-derived products, holds significant therapeutic value in chronic metabolic conditions, including diabetes mellitus. Despite its traditional efficacy, the lipidic and semi-solid nature of PGG poses challenges in terms of patient compliance, dose uniformity, and stability. This research aims to overcome these limitations by formulating PGG into a conventional oral tablet dosage form, ensuring better delivery, patient acceptability, and controlled dosing. The formulation process involved adsorbing the Ghrita onto optimized concentrations of Fujicalin® and Neusilin® to convert it into a free-flowing powder. Excipients including microcrystalline cellulose (MCC), hydroxypropyl methylcellulose (HPMC), and crospovidone were incorporated to improve compressibility, disintegration, and hardness. UV spectrophotometry was used to evaluate in vitro drug release, with the λ max established at 239 nm. This study successfully transformed a traditional lipid-based Ayurvedic formulation into a scientifically validated tablet dosage form. The developed PGG tablets may serve as a promising alternative in managing diabetes mellitus with improved patient compliance and reproducibility in clinical use.

**Keywords:** Panchgavya Ghrita (PGG), Diabetes Mellitus, Conventional Tablet, Fujicalin, Neusilin.

**PC-536**

## FORMULATION AND EVALUATION OF TRANSDERMAL PATCHES OF CORDIA DICHOTOMA: A MOLECULAR DOCKING APPROACH FOR ANTI-ARTHRITIC ACTIVITY

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This research explores the development and assessment of Cordia dichotoma transdermal patches for anti-arthritic potential through both experimental formulation and molecular docking validation. Ethanolic extracts of the plant were prepared and analyzed, revealing key phytochemicals including flavonoids (quercetin, rutin), phenolic compounds (gallic acid, ferulic acid), and alkaloids (cordifolamine derivatives). These extracts were incorporated into polymeric patches prepared via solvent casting, which exhibited desirable physicochemical attributes such as consistent thickness, folding endurance, appropriate moisture content, and sustained drug release. To further substantiate their therapeutic action, molecular docking was performed against rheumatoid arthritis targets—cyclooxygenase-2 (COX-2) and tumor necrosis factor-alpha (TNF-α). Docking studies indicated strong interactions, with quercetin showing binding scores of −9.1 kcal/mol




ISBN: 978-81-980623-8-3

(COX-2) and −8.7 kcal/mol (TNF-α), rutin −8.6 and −8.2 kcal/mol, gallic acid −7.9 and −7.4 kcal/mol, and ferulic acid −7.2 and −6.8 kcal/mol, respectively. These outcomes suggest that Cordia dichotoma phytoconstituents possess significant potential to modulate inflammatory pathways in arthritis. Overall, the work highlights that combining transdermal drug delivery with computational docking strengthens the case for Cordia dichotoma-based patches as a novel anti-arthritic therapy.

**Keywords:** Anti-Arthritic activity, Cordia Dichotoma, Phytoconstituents and Molecular Docking.

**PC-537**

## FORMULATION AND EVALUATION OF NANOGEL OF ACOROUS CALAMUS

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Acorus calamus, commonly known as "sweet flag," contains aromatic oil with various medicinal properties such as antispasmodic, carminative, anthelmintic, and expectorant activities. The roots of A. calamus have shown strong analgesic effects, supporting its traditional use in pain treatment. This study aims to explore the anti-inflammatory activity of A. calamus and utilize nanogel as a drug delivery system to enhance the absorption of active compounds like monoterpenes, providing targeted and effective anti-inflammatory treatment. Investigating A. calamus' chemical composition and traditional uses contributes to natural product-based drug development. The biocompatible nature of A. calamus' nanogel ensures it does not cause skin irritation. Moreover, in vivo studies have shown that the anti-inflammatory activity of the A. calamus' nanogel is significantly higher compared to a standard diclofenac 1.0% gel with an equivalent concentration. This enhanced efficacy can be attributed to the ultra-small size of the nanoparticles present in the nanogel formulation. Based on the in vivo data, it can be concluded that the developed A. calamus' nanogel holds great potential for transdermal drug delivery. Its ability to deliver drugs through the skin could lead to improved therapeutic outcomes, as it offers a highly effective and targeted approach for the treatment of inflammatory conditions. The findings suggest that the A. calamus' nanogel could be a promising alternative to conventional topical formulations, providing a more efficient and potent means of drug administration.

**Keywords:** Acorus calamus, Nanogel, Anti-inflammatory activity and Analgesic effects.

**PC-538**

## FORMULATION AND EVALUATION OF HERBAL LIPSTICK OF BETA VULGARIS (BEETROOT) CONTAINING ANTIMICROBIAL AGENT

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The growing demand for natural and safe cosmetic products has led to increased interest in herbal formulations. Among them, herbal lipsticks are emerging as a healthier alternative to conventional ones, which often use synthetic dyes and chemicals that may cause allergies or skin irritation. This study aimed to create and test an herbal lipstick using beetroot (Beta vulgaris) extract as a natural colorant, while also adding an antimicrobial component for extra therapeutic benefits. Beetroot, rich in betalains, provides a bright red shade along with antioxidant properties. To further protect against infections, ingredients like curcumin or fluconazole were included to help fight common bacterial and fungal issues affecting the lips. The lipstick was made with natural waxes (beeswax, carnauba wax, cocoa butter) and fixed oils (castor oil, and coconut oil) as natural base, chosen for their ability to give good texture, smooth application, and moisturization. The formulation was checked for different quality factors, including melting point, pH, hardness, spreadability, solubility, drug content, release behavior, skin absorption, and stability. Its antimicrobial potential was also tested, particularly against Candida albicans. The results showed that the beetroot-based lipstick had appealing appearance, good stability under storage, and promising antimicrobial activity. Overall, the study suggests that herbal lipsticks are made with natural colors, and antimicrobial agents can be safe, effective, and multifunctional cosmetic options with fewer side effects.

**Keywords:** Lipstick, Beetroot extract, antimicrobial agent, Candida albicans, Natural colorant.

**PC-539**

## FORMULATION AND EVALUATION OF AMIKACIN LOADED PLGA NANOPARTICLES BASED TRANSDERMAL PATCH FOR THE TREATMENT OF WOUND HEALING

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Now a day many drugs are administered orally, but they are observed not more effective as desired so to upgrade such character TDDS was created. A transdermal dermal patch is characterized as a medicated adhesive patch which is set over the skin to deliver a particular dose of medication by the skin with a foreordained rate of release to reach into the circulation system. The purpose of the research work was to formulation and evaluation of nanoparticle loaded transdermal drug delivery system of Amikacin using polymers such as poly lactic coglycolic acid, hydroxy propyl methyl cellulose by the solvent evaporation method. The Fourier transform study revealed no physical or chemical reaction in between Amikacin, PLGA and HPMC. The differential scanning calorimetry study also confirms the sharp exothermic peak at melting point of drugs and polymers. the physical appearance also studied like physical evaluation, colour, odour, taste, solubility. The prepared nanoparticles were evaluated for Drug content, entrapment efficiency, PDI, particle size, zeta potential. On the basis of these parameter of nanoparticles the optimized batch were used to formulation of nanoparticle loaded transdermal patch. The prepared formulation was evaluated for different physiochemical characteristics such as, weight uniformity, thickness, folding endurance, flatness, surface pH determination, skin irritation, drug content, in-vitro drug release study. The result of in vitro drug release study F3 shows maximum release of 84.5% in 24 hrs. Whereas F2 shows the minimum release of 70.5% in 24 hrs. Based on that the physiochemical values and drug release and obtained the formulation F3 was considered as an optimized formulation, which shows the higher percentage of drug release of 84.5% in 24 hrs. The developed nanoparticle loaded transdermal patches increase the therapeutic efficacy and bioavailability of Amikacin.

**Keywords:** Skin, Wound, Amikacin, PLGA, HPMC And Transdermal Patch.

**PC-540**

## FORMULATION AND INVITRO EVALUATION OF CYTARABINE LOADED PLGA NANOPARTICLES WITH BIOENHANCER

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In order to lower total dosage needed for leukaemia therapy by loading in polymeric nanocarrier, this research study was conducted with goal of creating nanoparticles carrying Cytarabine HCl that have high stability and controlled release of Cytarabine HCl. To reduce the total dosage needed for chemotherapy in order to lessen the negative responses. Sustained delivery of the loaded medications to the appropriate location is possible with polymeric nanoparticles. Cytarabine HCl (CYTNP)-containing PLGA nanoparticles were formulated for continuous release during intravenous injection, which enhance patient compliance and lessen side effects. Using FT-IR, it was discovered that PLGA, had good compatibility with cytarabine and no mutual interaction. PLGA polymer and quercitin as bioenhancer were used in modified nanoprecipitation method to formulate CYTNP. Sustained delivery of the loaded medications to appropriate location is possible with polymeric nanoparticles. It is comfortable to utilize PLGA, a biodegradable polymer, to formulate nanoparticles. The particle size of prepared nanoparticles increased as percentage of polymer increased. Quercitn, a bioenhancer, is utilized to enhance activity, and entrapment efficiency and drug content were both found to rise. PLGA nanoparticles' surface morphology was analysed using transmission electron microscopy (TEM). According to the nanoformulation, the particles are round, smooth, and distinct.

**Keywords:** Nanoparticles, Cytarabine, Cancer, Nanoformulations and Blood Brain Barrier (BBB).

**PC-541**




ISBN: 978-81-980623-8-3

**A NOVEL BUCCAL MUCOADHESIVE DRUG DELIVERY SYSTEM OF GLIPIZIDE: FORMULATION AND EVALUATION**

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The present investigation aimed to design and evaluate mucoadhesive buccal tablets of Glipizide employing Carbopol 974P (CP) in combination with cashew nut tree gum and Aegle marmelos gum as bioadhesive polymers, along with ethyl cellulose (EC, 50 mg) as an impermeable backing layer. A total of nine formulations were developed using the direct compression method and systematically characterized for swelling behavior, surface pH, bioadhesive strength, in-vitro drug release, and diffusion profiles. All formulations complied with pharmacopoeial standards for hardness, friability, weight variation, and drug content. The swelling index was found to increase proportionally with polymer concentration, while surface pH values remained near neutrality, indicating compatibility with buccal tissues. The release and diffusion of Glipizide were strongly influenced by the ratio of natural polymers, where higher proportions of Aegle marmelos gum led to reduced drug release but enhanced mucoadhesive strength and swelling capacity. Drug–polymer interactions were further confirmed by FTIR and DSC analyses, ensuring formulation stability. The study demonstrates that combining synthetic and natural gums offers a promising approach to achieving controlled release and prolonged buccal residence time for Glipizide.

**Keywords:** Cashew nut tree gum, Swelling index, Aegle marmelos gum

**PC-542**

**DESIGN AND EVALUATION OF A DUAL-RELEASE CAPSULE SYSTEM FOR METOPROLOL: COMBINING IMMEDIATE AND FLOATING EXTENDED RELEASE TABLETS**

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Metoprolol, a selective β-blocker, is widely prescribed for the management of hypertension, angina, and heart failure. Conventional single-unit, floating, and sustained-release formulations often fail to maintain optimum plasma concentrations, thereby limiting therapeutic efficacy and bioavailability. The present research focuses on the development of a single-dose capsule dosage form incorporating both an Immediate Release (IR) and a Floating Extended Release (ER) tablet of Metoprolol to achieve biphasic drug release. Three formulation batches were prepared using different combinations of IR and ER tablets and were evaluated through pre- and post-formulation parameters, all of which complied with pharmacopeial limits. In vitro release studies were performed to compare drug release profiles of individual tablets with the dual-tablet capsule system. The optimized capsule demonstrated an initial rapid release from the IR tablet, achieving therapeutic plasma concentration promptly, followed by sustained drug release from the floating ER tablet, maintaining prolonged plasma levels. This novel dual-tablet capsule system showed superior release characteristics compared to conventional approaches, offering a promising strategy for enhancing bioavailability, patient compliance, and therapeutic efficacy of Metoprolol in cardiovascular therapy.

**Keywords:** β-blocker, Dual tablet capsule system, Bioavailability enhancement, Bioavailability enhancement.

**PC-543**

**STABILITY ENHANCEMENT OF MOXIFLOXACIN ORAL SUSPENSION THROUGH NATURAL AND SEMI-SYNTHETIC POLYMER-BASED FORMULATION APPROACHES**

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Moxifloxacin is a potent fluoroquinolone antibiotic used in the treatment of a wide spectrum of bacterial infections. The present investigation was aimed at developing and evaluating stable moxifloxacin oral suspensions using natural (Karaya gum, Isabgol husk) and semi-synthetic (sodium carboxymethyl cellulose, Na-CMC) polymers as suspending agents. Each polymer was incorporated at concentrations of 0.5%, 1.0%, and 1.5% w/v, and the formulations were assessed for viscosity, flow behavior, sedimentation volume, particle size, redispersibility, and drug content uniformity. Batch optimization was carried out using design of experiment (DoE) software. The optimized formulation was subjected to stability studies as per ICH guidelines. Trial batches played a crucial role in formulating the suspension.The results revealed marked differences in performance among the polymers. Sodium cmc suspensions showed optimal rheological properties, Isabgol suspensions demonstrated excessive swelling, irregular particle sizes , and unstable flow, with viscosities of 200 cps, 310 cps, and 450 cps and high sedimentation volume ratios Comparative analysis indicated that Na-CMC at 1.5% provided the best balance of viscosity, flow, and stability, ensuring pourability and uniform dosing. The study concludes that while natural polymers contribute to suspension stability, Na-CMC offers superior performance for enhancing the physical stability of moxifloxacin oral suspension. Stability studies were conducted for up to 30 days under both room temperature and refrigerated conditions, following ICH guidelines. The optimized batch demonstrated stability and successfully passed the stability tests. A stable oral suspension dosage form of the moxifloxacin was successfully developed, meeting pharmacopoeial standards and offering a patient-friendly alternative for those with difficulty swallowing solid dosage forms.

**Keywords:** Moxifloxacin Hydrochloride, Oral suspension formulation, Sodium carboxy methyl cellulose, Karaya gum, Isabgol, Suspending agents, Viscosity, Stability studies, pH, Sedimentation volume, Flow rate, Redispersibility, Dissolution rate, Particle size

**PC-544**

**FORMULATION AND EVALUATION OF ZALTOPROFEN LOADED NANODISPERSIONS AND FAST DISINTEGRATING ORODISPERSIBLE FILMS: AN APPROACH TO ENHANCE EFFICACY**

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Drug delivery innovations are critical to overcoming challenges associated with poorly water-soluble drugs. Zaltoprofen (ZLT), a COX-2 selective inhibitor and BCS class II compound, has poor aqueous solubility and low oral bioavailability as a result of considerable first-pass hepatic metabolism. This study explored two delivery strategies, such as nanodispersions (NDs) for intravenous administration and fast disintegrating orodispersible film (FDOFs) for oral delivery, to enhance ZLT solubility, bioavailability, and therapeutic efficacy. In our previous work, Zaltoprofen loaded nanodispersions (ZLTNDs) were formulated, characterized, and evaluated in vitro (published). Based on the above findings, this study was carried out to investigate their hemocompatibility, cellular uptake, and in vivo anti-arthritic properties. Optimized ZLTNDs exhibited excellent hemocompatibility with negligible haemolysis, efficient macrophage internalization, and significant anti-arthritic effects, achieving a 22.64% reduction in paw swelling and restoration of hematological parameters in CFA-induced rheumatoid arthritis rats. In parallel, Zaltoprofen loaded FDOFs (ZFDOFs) were prepared by the solvent casting method by using pullulan, sodium starch glycolate, and PEG-400. Our optimized films exhibited fast disintegration (14-22 s), high percentage drug release (65-92% in 2 min), and were stable up to 90 days. FTIR, DSC, and XRD confirmed the absence of drug–excipient interactions. Pharmacokinetics evaluation also showed an increase in absorption and an optimization of bioavailability over unmodified ZLT. The solubility, efficacy of the therapy, and patient compliance were significantly enhanced in both delivery systems. The results make nanodispersions and FDOFs a promising and complementary platform to deliver ZLT with potential clinical benefits over conventional formulations.

**Keywords:** Zaltoprofen, nanodispersion, fast disintegrating orodispersible film, bioavailability, rheumatoid arthritis.

**PC-545**

**ENHANCEMENT OF BIOAVAILABILITY OF PITAVASTATIN LOADED SOLID LIPID NANOPARTICLES**

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ISBN: 978-81-980623-8-3

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Pitavastatin (PS) is a lipid-lowering drug widely used to treat hypercholesterolemia. Its clinical effectiveness is hindered by poor aqueous solubility and extensive hepatic first-pass metabolism, resulting in low oral bioavailability. To address this limitation, solid lipid nanoparticles (SLNs) and coated SLNs were developed and evaluated as potential drug delivery systems to enhance PS bioavailability. Seven SLN formulations were prepared using three different lipids, either alone or in combination, along with two stabilizers. To further improve drug release and stability, two polymers; chitosan (CS) and alginate (AL) were used as coating materials at two different concentrations. The formulations were assessed for particle size, zeta potential, in vitro drug release, rheological behavior, and in vivo bioavailability. The results showed that both uncoated and coated SLNs displayed shear-thinning behavior. Specifically, the viscosity of F5-CS (1% chitosan-coated) decreased from 432 to 173 cp as the shear rate increased from 20 to 40 rpm, indicating favorable flow characteristics. The F5 formulation (uncoated) exhibited a particle size of 262.4 ± 2.98 nm and demonstrated a higher drug release compared to other formulations. Coating F5 with 1% chitosan enhanced its particle size to 513.8 ± 69.72 nm. In vivo pharmacokinetic studies revealed a significant increase in PS plasma concentration and overall bioavailability for SLNs. The area under the curve ($AUC_{0\rightarrow24}$) for the PS, F5, and F5-CS (1%) was 298, 1794.61, and 3518.26 ng·h/mL, respectively. These findings confirm that SLNs, particularly chitosan-coated ones, are promising systems for enhancing the oral delivery of poorly soluble drugs like pitavastatin.

**Keywords:** Oral Bioavailability, Pitavastatin, Solid Lipid Nanoparticles, Hypercholesterolemia.

**PC-546**

## OPTIMIZATION OF SELF-EMULSIFIED NANOEMULSION (SNEDDS) OF AZELNIDIPINE BY D-OPTIMAL DESIGN APPROACH TO ENHANCE THE SOLUBILITY

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The objective of the study was to enhance the solubility of poorly soluble BCS class II drug azelnidipine (AZE) by formulating self-emulsified nanoemulsion (SNEDDS) using D-optimal design approach. The components oleic acid (oil), S mix (tween 20 (surfactant), transcutol P (cosurfactant) 3:1) and their concentration range were finalised by saturation solubility study and pseudo-ternary phase diagram. The D optimal design approach was employed to optimized formulation variables. In evaluation it was found that SNEDDS (15 % oleic acid, 70% Smix and 15 % water), formulated by low-energy method exhibited maximum entrapment efficiency (99.12 % ± 0.5 %), drug content (99.35 ± 0.10 %), percentage transmittance (98.85 ± 0.25), minimum self-emulsification time (22.00 ± 1 s), droplet size (350.8 ± 5 nm) and polydispersity index (0.30 ± 0.05) and acceptable zeta potential -26.5 mv. Solid SNEDDS was characterised by FTIR analysis showed significant interactions with the emulsifying agents and the solvent matrix, confirming effective incorporation into the nanoemulsion formulation. Broad and significant shift in the endothermic peak in DSC thermogram, different and diffused diffractogram of XRD compared to pure drug indicates the amorphization. In FE-SEM characterization exhibits the nanosized particles in between 200-300 nm which proves successful nanonization, absence of crystalline edges confirms the amorphization. The four times improvement in dissolution potential in pH 6.8 buffer solution at 60 minutes was confirmed by an in vitro dissolution study. Thus, it can be concluded that this study successfully formulates self-emulsified nanoemulsion (SNEDDS) of azelnidipine by D-optimal design approach to enhance the solubility.

**Keywords:** Azelnidipine, SNEDDS, D-optimal design approach.

**PC-547**

## PANCHAGAVYA MEDIATED CHITOSAN CONJUGATED NANOCOMPOSITES: ECO-SYNTHESIS, CHARACTERIZATION AND ITS THERAPEUTIC ASSESSMENT FOR AGRICULTURAL SUSTAINABILITY

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The current study employs Panchagavya (PG) conjuncted ZnO and chitosan (CS) nanocomposites to create a sustainable and biodegradable plant growth enhancer. The crop-improvement qualities of PG and the nanoscale features of ZnO encourage plant growth while using less chemicals. Unique particle architectures were revealed through the synthesis and characterization of PG-ZnONP nanoparticles (NPs) and CS/PG-ZnONC nanocomposites (NCs) using UV-Vis, XRD, SEM, and HRTEM. SEM results revealed hexagonal wurtzite structure for PG-ZnONPs, while CS/PG-ZnONCs exhibited oval rod-like structures. TEM confirmed nanosized particles for PG-ZnONPs and CS/PG-ZnONCs. Dynamic light scattering (DLS) analysis demonstrated that PG-ZnONPs had an average size of 234.4 nm, with a zeta potential of -22.4 mV, whereas CS/PG-ZnONCs had an average size of 496.5 nm with a zeta potential of 1.11 mV. Seed germination and pot studies on mung bean plants determined that 125 mg/L for PG-ZnONPs and 62 mg/L of CS/PG-ZnONCs were the best doses, exhibiting enhanced growth metrics and hence suited for foliar spraying. Mung seedlings treated with PG-ZnONPs at this concentration had an average root and shoot length of 2.42 cm and 5.20 cm, respectively. In comparison, seedlings treated with CS/PG-ZnONCs had root and shoot lengths of 2.48 cm and 10.17 cm, indicating that the concentration is suitable for foliar treatment. In the pot studies, many growth characteristics were examined across seven treatments, with the findings revealing that CS/PG-ZnONCs performed better in growth than the other treatments. Research therefore highlights sustainable agriculture.

**Keywords:** Zinc oxide nanoparticles, Box behnken design, Nanofertilizers, Pot study, Seed germination

**PC-548**

## NANOCARRIER-BASED ENHANCEMENT OF SILYBIN'S ORAL ABSORPTION AND HEPATOPROTECTIVE EFFICACY USING DEOXYCHOLIC ACID FUNCTIONALIZED CHITOSAN

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Silybin is a potent liver-protective agent, but its clinical use is limited by very low oral bioavailability (~0.95%) due to poor solubility. We developed deoxycholic acid-grafted chitosan–lecithin nanoparticles (DCS-LC NPs) to enhance intestinal absorption and hepatoprotection. The amphiphilic polymer was designed to exploit bile acid transport pathways, improving oral uptake. Nanoparticles were prepared via ionic gelation and optimized using Box–Behnken design, yielding favourable particle size, drug loading, sustained release, and excellent biocompatibility. Ex vivo and in vivo studies confirmed enhanced intestinal permeation and a 2.9-fold increase in oral bioavailability compared to free Silybin. Caco-2 cell assays verified the safety of the formulation. In a $CCl_4$-induced hepatotoxicity model, DCS-LC NPs demonstrated superior liver protection, supported by improved biochemical and histological markers. These findings highlight DCS-LC nanoparticles as an effective oral delivery system for poorly soluble hepatoprotective compounds, offering a promising strategy for liver-targeted nanomedicine and improved therapeutic outcomes.

**Keywords:** Silybin, Oral delivery, Nanocarrier, Bioavailability, Hepatoprotection

**PC-549**

## IN-SILICO DRUG REPOSITIONING OF DICLOFENAC SODIUM AS A PPAR-Γ MODULATOR FOR OBESITY

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In the current research, in-silico and bioinformatics tools were employed to explore the repurposing of Diclofenac sodium as a therapeutic candidate for obesity by targeting Peroxisome Proliferator-Activated Receptor Gamma (PPAR-γ). The objective was to identify obesity-




ISBN: 978-81-980623-8-3

associated molecular targets and evaluate the binding potential of Diclofenac through computational modeling. Target prioritization was performed using the Open Targets platform which identified PPAR-γ with a disease association score of 0.6993. Protein–protein interaction analysis using the STRING database revealed a network of 6 nodes and 11 edges with an average node degree of 3.67, clustering coefficient of 0.822 and enrichment p-value of $3.77 \times 10^{-15}$, confirming strong biological relevance. Molecular docking studies using AutoDock Vina demonstrated that Diclofenac exhibited a binding energy of –7.91 kcal/mol comparable to the co-crystal ligand (–10.3 kcal/mol). Stable interactions were observed with residues GLU343, ILE341 and SER342 which played key roles in ligand stabilization within the receptor pocket. Molecular dynamics simulations performed with Desmond for 100 ns further validated the complex stability with RMSD stabilizing at 2.5–3.0 Å for the protein and 2.0–2.5 Å for the ligand after 20 ns. RMSF plots confirmed minimal fluctuations at binding site residues and interaction timeline analysis showed persistent contacts with GLU343 (74%), ILE341 (62%) and SER342 (49%) maintaining stable interactions. Further, Diclofenac sodium demonstrated strong and stable binding comparable to the native ligand supporting its potential for therapeutic application in obesity management.

**Keywords:** Diclofenac Sodium, Obesity, PPAR-γ Modulation, In-silico Drug Repurposing

**PC-550**

## CO-ADMINISTRATION OF GLIBENCLAMIDE WITH QUERCETIN FOR BIOAVAILABILITY ENHANCEMENT

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In the present study, the enhancement of bioavailability of poorly soluble drugs was explored using natural phytoconstituents. The objective was to investigate the potential of quercetin, a flavonoid found in vegetables and citrus fruits, as a bioenhancer to improve the therapeutic performance of glibenclamide (GBC), a BCS Class II drug used in diabetes management, which exhibits poor solubility and inconsistent bioavailability. Quercetin has shown potential to inhibit key metabolic enzymes such as cytochrome P450 3A4 (CYP3A4) and P-glycoprotein (P-gp), which may enhance drug absorption and reduce first-pass metabolism. Analytical and bioanalytical methods were developed and validated for the simultaneous estimation of glibenclamide and quercetin using HPLC. A pharmacokinetic study was conducted to assess the impact of quercetin co-administration on the oral bioavailability of glibenclamide in rats. The findings showed a moderate increase in Cmax, rising from 0.4052 µg/ml in Group I (glibenclamide alone) to 0.6329 µg/ml in Group II (glibenclamide with quercetin). Additionally, a significant enhancement in AUC was observed in Group II, which received glibenclamide along with quercetin, achieving an AUC of 5.089 µg·h/mL, compared to 2.574 µg·h/mL in Group I. This improvement suggests that quercetin effectively enhances bioavailability of glibenclamide by inhibiting its metabolic degradation and extending its duration of action. These findings underscore the potential of natural phytoconstituents, such as quercetin, to act as bioenhancers in enhancing the therapeutic efficacy of poorly soluble drugs like glibenclamide.

**Keywords:** Glibenclamide, Bioavailability, Quercetin, Phytoconstituents.

**PC-551**

## TO STUDY THE RELEASE KINETICS OF ANTI-COAGULANT DRUG IN PREVENTION OF THROMBOEMBOLISM

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The COVID-19 pandemic has significantly increased the prevalence of thromboembolic complications, prompting widespread use of anticoagulants such as Rivaroxaban in post-COVID-19 management. The present study focuses on the formulation and evaluation of mouth dissolving films (MDFs) of Rivaroxaban complexed with β-cyclodextrin to enhance solubility and ensure rapid onset of action through oral transmucosal delivery. MDFs were prepared by the solvent casting method using various combinations of film-forming polymers—HPMC E15, PVP K30, and PVA—along with plasticizers (PEG 400 and glycerine), a disintegrant (sodium starch glycolate), and a sweetener (aspartame). Six formulations (F1–F6) were developed and evaluated for physicochemical properties including surface pH, thickness, folding endurance, tensile strength, weight uniformity, and drug content. Among them, F-2 (HPMC E15 + PVP K30) and F-5 (HPMC E15 + PVA) showed superior performance in in-vitro drug release studies, with cumulative drug release of 98.70% and 94.56% respectively within 60 minutes. Drug release kinetics followed the Korsmeyer–Peppas model with $r^2$ values of 0.9961 (F-2) and 0.9933 (F-5), indicating Fickian diffusion as the dominant mechanism. F-2 demonstrated a faster onset, ideal for immediate therapeutic action, whereas F-5 showed sustained release suitable for prolonged effect and enhanced mucosal adhesion. These results suggest that the developed MDFs, particularly F-2 and F-5, hold promise as effective, patient-friendly delivery systems for Rivaroxaban, particularly suited for rapid therapeutic intervention due to their efficient drug release profiles.

**Keywords:** Rivaroxaban, β-cyclodextrin, HPMC E15, PVP K30, and PVA.

**PC-552**

## OPTIMISATION OF LOW DENSITYVINDOLINE FLOATING PULSATILE SYSTEMS FOR THE THERAPY OF CANCER EMPLOYING HIBISCUS ESCULENTUS GUM AS A BIODEGRADABLE AND BIOCOMPATIBLE NOVEL NATURAL TIMED RELEASE POLYMER

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The present research focuses on the design and optimization of a low-density floating pulsatile system of vindoline for the therapy of cancer, employing Hibiscus esculentus gum, a biodegradable and biocompatible novel natural timed-release polymer. The therapeutic rationale was to achieve a defined lag phase, allowing a drug-free interval, followed by a rapid burst release of vindoline to coincide with tumor cell cycle sensitivity, while ensuring gastric retention by maintaining system buoyancy. A $2^3$ full factorial design was employed to evaluate the effect of three critical formulation factors—polymer concentration, effervescent agent level, and coating thickness—on dependent variables such as lag time, percentage drug release, and floating duration. The formulations were systematically characterized for floating lag time, total floating duration, in-vitro drug release kinetics, surface morphology, and drug–polymer compatibility using FTIR and DSC techniques. Statistical analysis revealed that polymer concentration and coating thickness significantly modulated the lag period, whereas the effervescent agent level had a dominant influence on buoyancy parameters. The optimized formulation demonstrated a lag time of 2.1 ± 0.2 h, a burst release of 86.5 ± 1.3% within 90 min, and a floating duration exceeding 10 h, aligning well with the predefined Quality Target Product Profile. The outcomes of this investigation highlight the potential of Hibiscus esculentus gum as a novel natural timed-release polymer in formulating gastro-retentive pulsatile delivery systems. Such systems can provide site-specific, time-programmed drug delivery, offering improved therapeutic outcomes and reduced toxicity in cancer management.

**Keywords:** Vindoline, Hibiscus esculentus gum, floating pulsatile system, factorial design, cancer therapy.

**PC-553**

## FORMULATION AND CHARACTERIZATION OF POLYHERBAL LOZENGES FOR THE TREATMENT OF MOUTH ULCER

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Mouth ulcers, often called oral ulcers, often affect the mucosal lining of the oral cavity. The pain and suffering they inflict may make it difficult to do everyday tasks like eating and speaking. Numerous conditions, including autoimmune illnesses, trauma, infections, malnourishment, and systemic problems, can result in these ulcers, among all the types, recurrent aphthous stomatitis (RAS) is the most prevalent. Synthetic medications like corticosteroids, analgesics, and antiseptics have long been used to treat mouth ulcers. Nevertheless, these therapies


ISBN: 978-81-980623-8-3

frequently have unfavourable side effects and are not very good at accelerating healing. Because of its medicinal potential, safety, and biocompatibility, herbal medicine has drawn interest as a possible substitute. Lozenges' sedative properties, targeted drug release, and extended contact duration have made them a preferred medication administration method for treating oral ulcers. Unlike traditional treatments like mouthwashes and gels, lozenges dissolve gradually in the oral cavity, ensuring a continuous release of active components for improved therapeutic efficacy. Formulation and evaluation of polyherbal lozenges to treat oral ulcers is the main objective of this research. The herbal ingredients utilized in the composition were chosen because of their anti-inflammatory, antibacterial, and wound-healing qualities. In order to promote greater healing and longer-lasting therapeutic effects, the lozenges were created to increase medication retention in the oral cavity. The prepared lozenges were evaluated using a number of physicochemical tests, such as hardness and disintegration time. Their effectiveness in lowering inflammation and accelerating ulcer healing was also evaluated in vitro.

**Keywords:** Mouth ulcer, lozenges, drug delivery, anti-inflammatory, wound healing and polyherbal therapy.

**PC-554**

## FORMULATION AND EVALUATION OF POLYHERBAL LOZENGES

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Bacteria or viruses are typically the cause of throat infections. Since their invention in 1900 BC, lozenges have remained a market favorite. Using a tasty solid dose form, lozenges are taken orally. In order to lubricate and soothe irritated throat tissues, lozenges are solid preparations that typically comprise one or more substances in a sweetened, flavored base. The creation and assessment of polyherbal lozenges to reduce throat infection symptoms were done in this research work. Liquorice [glycerrhiza glabra], Quercitin, Vasaka [Adhatoda vasica], Mint [Mentha spicata], Tulsi [Ocimum Tenuiflorum], and Ginger [Zingiber officinale] are traditionally used as cough suppressants and for colds and flu. The other ingredients in the polyherbal extract-based lozenge include honey [Apis mellifera] and jaggery [Saccharum officinarum L.], which have a nourishing and calming effect on the respiratory tract's mucous membrane. Before creating the polyherbal through macroscopic evaluation, each individual herbal medication is put through a number of tests. Their solubility, melting and boiling points, FTIR, DSC, and preliminary test were all performed. The physicochemical properties of the polyherbal lozenges, including their thickness, diameter, disintegration, hardness, weight change, and macroscopic features, were assessed. The goal of the current study is to create and assess a herbal remedy that is safe, effective, and has very few adverse effects or symptoms of a throat infection. The prepared lozenges have the greatest advantages over the other dosage forms: they are easy to deliver to both children and elderly people, they taste delicious, they prolong the duration of the drug in the oral cavity to release a specific effect, they are simple to create, and they don't require water intake to be administered.

**Keywords:** Lozenges, Polyherbal Extract, Side effects and Throat Infection.

**PC-555**

## "PHARMACOKINETIC PROFILING OF ATENOLOL AND TULSI EXTRACT: IMPLICATIONS FOR CARDIOPROTECTIVE THERAPY"

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This study explores the pharmacokinetic interaction between Atenolol (AT), a cardioselective β-blocker, and Ursolic acid, a key bioactive compound in Standardized Extract of Ocimum sanctum (SEOS), following oral administration in rats. The objective was to evaluate changes in plasma concentration and pharmacokinetic parameters when both agents are co-administered. Standard solutions of AT and Ursolic acid were prepared in methanol at 1000 µg/ml and serially diluted to obtain calibration ranges of 20–120 µg/ml and 100–600 µg/ml, respectively. Mixed standards were spiked into rat plasma and processed using protein precipitation with acetonitrile, followed by centrifugation and filtration. Plasma samples were analyzed using HPLC to determine drug concentrations over time. Results indicated a significant reduction in Cmax and $AUC_{0-10}$ for both compounds when administered in combination. Atenolol's Cmax decreased from 118.99 µg/ml to 95.86 µg/ml, and AUC from 694.3 to 433.9. Ursolic acid showed a similar decline in Cmax (10.91 µg/ml to 8.38 µg/ml) and AUC (15.49 to 11.33). Additionally, elimination rate constants (Ke) increased, while half-life ($t_1/_2$), volume of distribution (Vd), and clearance (Cl) values were reduced in the combination group. In conclusion, co-administration of SEOS and Atenolol alters the pharmacokinetic profile of both agents, suggesting potential herb-drug interactions that may impact therapeutic efficacy. These findings warrant further investigation to guide safe clinical use of herbal supplements alongside conventional cardiovascular medications.

**Keywords:** Atenolol, Ursolic acid, Pharmacokinetics, Herb-drug interaction

**PC-556**

## FORMULATION, EVALUATION AND MOLECULAR DOCKING STUDY OF GHEE-BASED ANTI- EPILEPTIC NANOPARTICLES FROM BAUHINIA PURPUREA

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A chronic neurological disorder that has an immense effect on a patient's quality of life is epilepsy. Current therapeutic options often have severe side effects, highlighting the need for novel, effective, and safer treatments Bauhinia Purpurea a plant widely used in traditional medicine, has shown promising anticonvulsant activity, which has been traditionally attributed to its rich phytochemical profile, including flavonoids, triterpenoids, and saponins. Its inadequate water solubility and low absorption, however, may restrict its therapeutic effectiveness. By designing an extract delivery formulation using ghee-based nanoparticles, this work seeks to get beyond such limitations. The solubility, bioavailability, and targeted administration of the active phytochemicals are anticipated to be enhanced by the use of ghee, a conventional lipid that is a great carrier for lipophilic substances, in a nanostructured lipid carrier (NLC) system. The creation of ghee-based nanoparticles loaded with a hydroalcoholic extract utilizing a high-energy approach will be the primary focus of the study. Zeta potential, size, shape, and drug entrapment efficiency will all be evaluated for the nanoparticles To ensure the nanoparticles anti-epileptic potential, the study will carry out a through in vitro assessment after formulation. Using well-established cellular or in vitro models relevant to epilepsy will be part of this. A molecular docking study to clarify the mechanism of action of the important phytochemicals will be a crucial component of this investigation. The study will use computational techniques to forecast the binding affinities and interactions of Bauhinia Purpurea main constituents (such as certain flavonoids and triterpenoids) with important molecular targets linked to epilepsy, including voltage-gated ion channels and GABA receptors. The docking study's findings will serve as a solid justification for the reported in vitro effects and direct further formulation enhancement. In summary, this research presents a novel approach to enhance the therapeutic efficacy of Bauhinia Purpurea in the management of epilepsy disease. This research work opens the possibility to a safer and more effective anti-epileptic drug by combining traditional knowledge (using Ghee) with modern nanomedicine and computational biology (molecular docking) to provide a comprehensive analysis from formulation to a mechanistic understanding.

**Keywords:** Molecular Docking, Anti-Epileptic, Nanoparticles, and Bauhinia Purpurea.

**PC-557**

## INNOVATIONS IN ADVANCED DRUG DELIVERY SYSTEMS: A NEW ERA OF TARGETED THERAPY

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Innovations in advanced drug delivery systems have revolutionized the field of medicine, ushering in a new era of targeted therapy. These systems enhance therapeutic efficacy by delivering drugs precisely to the site of action, minimizing systemic side effects and improving patient outcomes. This paper explores recent advancements in drug delivery




ISBN: 978-81-980623-8-3

technologies, including nanocarriers, liposomes, dendrimers, and microneedles, which are designed to overcome limitations of traditional methods. Emphasis is placed on the role of stimuli-responsive systems, such as pH- or temperature-sensitive carriers, that release drugs in response to specific physiological conditions. Additionally, the integration of biotechnology and nanotechnology has enabled the development of personalized delivery platforms, such as CRISPR-based systems and RNA therapeutics, offering solutions for complex diseases like cancer, neurodegenerative disorders, and autoimmune conditions. Advances in biomaterials and smart polymers have further improved drug stability and bioavailability. Challenges, including scalability, regulatory hurdles, and biocompatibility, are discussed alongside promising strategies for addressing these barriers. By focusing on precision, sustainability, and patient-centric approaches, advanced drug delivery systems represent a paradigm shift in therapeutic modalities. This review underscores their potential to transform modern medicine and pave the way for more effective, safe, and accessible treatments across diverse clinical applications.

**Keywords:** Liposomes, Nanocarriers, Targeted Therapy, Precision Medicine

**PC-558**

## FORMULATION AND EVALUATION OF POLYMERIC NANOFORMULATIONS LOADED WITH AMANTADINE HYDROCHLORIDE FOR THE TREATMENT OF PARKINSON'S DISEASE

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Parkinson's disease represents the second most prevalent neurodegenerative disorder subsequent to Alzheimer's disease. Nanoparticles comprising Amantadine hydrochloride were synthesized utilizing PLGA polymers. Prior to the formulation of Amantadine hydrochloride polymeric nanoparticles, preformulation investigations were conducted to assess the physical and chemical compatibility between the drug and the polymer through FTIR and DSC. Subsequently, the formulated nanoparticles were characterized concerning particle size, polydispersity index, zeta potential, drug content, entrapment efficiency, and morphology via scanning electron microscopy, in addition to evaluating drug-excipient compatibility. The FTIR analysis inferred that no significant interactions transpired between the drug and the polymers utilized in the current investigation. The FTIR analysis inferred that no significant interactions transpired between the drug and the polymers utilized in the current investigation. The nanoformulations of Amantadine hydrochloride were synthesized utilizing varying concentrations of polymeric materials. The nanoparticulate formulation prepared with a PLGA 1:4 ratio demonstrated commendable outcomes, specifically an average particle size of 178.5 nm, a polydispersity index of 0.185, a zeta potential of -25.9 mV, a drug content of 80.44%, and an entrapment efficiency of 84.67%. Furthermore, the particle morphology as assessed by SEM revealed a mean particle diameter in the vicinity of 120 nm, with the nanoparticles exhibiting a spherical shape and a smooth surface texture. In vitro drug release investigations suggested a controlled and sustained release of the drug over a duration of 24 hours. Based on these characteristics, it was determined that the nanoprecipitation technique was a practical way to successfully include amantadine Hcl with a high entrapment efficiency. Thus, as a drug delivery vehicle, polymeric nanoparticles improve the bioavailability of drugs that are low lipophilicity and poorly soluble in water, such as amantadine HCl.

**Keywords:** Nanoparticles, Nanoprecipitation, Poly dispersity Index, Zeta potential, Entrapment Efficiency, Scanning Electron Microscopy.

**PC-559**

## OPTIMIZATION AND CHARACTERIZATION STUDY OF VINORELBINE TARTRATE-CONTROLLED RELEASE TABLETS WITH SBA-15 NANOMATERIAL

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For the current study, Nanomaterial Santabarbara amorphous -15 (SBA-15) a versatile carrier has been selected to prepare controlled release tablets of vinorelbine tartrate. The objective of this project is to study the effect of nanomaterial on drug release by formulation of oral solid dosage forms with the highly porous SBA-15 nanomaterial. Pre-formulation studies for compatibility conducted by FTIR study and morphology study by XRD. Trials conducted in optimizing the formulation into a oral solid dosage forms by direct compression method and further assessed for drug release by spectrophotometric method and thermodynamic studies. The observed results in pre-formulation by spectroscopic method FTIR revealed good compatibility with SBA-15 showing no change in characteristic peak of pure drug. morphology study by XRD revealed amorphous nature of the nanomaterial and compatibility with the drug. The TGA studies under air conditions at temperature range 30-5000 C revealed complete mass degradation to less than 0.5% at 5000 C. The drug release by dissolution study revealed that SBA-15 shows good controlled release effect on vinorelbine tartrate by 18 % at 60 min compared with pure drug 40% release in 6.8 pH phosphate buffer. With the results it can be concluded that SBA-15 nanomaterial can be effectively used as a carrier to control the vinorelbine tartrate release by oral dosage forms.

**Keywords:** vinorelbine tartrate, SBA-15, controlled release, nanomaterials.

**PC-560**

## DEVELOPMENT OF POSACONAZOLE LOADED NANOSTRUCTURED LIPID CARRIERS FOR IMPROVED ANTIFUNGAL EFFICACY IN MUCORMYCOSIS

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Lipid-based drug delivery systems have the potential capacity to entrap both hydrophobic and hydrophilic molecules, enhance the bioavailability of poorly aqueous soluble drugs, and protect them from untimely degradation. Nanostructured lipid carriers (NLCs), the second generation innovative lipid nanoparticle that act as a bioactive carrier system. Nanostructured lipid carriers are biocompatible drug carriers used for hydrophilic as well as hydrophobic drugs. NLCs are high permeability, better physical stability, huge loading capacity and most affordable (less expensive than polymeric/surfactant based carriers). Many antifungal drugs currently available in market exhibit solubility and permeability problems and mostly belongs to BCS class-II and IV drugs so bioavailability is the major cause and could be resolved by formulating Posaconazole-loaded NLCs. NLCs have the usual particle diameter ranging 10-1000 nm. Posaconazole loaded NLCs were successfully formulated using the melt homogenization technique combined with ultrasonication. The rapid emergence and spread of the Covid-19 pandemic in India has highlighted the country's health-care system's failure to cope with the increasing number of cases. At its peak, over 400,000 cases were reported each day, and the country was not able to provide adequate resources to address the needs of its patients. Mucormycosis is caused by a group of molds known as mucormycetes. The most common species of these organisms is the Mucor and the Rhizopus. As of June 2021, there were over 40,000 cases of this disease in India. The NLCs were formulated using melt homogenization followed by ultrasonication, resulting in nanoparticles with a mean particle size of 300 to 400 nm and a positive zeta potential of 28 mV to 34 mV, confirming nanoscale dimensions suitable for ocular delivery with good stability against aggregation. The formulation exhibited the entrapment efficiency 74.23 % to 95.99%, indicating excellent drug incorporation, which is critical for ensuring sustained drug release and therapeutic efficacy. The formulation of Posaconazole NLCs was optimized using Box-Behnken design by considering surfactant concentration and lipid concentration as independent variables and particle size, entrapment efficiency and drug loading as dependent variables. Significance of the study to increase permeability, bioavailability, to provide sustained.

**Keywords:** Nanostructured Lipid Carriers, Posaconazole, Melt Emulsification, and Mucormycosis.

**PC-561**

## REVOLUTIONIZING CANCER THERAPY: ADVANCING DRUG DELIVERY SYSTEMS WITH NANOPARTICLES FOR TARGETED AND EFFECTIVE TREATMENT

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ISBN: 978-81-980623-8-3

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The advent of nanoparticles in cancer therapy has revolutionized drug delivery systems, enabling more precise and effective treatments. Traditional cancer therapies, such as chemotherapy and radiation, often result in significant off-target effects, leading to systemic toxicity and diminished patient quality of life. Nanoparticles, with their unique physicochemical properties, offer an innovative platform for targeted drug delivery, enhancing therapeutic efficacy while minimizing adverse effects. This review highlights recent advancements in nanoparticle-based delivery systems, including liposomes, polymeric nanoparticles, and dendrimers, designed to achieve controlled drug release, improved bioavailability, and enhanced tumor selectivity. Special emphasis is placed on the role of surface functionalization, such as ligand targeting and pH-responsive mechanisms, which enable nanoparticles to navigate biological barriers and achieve site-specific drug accumulation. Additionally, the integration of imaging agents into nanoparticles facilitates real-time monitoring of therapeutic outcomes. Despite promising preclinical results, challenges remain, including scalability, immunogenicity, and regulatory approval for clinical applications. Addressing these issues through interdisciplinary research is critical to translating nanoparticle-based systems from bench to bedside. By leveraging their potential for precision medicine, nanoparticles are poised to transform the landscape of cancer therapy, offering hope for improved outcomes and reduced burden on patients.

**Keywords**: Nanoparticles, Cancer therapy, Nanocarriers, Cancer nanomedicine, Angiogenesis, Precision medicine, Tumor targeting

**PC-562**

## INNOVATIVE BIOACTIVE STRIPS FOR PAIN RELIEF, INFECTION CONTROL, AND HEALING OF POSTPARTUM PERINEAL WOUNDS

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Postpartum perineal trauma, often caused by episiotomy or spontaneous lacerations, is a major maternal health issue that results in pain, infection risk, and delayed healing, thereby impairing physical comfort and emotional well-being. Conventional treatments such as analgesics, antiseptic applications, and sitz baths offer only limited relief and are often inconvenient for regular use. To address these challenges, this work focuses on developing novel bioactive polymeric strips for direct application on perineal wounds. The strips are formulated using a biocompatible polymeric base integrated with natural bioactive agents and therapeutic additives known for their analgesic, antimicrobial, and wound-healing activities. The design aims to provide sustained release of actives, maintain a moist healing environment, and reduce microbial colonization while ensuring patient comfort and ease of application. Preformulation studies will examine compatibility between selected bio actives and the polymer matrix. The prepared strips will be characterized for thickness, tensile strength, folding endurance, surface pH, swelling index, content uniformity, and in vitro release profile. Antimicrobial potential will be evaluated against common postpartum pathogens, and wound-healing activity will be assessed using in vitro and ex vivo models. Irritation studies will confirm safety for sensitive perineal tissues. The project is expected to yield a novel, non-invasive, and patient-friendly therapeutic system that relieves pain, prevents infection, and promotes faster wound healing. If successful, these bioactive strips may serve as an effective alternative to conventional methods, offering a significant advancement in postpartum wound management and improving maternal health outcomes.

**Keywords:** Postpartum perineal trauma, Bioactive polymeric strips, Wound healing, Antimicrobial activity

**PC-563**

## FORMULATION AND OPTIMIZATION OF ORODISPERSIBLE HERBAL TABLETS: A DOE-BASED APPROACH TO STANDARDIZATION

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This study aimed to develop and optimize orodispersible herbal tablets incorporating Achyranthes aspera Linn. extract. To achieve rapid disintegration, Crospovidone and Sodium Starch Glycolate were used as superdisintegrants, while β-cyclodextrin was added to enhance the solubility of bioactive constituents. Formulations were designed using a Design of Experiments (DOE) approach, considering Crospovidone and Sodium Starch Glycolate as independent variables and disintegration time along with cumulative drug release as dependent responses. The prepared tablets were evaluated for critical quality parameters, including hardness, friability, weight variation, wetting time, in vitro dispersion time, water absorption, and content uniformity. The optimized formulation (F6) demonstrated excellent performance, with a disintegration time of 1.805 seconds, cumulative drug release of 98.04%, hardness of 2.98 kg/cm², friability of 1.58%, weight variation of 3.319%, wetting time of 34.4 seconds, water absorption capacity of 36%, and content uniformity of 99.5%. All values were within pharmacopeial limits, validating the reliability of the optimization model. The findings confirm that the synergistic action of Crospovidone and Sodium Starch Glycolate effectively enhanced tablet disintegration and dissolution, thereby improving the potential oral bioavailability of Achyranthes aspera Linn. extract. The study further demonstrates the robustness of DOE as a tool for developing standardized orodispersible herbal formulations.

**Keywords:** Orodispersible, Sodium starch glycolate, microcrystalline cellulose (MCC), Crospovidone, Design of experiment.

**PC-564**

## FORMULATION AND EVALUATION OF ANTI-INFLAMMATORY TOPICAL HERBAL GEL

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Herbal remedies are more acceptable in the view, that they are safe with fewer side effects than the synthetic ones. Herbal formulations are in more demand in the market. Inflammatory diseases including different types of rheumatic disease are major cause of morbidity throughout the world. The present work deals with the formulation and evaluation of polyherbal Anti-inflammatory formulation containing aqueous extract of Myristica fragrance fruits, Trigonella foenum- graecum seeds, Moringa oleifera Lam leaves. Aqueous extracts of the selected plants were prepared by maceration. Prepared extracts were subjected to preliminary phytochemical screening using standard chemical tests. The gel was prepared using all extracts, polymer carbopol 934, propylene glycol, triethanolamine, propyl paraben, Jasmine oil, Alcohol, EDTA and distilled water. Prepared formulations were evaluated for various parameters like colour, appearance, consistency, viscosity , Spreadability, pH and In vitro anti-inflammatory study was carried out using inhibition of protein denaturation assay. Preliminary phytochemical screening revealed the presence of carbohydrates, proteins, alkaloids, glycosides, flavonoids, tannins and phenolic compounds in the prepared extracts. Batch D of prepared formulation showed all the evaluation parameters in acceptable limit. In vitro anti-inflammatory evaluation using the protein denaturation inhibition assay revealed 40.94% inhibition for the developed herbal gel compared to 63.28% for the marketed formulation. Statistical analysis ($p > 0.05$) indicated no significant difference between the two, suggesting that the prepared formulation exhibits anti-inflammatory potential, demonstrating comparability with the standard product and supporting its promise as an effective topical alternative.

**Keywords:** Herbal gel, Anti-inflammatory activity.

**PC-565**

## PREPARATION AND CHARACTERISATION OF CAPECITABINE MICROSPHERES FOR COLORECTAL CANCER

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ISBN: 978-81-980623-8-3

The aim of the present study was to formulate and evaluate Capecitabine microspheres for colorectal cancer and to reduce dosing frequency and improve patient compliance. Microspheres were prepared by emulsion solvent evaporation technique using polymers like ethyl cellulose (EC) and HPMC K-100 in different ratios. The prepared microspheres were evaluated for flow properties, percentage yield, drug entrapment efficiency and in vitro dissolution studies. Results showed that as the concentration of polymer ratio increases it affects the particle size, percentage yield and drug release from the microspheres. Percentage yield of F6 microspheres was found up to 95.13%. The release study was done simulated intestinal fluid (SIF - pH 7.4) for 24 hours and showed that the drug was protected from being release in the physiological environment of intestine and efficiently released in colon (95.85%). The optimized formulation F6 exhibited the drug release in sustained manner and follows zero order, non Fickian diffusion mechanism. Accelerated stability study was carried out for the optimized formulation and results showed that there were no significant changes in percentage drug entrapment efficiency, particle size and In vitro controlled release of Capecitabine. The surface morphology analysis formulation F6 showed spherical structure with smooth surface morphology. The prepared microspheres are promising drug delivery for oral sustained administration to targeting colon and provides better kinetic profile with improved bioavailability.

**Keywords:** Colorectal cancer, Microspheres, and In vitro controlled release.

**PC-566**

## FABRICATION OF AN OPTIMIZED COLLAGEN-BASED BIOSCAFFOLDS FOR SKIN TISSUE REGENERATION BY 3D PRINTING

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Skin tissue engineering offers advanced solutions for chronic wounds, burns, and skin loss. Collagen-based scaffolds when integrated with 3D printing will yield precise porous architectures that greatly enhance regenerative and therapeutic outcomes. This study developed fish scales derived collagen bioscaffolds using 3D printing via pneumatic extrusion, optimized through a $3^2$ factorial design with HPMC and TCP as variables. The optimized scaffold exhibited 0.15 mm thickness, 76% swelling index, apparent density (0.018 g/cm²), porosity (98.6%), folding endurance of 261 cycles, tensile strength of 0.706 MPa, and burst resistance of 18.63 N. Biodegradation showed 16.8% after 30 days. SEM revealed interconnected pores (200–400 µm) with nano roughness, supporting cell adhesion. FTIR analyses confirmed the presence of collagen, HPMC functional groups including amide I, amide II, hydroxyl, and ether, while XRD results showed the same characteristic peaks as pure collagen, HPMC, signifying no alteration in crystallinity. DSC confirmed thermal stability fit for biomedical applications. Biological evaluations demonstrated excellent cytocompatibility, with a 262.0% increase in cell proliferation, absence of cytotoxicity, and enhanced cell migration in wound scratch assay. Antibacterial activity was confirmed with inhibition zones of 18.4 ± 2.4 mm (E. coli) and 21.9 ± 2.5 mm (S. aureus). Stability tests showed no significant changes under ambient and refrigerated storage. In vivo studies demonstrated superior wound contraction, faster re-epithelialization, and angiogenesis evidenced by CAM assay. In summary, the optimized 3D-printed collagen based scaffold exhibited strong structural, mechanical, antibacterial, and biological characteristics, positioning it as a highly promising option for wound healing and skin tissue engineering.

**Keywords:** Collagen, Bioscaffold, Skin tissue engineering, 3D printing

**PC-567**

## FABRICATION OF AN OPTIMIZED BIOCERAMIC SCAFFOLD BY 3D PRINTING FOR SKIN TISSUE REGENERATION

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Recently, 3D bioprinted scaffolds have been considered as a novel approach, aimed at replicating the intricate structure of native skin in skin tissue engineering. In this study, pneumatic extrusion-based 3D printing technique was employed to fabricate cube-shaped scaffolds. Methyl cellulose and tricalcium phosphate concentrations were optimized using a 32-factorial design approach, and combined with a constant collagen concentration to maximize the swelling index and porosity, while minimizing thickness and apparent density. An optimized blank scaffold was incorporated with varying concentrations of Bredigite (1%, 2%, and 3%) to fabricate bioceramic scaffolds. Bioceramic scaffolds exhibiting the presence of hydroxyl, Si–O stretching in FTIR, along with improved crystallinity due to functionalization effects in XRD, and an increase in DSC enthalpy of 9.87 mJ. SEM with EDS images revealed a highly porous, rough-surfaced scaffold composed of calcium, silicon, and magnesium.The tensile strength of 3% bioceramic scaffold significantly increased from 0.64±0.04 MPa to 1.94±0.06 MPa, burst strength improved from 7.85±0.21N to 21.58±0.11N, and antibacterial activity was enhanced considerably against Streptococcus and E. coli. Furthermore, in the MTT assay, a higher cell proliferation of 393.6±2.07% and substantially lower cytotoxicity were observed, along with increased angiogenesis in the CAM assay. In vivo experiments demonstrated significant wound contraction over 28 days, accompanied by full-thickness wound assessment. The short-term stability studies confirmed the stable thickness, density, swelling index, and porosity at ambient and refrigerator temperatures. Overall, this study highlighted that these scaffolds offer a mechanically stable framework for wound healing by speedy regeneration of the skin tissue.

**Keywords:** Skin tissue engineering,3D printing, Bioceramic scaffolds, Bredigite.

**PC-568**

## DEVELOPMENT OF NOVEL BIODEGRADABLE VAGINAL CUP FOR THE TREATMENT OF VULVOVAGINAL CANDIDIASIS

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The common fungal infection known as vulvovaginal candidiasis (VVC), which is mostly caused by Candida species, causes severe pain and repeated infections in those who have it. Conventional antifungal therapies frequently have systemic adverse effects, low retention times, and limited absorption. With a number of benefits, including localized action, less systemic adverse effects, and increased bioavailability, vaginal medication administration is a focused and efficient method of delivering therapeutic compounds straight to the vaginal mucosa. When it comes to treating infections, hormone imbalances, and contraceptive uses, the vaginal method is very helpful. Its porosity and abundant blood flow create an ideal setting for medication absorption. To improve medication retention and prolong release, a variety of dosage forms have been created, such as gels, creams, pills, vaginal rings, and bioadhesive drug delivery systems. Available dosage forms issues including mucosal irritation, pH fluctuation, and enzymatic degradation must be resolved. The efficiency and patient compliance of vaginal medicines are being enhanced by developments in controlled-release formulations and polymer-based drug delivery methods. In order to overcome these obstacles, the goal of this study is to develop a vaginal cup for the treatment of VVC that is made of gelatin, gellan gum, and hydroxypropyl methylcellulose (HPMC K4M) as polymers and glycerol was added to improve mechanical strength. The casting method was used to prepare dosage form. As an API the posaconazole the powerful broad-spectrum triazole antifungal was incorporated into the formulation, Physical-chemical characteristics, drug content, and in-vitro antifungal activity were all evaluated for the produced formulation. The vaginal cup formulation was optimized using 32 full factorial design, resulting in an optimized batch with an in-vitro drug release 93.12±0.66 %, folding endurance 154±1.62 folds, drug content 92.37±0.17 %. The results highlight that the potential of posaconazole loaded biodegradable vaginal cup as an optimal targeted drug delivery method for the treatment of VVC, offering a promising approach to improving therapeutic outcomes while reducing systemic exposure.

**Keywords:** vulvovaginal candidiasis, vaginal medication delivery, vaginal cup, posaconazole, 32 full factorial design.




ISBN: 978-81-980623-8-3

**PC-569**

**MICRONEEDLE-MEDIATED DELIVERY SYSTEMS FOR PROTEINS AND PEPTIDES: A PAINLESS AND EFFICIENT APPROACH**

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Proteins and peptides are highly effective therapeutic agents, but their clinical use is often limited by poor oral bioavailability and the invasiveness of conventional injections. Microneedle (MN) technology has emerged as a minimally invasive, painless, and patient-friendly alternative for protein and peptide delivery. MNs penetrate the stratum corneum without reaching pain receptors, allowing efficient transdermal transport of biomolecules while avoiding enzymatic degradation. Different types of microneedles, including solid, coated, dissolving, hydrogel-forming, and hollow systems, have been developed using biocompatible materials. Preclinical and clinical studies demonstrate successful delivery of insulin, vaccines, and hormones with enhanced stability, reduced storage requirements, and improved patient compliance. Overall, microneedle-mediated systems offer a promising platform for next-generation therapeutic delivery, with potential applications in chronic disease management, vaccination, and regenerative medicine.

**Keywords:** Microneedles, Protein delivery, Peptide therapeutics, Transdermal drug delivery, Controlled release

**PC-570**

**"A REVIEW ON TRANSFEROSOME- BASED TOPICAL DRUG DELIVERY: A NOVEL STRATEGY FOR RHEUMATOID ARTHRITIS MANAGEMENT "**

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Arthritis is a chronic autoimmune disorder which is characterized by a chronic inflammation of synovium and severe joint destruction. After a vast study and development in the field of arthritis, the disease is still incurable. The conventional treatment methods suffer from poor bioavailability, and severe adverse effects. Hence RA requires rapid onset of action for immediate pain relief and delivery of drug directly to the site of action. Transferosomes also known as the "the ultra flexible lipid vesicles" can resolve these drawbacks by making the drug available directly to the affected site of the body. Transferosomes can accommodate drug molecules with wide range of solubilities and facilitate topical delivery of low as well as high molecular weight drugs. Transferosomes can deform and pass through narrow constriction (from 5 to 10 times less than their own diameter) without measurable loss and provide better penetration of intact vesicles. This review highlights the importance of transferosomal system for the treatment of the rheumatoid arthritis from topical route.

**Keywords:** Transferosome, autoimmune disorder, rheumatoid arthritis

**PC-571**

**"GELATIN-FREE CAPSULES: A MODERN APPROACH"**

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The pharmaceutical industry is witnessing a paradigm shift toward sustainable and patient-friendly dosage forms.Traditionally, capsules have been manufactured using gelatin derived from animal sources,which raises concerns regarding dietary restrictions, cultural preferences, and environmental sustainability. Two-piece capsules have been used for almost a century in the pharmaceutical field, and gelatin has been adopted as the main material of these capsules due to its excellent characteristic as a thickener. The gelatin dissolves under high concentration into water of a high temperature and quickly gels in room temperature. The thickness of the film made by the gelatin becomes uniform. The crosslinking of gelatin and drug incompatibilities and the strict regulations regarding the use of animal derived gelatin requiring the absence of transmissible spongiform encephalopathy (TSE) have encouraged the search for gelatin replacement. To replace gelatin, Artificial Intelligence (AI) is playing a transformative role in the development of gelatin-free capsules. By leveraging data-driven insights, AI enables the identification and optimization of plant-based polymers such as hydroxypropyl methylcellulose (HPMC), pullulan, and seaweed-derived polysaccharides. AI algorithms accelerate material screening, predict capsule stability, simulate drug release behavior, and reduce formulation costs. Furthermore, AI integrates with advanced manufacturing technologies, including 3D printing, to design personalized capsule systems with precise disintegration and dissolution profiles. This innovative approach not only ensures broader patient compliance but also promotes eco-friendly practices in pharmaceutical manufacturing. Thus, AI in action is redefining capsule technology by enabling safer, sustainable, and consumer acceptable gelatin-free alternatives.

**Keywords:** Capsule, Gelatin, TSE,Artificial Intelligence (AI), Gelatin-free capsules, Plant-based polymers, Hydroxypropyl Methylcellulose (HPMC), Pullulan, Optimization, 3D printing, Personalized capsule.

**PC-572**

**BRAIN-TARGETED DELIVERY OF VENLAFAXINE VIA SERUM ALBUMIN NANOPARTICLES: PREPARATION AND CHARACTERIZATION**

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Most of the antidepressants available on the market for the management of depression are available through the oral route of administration and also have several drawbacks. The most innovative and adaptable class of delivery methods, nanoparticles can be used to deliver therapeutic medicines to a specific target site in a regulated manner and as both diagnostic and therapeutic agents. The purpose of the present study was to develop nano-based formulations of Venlafaxine for the management of depression. Different batches of venlafaxine-loaded serum albumin nanoparticles were prepared using the desolvation technique, with varying polymer concentrations. Amongst the six batches of nanoparticles, V4 was found to be ideal by considering its drug loading percentage of 32.57±0.51%w/w along with the yield of 94.89±0.2% w/w, the particle size of 194± 1.2nm with the polydispersity index of 0.375 ± 0.8 and zeta potential of -27.1mV. In vitro drug release showed a biphasic pattern with initial burst release and later sustained release (23.78% w/w to 84.94% w/w after 24 h) following the Fickian diffusion-based release mechanism based on release kinetics ('n' values from the Korsmeyer-Peppas were ranged from 0.0804 to 0.2676). The formulation V4 was incorporated into thermosensitive gelling systems called in situ gels to enhance the drug delivery to the specific target site. Ex vivo drug diffusion studies were conducted on freshly excised goat nasal mucosa with a Franz diffusion cell simulated nasal fluid for all three formulations up to 8h, and the in-situ gel showed 89% drug release. The targeting efficiency of VLF-BSA NPs incorporated in situ gel was compared with nanoparticles. Drug solution was administered through the nasal route to determine the antidepressant activity through the forced swim test.

**Keywords:** Venlafaxine, Serum Albumin, Nanoparticles, Thermosensitive gels, Anti-depressant

**PC-573**

**DESIGN AND DEVELOPMENT OF HYALURONIC ACID SURFACE MODIFIED ASTAXANTHIN LOADED CHITOSAN NANOPARTICLES FOR ENHANCED ANTI- TUMOUR EFFICACY IN HEPG2 CELLS**

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Astaxanthin (AST), a potent antioxidant with reported anticancer activity, suffers from poor aqueous solubility and limited stability, restricting its therapeutic applications. In this study, astaxanthin was encapsulated in hyaluronic acid (HA)-surface-modified chitosan-based nanoparticles to enhance stability, bioavailability, and tumor-targeting potential. Nanoparticles were formulated using chitosan, soya lecithin, TPGS, and HA through molecular self-assembly, followed by high-pressure homogenization and centrifugation at 19,000 rpm for 60 min, yielding three formulations (F1–F3). Physicochemical characterization included particle size, polydispersity index (PDI), zeta potential, SEM, and XRD analyses. Astaxanthin exhibited very low water solubility, moderate




ISBN: 978-81-980623-8-3

solubility in methanol and ethanol, and high solubility in DMSO, with a melting point of 210 °C, confirming thermal stability. FTIR and DSC analyses indicated no significant interactions between the drug and polymer matrix, demonstrating compatibility. UV spectroscopy confirmed purity with λ_max at 491 nm (HCl) and 495 nm (phosphate buffer). Formulation F1 exhibited optimal properties, with a mean particle size of 110.6 nm, PDI 0.282, zeta potential 32.0 mV, drug content 84.43 ± 1.15%, and entrapment efficiency 75.15%, indicating uniform dispersion and good stability. In vitro drug release studies showed F1 released 95.14 ± 1.15% of astaxanthin in phosphate buffer, compared to 25.18% from free drug, demonstrating significantly enhanced release. Cytotoxic evaluation against HepG2 liver cancer cells via the MTT assay (570 nm) confirmed potent anticancer activity. These results suggest that HA-modified chitosan nanoparticles provide a promising platform for improving astaxanthin's stability, controlled release, and therapeutic efficacy, highlighting their potential for targeted anticancer applications.

**Keywords:** Astaxanthin; Chitosan; Hyaluronic acid; Anti-tumour activity

**PC-574**

## FORMULATION AND EVALUATION OF NIOSOMAL HERBAL HAIR SERUM USING ALKANET ROOT EXTRACT

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In recent years, hair-related problems have become an important source of stress and depression for many individuals, mainly driven by factors such as genetics, hormonal changes, environmental effects, and the use of chemical hair products. The purpose of this research paper is to evaluate a herbal hair serum using Alkanet tinctoria root extract with various natural ingredients to solve the prevalent hair problems. The alkanet root is a natural component that has several possible benefits with a rich history of traditional use. It is rich in alkannin and shikonin, which promote hair growth and have many other medicinal activities. In recent times, herbal formulations have become more popular due to their fewer side effects. More popularly, hair serum is preferred by many people due to its mild and non-disintegrating nature over hair oil. Herbal hair serum has been developed with a focus on promoting hair growth, enhancing management, and reducing the side effects associated with chemical options. Formulation involves Niosome, in which active ingredients are encapsulated to improve the delivery and efficacy of active ingredients. The niosomal incorporation of the alkanet root extract in a herbal serum greatly improves its stability and bioavailability, providing a promising natural option for hair care. Herbal hair serum is evaluated through physical appearance, viscosity, skin irritation test, and antimicrobial efficacy against Malassezia globosa, demonstrating promising results, indicating that the prepared serum is safe and effective for daily use.

**Keywords:** Alkanet Tinctoria, Hair serum, niosome, Hair growth, Herbal formulation.

**PC-575**

## ROLE OF 3D PRINTING IN PHARMACEUTICAL DRUG DEVELOPMENT

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The advent of 3D printing technology has heralded a transformative era in various sectors, including the pharmaceutical industry. This review paper explores the pivotal role of this technology in pharmaceutical drug development, offering a comprehensive analysis of its applications, benefits, challenges, and future prospects. 3D printing, or additive manufacturing, has demonstrated significant potential in revolutionizing drug formulation and production by enabling the precise fabrication of complex drug geometries, personalized dosages, and multi-drug combinations with controlled release characteristics. The technology allows for the creation of dosage forms that are specific to individual patient needs, potentially improves efficacy, patient compliance, and therapeutic outcomes of the drug. Additionally, 3D printing presents opportunities for rapid prototyping and innovation in drug design, reducing development times and costs. However, the integration of 3D printing into pharmaceutical manufacturing also poses regulatory, technical, and ethical challenges that need to be addressed to fully leverage this technology's potential. This paper reviews the current state of these technologies in drug development, including fused deposition modelling, stereolithography, and selective laser sintering, among others. It discusses their implications for personalized medicine, the regulatory landscape, intellectual property issues, and the environmental impact of pharmaceutical manufacturing. Moreover, the paper outlines the future directions emphasizes the need for interdisciplinary collaboration, standardization, and regulatory frameworks to foster innovation while ensuring patient safety and product quality. Through this review, the transformative potential of three - dimensional printing in pharmaceutical development of drug, marking shift towards more personalized, efficient, and sustainable drug manufacturing processes are highlighted.

**Keywords:** 3D printing technology, transformative era, pharmaceutical drug development, additive manufacturing, personalized medicine.

**PC-576**

## NOVEL CAPSULE IN CAPSULE FORMULATION

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Fungal infections continue to pose a major therapeutic challenge, particularly with the rise of drug resistance and patient non-compliance due to side effects of conventional antifungal drugs. Itraconazole, a broad-spectrum triazole antifungal agent, is effective against systemic and superficial fungal infections but often causes gastrointestinal disturbances, including dysbiosis and constipation, during prolonged therapy. To address these limitations, the present project focuses on capsule-in-capsule formulation combining Itraconazole with Triphala, a traditional Ayurvedic formulation composed of Terminalia chebula, Terminalia bellirica, and Emblica officinalis. Triphala is recognized for its antioxidant, anti-inflammatory, gut-regulating, and prebiotic activities, which may counteract the gastrointestinal side effects of Itraconazole and improve therapeutic acceptability. The inner capsule will be loaded with Itraconazole, ensuring controlled antifungal release, while the outer capsule will contain Triphala to support gut health and restore intestinal balance. The formulation will be evaluated for physicochemical properties, compatibility, in vitro dissolution, and antifungal efficacy against selected fungal strains using zone of inhibition and minimum inhibitory concentration assays. Additionally, intestinal gut motility studies will be performed to determine the protective effect of Triphala on bowel regularity and to validate its supportive role in minimizing Itraconazole-induced gastrointestinal discomfort. By integrating modern antifungal therapy with a time-tested herbal formulation, this study aims to create a safe, effective, and patient-compliant antifungal dosage form. The expected outcome is a dual-benefit capsule that not only enhances antifungal activity but also promotes gastrointestinal well-being.

**Keywords:** Capsule-in-capsule, Itraconazole, Triphala, antifungal therapy, gut motility, synergistic effect

**PC-577**

## FORMULATION AND EVALUATION OF GANCICLOVIR FLOATING CONTROLLED DRUG DELIVERY SYSTEM

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Oral controlled release dosage form has been developed over the past three decades due to their considerable therapeutic advantages such as ease of administration, patient compliance and flexibility in formulation. One of the most feasible approaches for achieving a prolonged predictable drug delivery profile is floating drug delivery system (FDDS) which prolongs the gastric residence time and increases the overall bioavailability of the dosage form. In this study the Ganciclovir is formulated as a floating tablet. 4 formulations were prepared. In each formulation drug concentration remains the same and excipient concentration was varied. Direct compression method was used for the formulation. Different polymers such as HPMC K 15, HPMC K 100, MCC were used with other standard excipients. Sodium bicarbonate was used




ISBN: 978-81-980623-8-3

as effervescent agent. The prepared powder blend was evaluated for its preformulation characteristics viz, true density, bulk density, compressibility index, angle of repose, Hausner's ratio.The physical characters of tablet were evaluated viz, hardness, friability, weight variation, thickness, drug content, swelling study, floating time and in vitro dissolution analysis. The results of preformulation study showed that the prepared powder blend had good flow property and packaging ability. The results of hardness and friability test revealed that all the twelve formulation F1 to F4 showed good mechanical strength and complied with pharmacopoeial specifications. Optimized formulation F3 showed a drug release of 97.55±1.53 % and a floating lag time of 2.92 min and total floating time of >15 h clearly complies with the standard values. Overall results showed that the formulation satisfies the parameters necessary for a good floating drug delivery system. The results of the present study clearly stipulate the feasibility to develop Ganciclovir in the form of gastroretentive drug delivery system with prolongation of gastric retention time and controlled drug release.

**Keywords:** Ganciclovir, Floating time, Floating tablets, Swelling index

**PC-578**

**OPTIMIZATION AND CHARACTERIZATION OF FLAX SEED MUCILAGE-BASED IMMEDIATE RELEASE TABLET FORMULATION**

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In tablet formulations, pharmaceutical excipients are essential, and natural sources are becoming more and more popular because of their accessibility, affordability, and safety. In senna-based immediate release tablets, flaxseed mucilage (FSM), a hydrocolloid high in polysaccharides, was assessed as a possible natural binder and disintegrant. Following its extraction, characterization, and determination of its physicochemical properties (pH 6.4, swelling index 53.84%), FSM was shown to be suitable for gastrointestinal disorders. Different FSM concentrations were used to generate the formulations, which were then compared to starch as a standard binder. With a hardness of 7.2 kg/cm2, a disintegration time of 5.1 minutes, and a total drug release of 99.81% within 60 minutes, the optimized formulation (F5), which contained 4% FSM and 10% starch, outperformed the other factorial design batches. These findings suggest that FSM not only had sufficient binding qualities but also made a substantial contribution to quick breakdown and effective drug release. Similar results were obtained from comparison research with the commercially available senna tablet (Senasof), which demonstrated a hardness of 8.0 kg/cm2, disintegration in 6 minutes, and 99.03% drug release at 60 minutes. This proves that FSM is a good natural substitute for artificial binders. The study demonstrates that flaxseed mucilage can be effectively used as a natural excipient in immediate-release laxative pills because of its swelling capability and advantageous physicochemical profile. Its performance, which is on par with a commercial product, shows that it can either supplement or replace traditional binders and disintegrants in medicinal formulations.

**Keywords:** Flaxseed mucilage, natural excipients, senna, immediate release tablets, laxative.

**PC-579**

**FORMULATION DEVELOPMENT AND CHARACTERIZATION OF SUSTAINED RELEASE EFFERVESCENT FLOATING AND FLOATING ADHESIVE BILAYERED TABLETS OF EZETEMIBE-NATEGLINIDE AND GEMFIBROZIL-NATEGLINIDE**

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A major constraint in oral controlled release drug delivery system (CRDDS) is that not all drug candidates are absorbed uniformly throughout the GIT. Some drugs are absorbed in a particular portion of the GIT only or are absorbed to a different extent in various segments of the GIT. Such drugs are said to have an absorption window, which identifies the drugs primary site for absorption in the GIT. Drugs having site-specific absorption are difficult to design as oral CRDDS because once the drug is released after crossing the absorption window, the released drug goes to waste with negligible or no absorption. This phenomenon drastically decreases the drugs bioavailability. In this situation, design of CRDDS is to be modified in such a way that it has more residence time in stomach to release the drug before the absorption window. Bilayer tablets are prepared with different drugs, these two drugs are released at a time. This type of design is called as bilayered gastroretentive drug delivery system (GRDDS) and provides the better absorption. In this research work, nateglinide, ezetimibe and gemfibrozil were selected as model drugs. Nateglinide is an aminoacid derivative that induces an early insulin response to meals decreasing postprandial blood glucose levels which act by binding to β cells of the pancreas to stimulate insulin release. Ezetimibe is a lipid-lowering compound that inhibits intestinal cholesterol and phytosterol absorption. Gemfibrozil is used with diet changes (restriction of cholesterol and fat intake) to reduce the amount of cholesterol and triglycerides in the blood in certain people with very high triglycerides who are at risk of pancreatic disease. All the tablets were prepared by direct compression method. The prepared tablets were evaluated for their pre-compression characters (equilibrium solubility study and acid stability study of the drug, bulk density, tapped density, compressibility index, angle of repose and drug-excipient compatibility study) and post-compression characteristics such as hardness, thickness, weight variation, friability, drug content, in vitro buoyancy, in vitro dissolution studies, swelling studies, bioadhesive studies, stability studies, in vivo radiological and bioavailability studies in human volunteers.

**Keywords:** Constraint, Post prandial, buoyancy, bioadhesive, bioavailability.

**PC-580**

**FORMULATION AND EVALUATION OF HERBAL PATCH FOR SYMPTOMATIC TREATMENT OF VARICOSE VEINS**

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Varicose veins are a prevalent chronic venous disorder characterized by dilated, tortuous superficial veins, resulting in pain, swelling, and heaviness that impair quality of life. Current treatment options, including surgery and minimally invasive procedures, are costly, invasive, and unsuitable for patients such as pregnant women or individuals with diabetes who are at higher surgical risk. Conventional oral and topical pharmacotherapies provide only partial relief due to poor dermal penetration and bioavailability. This study focused on the development and evaluation of a herbal nanoemulsion-based transdermal patch designed for symptomatic relief of varicose veins. The formulation incorporated venotonic, anti-inflammatory and analgesic. A nanoemulsion was prepared using high-energy emulsification, yielding a droplet size <100 nm and low polydispersity index, ensuring stability and efficient transdermal delivery. The optimized nanoemulsion was incorporated into a patch and evaluated for mechanical strength, drug content uniformity, ex vivo skin permeation, and release kinetics. Results demonstrated improved dermal permeation and sustained drug release. Skin irritation studies confirmed good dermal safety. Overall, the developed herbal nanoemulsion patch provides a non-invasive, cost-effective, and patient-compliant alternative for managing varicose vein symptoms. Its use is particularly advantageous for pregnant women and diabetic patients who cannot undergo surgical intervention, offering enhanced therapeutic outcomes through synergistic analgesic, anti-inflammatory, and venotonic effects.

**Keywords:** Varicose veins, herbal, patch, venotonic, anti-inflammatory

**PC-581**

**FORMULATION AND EVALUATION OF A HERBAL ANTIMICROBIAL CREAM WITH OPTIMIZED TOPICAL PROPERTIES AND THERAPEUTIC POTENTIAL**

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This study focused on formulating and evaluating a herbal antimicrobial cream containing ethanolic extracts of Curcuma longa (curcumin) and Glycyrrhiza glabra (glycyrrhizin). Three optimized batches (F1, F2, F3) were prepared with excipients including sesame oil, coconut oil, white




ISBN: 978-81-980623-8-3

beeswax, and linoleic acid. Among these, batch F3 showed superior physicochemical properties and was selected as the most effective. The prepared cream exhibited desirable characteristics, including a smooth, non-greasy appearance, homogeneity, skin-compatible pH (6.21), suitable spreadability (9.33 g·cm/sec), and viscosity with pseudoplastic rheology, ensuring ease of topical application and skin compatibility. Permeation of actives was confirmed by Franz diffusion studies. Antimicrobial efficacy was assessed by the disc diffusion method, where filter paper discs impregnated with the formulation were placed on agar plates inoculated with standardized microbial cultures; zones of inhibition measured 20 mm against Escherichia coli, 18 mm against Staphylococcus aureus, and 15 mm against Candida albicans, demonstrating broad-spectrum activity. The formulation remained stable without phase separation during evaluation. This synergistic cream, enhanced by functional excipients like sesame oil, offers a promising natural alternative for microbial skin infections. Future studies may explore its potential anticancer activity to broaden therapeutic applications.

**Keywords:** Curcumin, Glycyrrhizin, sesame oil, herbal cream, antimicrobial activity, topical formulation, anticancer potential

**PC-582**

## FORMULATION AND EVALUATION OF FAST DISSOLVING TABLETS BY NANOCRYSTAL TECHNOLOGY FOR POORLY WATER-SOLUBLE DRUG

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This study focuses on the development of nanocrystal (NC) based fast dissolving tablets (FDTs) of Valsartan to enhance its solubility, dissolution, and bioavailability. Valsartan, a poorly water-soluble antihypertensive drug, was successfully processed into nanocrystals using the solvent-antisolvent precipitation method, optimized through a $2^3$ factorial design by varying stabilizer concentration, solvent to antisolvent ratio, and stirring speed. The prepared nanocrystals exhibited significantly higher saturation solubility than the pure drug due to reduced particle size. FDTs containing 20 mg of Valsartan nanocrystals were formulated via direct compression using 341roscarmellose sodium (CCS) and sodium starch glycolate (SSG) as superdisintegrants. Pre compression and post compression evaluations confirmed excellent flow properties, mechanical stability, and compliance with pharmacopeial standards. Among the six formulations, F3, containing 20 mg of CCS, demonstrated the shortest disintegration time (10.6 seconds) and the highest drug release (95.02% within 12 minutes). These findings highlight the potential of nanocrystal-based FDTs in improving Valsartan's bioavailability and addressing limitations associated with conventional tablet formulations, offering a promising alternative for better patient compliance and therapeutic efficacy.

**Keywords:** Nanocrystals, (NC), Fast Dissolving Tablets (FDTs), Solubility, Dissolution, Direct compression and Antihypertensive Drug.

**PC-583**

## DEVELOPING AND STANDARDIZING SUSTAINED RELEASE METFORMIN HYDROCHLORIDE TO PREVENT DIABETES

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Double layered solid dosage form used for internal purpose. It is double layered one is sustained release and other is immediate release. This research manages formulation of bilayer tablet of Metformin Hydrochloride used for slow drug releasing layer. Lab based studies of sustained release was performed and release profile of Lot L6 containing 40% concentration of HPMCK100 was best compared to other five formulations. As there is increment in polymer concentration then release time also rises. Metformin hydrochloride is a first choice of drug as it fallen both basal as well as post elevated blood sugar level in patient with insulin independent diabetes. Since it lowers the plasma glucose without affecting insulin secretion. HPMCK100 shows release up to 12hrs. at higher concentrations with other polymer xanthum gum. According to the n value of Koreseyer, the drug release kinetics of sustained release formulation match the Higuchi model, and Peppas's model appears to be a complex process of swelling and diffusion with zero order kinetics. Based on the solubility criteria of BCS different drug can be incorporated in bilayer drug delivery system to improve their bioavailability and to reduce the dose of drug with reduction in frequency of administration.

**Keywords:** Double layered, Metformin hydrochloride, Xanthum gum, Plasma glucose, solubility.

**PC-584**

## QUALITY BY DESIGN-BASED FORMULATION AND EVALUATION OF GASTRORETENTIVE FLOATING TABLETS OF TRAMADOL HYDROCHLORIDE

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The present study aimed to design and develop gastroretentive floating tablets of tramadol hydrochloride using a Quality by Design (QbD) approach to enhance gastric residence time and achieve sustained drug release. Floating tablets were prepared by direct compression using hydrophilic polymers such as xanthan gum, HPMC K100M CR, and their combinations. Preformulation studies including IR and DSC confirmed drug–excipient compatibility. A factorial design under QbD principles was employed to identify critical formulation variables influencing buoyancy and drug release. Prepared formulations were evaluated for buoyancy lag time (BLT), total floating time (TFT), dissolution, and drug release kinetics. Among the formulations, batch F8 (HPMC K100M CR 15% + xanthan gum 10% of tablet weight) exhibited optimized performance with >90% sustained release, BLT of 10 seconds, and TFT of over 24 hours. The release kinetics followed non-Fickian diffusion (n = 0.605), indicating combined diffusion and erosion mechanisms. Accelerated stability studies at 40 ± 2 °C/75 ± 5% RH for 30 days showed no significant changes in drug content or floating properties, confirming formulation stability. The optimized formulation demonstrated prolonged gastric retention, rapid buoyancy, and controlled drug release, making it a promising gastroretentive drug delivery system. The application of QbD provided a systematic framework for robust formulation development of tramadol HCl floating tablets.

**Keywords:** Quality by Design (QbD), gastroretentive system, floating tablets, sustained release, stability.

**PC-585**

## DEVELOPMENT OF 3D PRINTED BIODEGRADABLE MICRONEEDLES WITH PARACETAMOL LIPOSOMES; A NOVEL APPROACH FOR THE ANTI PYRETIC EFFECT

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The study aimed for the development of biodegradable 3D-printed microneedles with Paracetamol liposomes , a novel approach for the Antipyretic effect. The term 'Transdermal delivery' refers to the diffusion of a solute through the different layers of the skin to reach the systemic circulation and elicit a therapeutic effect. Microneedles are micron scaled medical devices. Microneedles are prepared using 3D printed microneedle fabrication method and the pure Paracetamol and Paracetamol liposomes were prepared and loaded into microneedle.The biocompatibility and safety of the Pure Paracetamol-loaded microneedles and Paracetamol liposome-loaded microneedles were evaluated through invitro and invivo studies to assess their efficacy in delivering anti-inflammatory and antipyretic effect were performed. Pure paracetamol loaded microneedles decreased temperature from 31.56°C to 29.10°C at 45 minutes , 28.70°C at 60 minutes , and 28.40°C at 120 minutes and Paracetamol liposomes loaded microneedles dropped the temperature from 31.56°C to 29.30°C at 45 minutes , 28.50°C at 60 minutes and 28.00°C at 120 minutes The study demonstrates that both pure paracetamol-loaded microneedles and paracetamol liposome-loaded microneedles are effective in inducing a significant reduction in rectal temperature, particularly the paracetamol liposome loaded Microneedle is one of the most effective treatment for producing the Antipyretic effect.




ISBN: 978-81-980623-8-3

**Keywords:** Transdermal drug delivery, Bio degradable Microneedle, Paracetamol, Anti Pyretic effect

**PC-586**

**DEVELOPMENT & CHARACTERIZATION OF HERBAL NIOSOMES FROM COSTUS IGNEUS LEAVES FOR MANAGEMENT OF DIABETES**

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Diabetes mellitus is a chronic condition characterized by high blood glucose levels. The prevalence of type 2 diabetes is increasing due to factors like obesity and decreased physical activity. Diabetes can lead to serious complications such as end-stage renal disease, ischemic heart disease (IHD), and blindness. While there are treatments available to manage diabetes, there is currently no permanent cure. However, research has shown that certain plant extracts from medicinal plants & their novel formulations have anti-diabetic properties and can potentially improve the function of pancreatic beta cells. Costus igneus, commonly known as insulin plant in India, belongs to the family Costaceae. Consumption of the leaves are believed to lower blood glucose levels, and diabetics who consumed the leaves of this plant did report a fall in their blood glucose levels. The purpose of this study is to develop novel herbal formulation from Costus igneus leaves and evaluate it for either improved its ability to treat or prevent diabetes & compare with activity of plant extract. Niosomes from the extracts was developed, standardized, and tested for comparative antidiabetic study in an in- vitro assay using alpha amylase and in vivo assay by Oral Glucose Tolerance Test (OGTT) on four groups of female Albino Wistar rats. Results were compared for formulated niosomes and conventional extract of Costus igneus leaves.

**Keywords:** Costus igneus, diabetes, niosome, novel herbal formulation

**PC-587**

**FORMULATION OF A VAPOURIZER-BASED AIR DISINFECTANT WITH ANTIMICROBIAL AND ANTIVIRAL ACTIVITY**

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The COVID-19 pandemic reminded us how quickly infections can spread through the air, especially in closed spaces. While chemical air disinfectants are widely used, they often bring side effects such as irritation, toxicity, and environmental damage. This has created a need for safer, natural solutions. Our work focuses on creating a herbal air vapourizer that can fight both bacteria and viruses while being safe and eco-friendly for daily use. We selected well-known medicinal plants and prepared their extracts and used to make a vapourizer formulation, which was then tested for its ability to stop harmful bacteria (S. aureus and E. coli) and to reduce viral activity in lab conditions. The herbal vapourizer successfully reduced bacterial growth and also showed encouraging antiviral effects. It proved to be safe, environmentally friendly, and left behind no harmful residues. This herbal vapourizer offers a natural and sustainable way to keep indoor air healthier. With its antibacterial and antiviral action, it could help lower the risk of airborne infections and support cleaner air in a post-COVID world.

**Keywords:** COVID-19, Herbal vapourizer, Antibacterial, Antiviral, Natural air disinfectant

**PC-588**

**DEVELOPMENT AND EVALUATION OF ROFLUMILAST SOLID DISPERSION FAST DISSOLVING TABLETS**

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The main objective of the present investigation was to formulate and evaluate fast dissolving tablets of roflumilast solid dispersions using direct compression method. Roflumilast solid dispersions were prepared by solvent evaporation as well as melting method. Roflumilast is a selective, long-acting inhibitor of the enzyme PDE-4 and has anti-inflammatory effects. It is used orally in the treatment of chronic obstructive pulmonary disease (COPD). Roflumilast drug belongs to BCS Class II drugs that have low solubility and high permeability. The current research work was focused to improve the aqueous solubility of roflumilast using solid dispersion technique and enhance the dissolution rate. Based on results of solubility analysis, phosphate buffer pH 6.8 was chosen as the dissolution medium. The powder blend of roflumilast solid dispersions was evaluated for flow characteristics. The fast-dissolving tablets of rolfumilast solid dispersions were subjected to post compression parameters such as weight variation, hardness, thickness, friability, drug content, wetting time, water absorption ratio, in vitro dispersion time and in vitro disintegration time and the results were found to be within the acceptable limits. Based on FT-IR spectra obtained, it was evident that there was no significant interaction of roflumilast with carriers and other excipients. From the results of dissolution study, SD1 and SD18 formulations were considered as best formulations.

**Keywords:** Solid dispersions, fast dissolving tablet, roflumilast, solvent evaporation, melting method.

**PC-589**

**FORMULATION OF A MUCOADHESIVE BUCCAL FILM OF SAROGLITAZAR WITH NATURAL BIOENHANCERS FOR ENHANCED PERMEABILITY AND PATIENT COMPLIANCE**

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This study describes the design and assessment of a mucoadhesive buccal film incorporating Saroglitazar, an antidiabetic drug classified under BCS Class III. Although Saroglitazar is highly soluble, its therapeutic utility is limited by poor permeability. To address this, buccal films were prepared to improve absorption and simplify administration. Hydroxypropyl methylcellulose (HPMC E15) served as the primary film forming polymer, with chitosan added to provide mucoadhesion. Piperine, a natural bioenhancer, was included to promote transmucosal transport, while glycerin and propylene glycol acted as plasticisers. Citric acid was used to regulate pH and sodium benzoate as a preservative. The films were fabricated by solvent casting in a 100 mL batch, producing 100 units each containing 1 mg of Saroglitazar. The final films were smooth, uniform and 2.0 mm thick with consistent weight. Folding endurance exceeded 300 cycles, confirming good flexibility. Surface pH was maintained at 6.5, supporting mucosal compatibility. Drug content uniformity was close to 90%of the stated dose per unit. The films also demonstrated adequate mucoadhesion and stable moisture content under storage. This formulation provides a promising delivery strategy for bypassing first-pass metabolism while overcoming permeability barriers. The combination of natural bioenhancers and mucoadhesive polymers adds novelty and positions the system as a potential candidate for patent protection.

**Keywords:** Saroglitazar, buccal film, mucoadhesion, bioenhancer, solvent casting.

**PC-590**

**FORMULATION AND EVALUATION OF FLOATING ALGINATE BEADS OF METFORMIN HYDROCHLORIDE**

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The objective of this study was to develop and evaluate metformin hydrochloride-loaded microbeads using the ionic gelation technique for controlled drug delivery. Five different formulations (F1–F5) were prepared by varying the concentrations of sodium alginate, a natural




ISBN: 978-81-980623-8-3

polymer, and using calcium chloride as the cross-linking agent. The prepared microbeads were subjected to a series of in vitro evaluation parameters, including particle size analysis, percentage yield, entrapment efficiency, and swelling index. Among all formulations, F3 exhibited the most favorable characteristics, showing the highest percentage yield of 68.51% and an entrapment efficiency of 88.25%, indicating effective drug incorporation and process efficiency. An in vitro drug release study was conducted for the optimized formulation (F3), which demonstrated a sustained release profile, with 79.82% of the drug released over a period of 8 hours. Drug release kinetics were analyzed, and the results indicated that all formulations followed a zero-order kinetic model with Fickian diffusion, suggesting a consistent and controlled release mechanism. Compatibility between the drug and excipients was confirmed using Fourier Transform Infrared Spectroscopy (FTIR), showing no significant interactions. Additionally, Scanning Electron Microscopy (SEM) confirmed the spherical morphology and smooth surface of the microbeads.In conclusion, the formulated microbeads exhibit promising potential as an effective drug delivery system for achieving sustained and controlled release of metformin hydrochloride, enhancing therapeutic efficacy and patient compliance.

**Keywords:** metformin hydrochloride, controlled drug delivery, ionic gelation

**PC-591**

## NEEDLELESS INJECTION – A PAINLESS PARENTERAL DELIVERY FOR IMPROVISED PATIENT COMPLIANCE

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When it comes to quick start of action, no drug waste, and avoiding first-pass metabolism, parenteral medication delivery is the most outstanding option. Nevertheless because of the severe pain and suffering it generates, it is least desired in terms of patient comfort. In order to deliver medication through the skin without the use of a traditional needle, needleless injection, also known as needle-free injection, uses a device-generated high-velocity jet of liquid or powder. This technique boosts patient comfort and compliance while minimizing the risk of needlestick injuries, pain, and needle phobia. These devices make medicine delivery safer and more convenient by creating a fluid "needle" that pierces the skin's protective outer layer using processes like spring power, gas pressure, or laser technology. Needleless injections are a chosen option due to their reduced pain and anxiety, increased stability, decreased infections, safety for healthcare providers, and improved patient compliance and adherence. These are versatile enough to offer liquid and powder formulations driven by gas, spring, or piezoelectric methods, as well as depot formulations for extended release. The major setbacks are risks of cross-contamination, under-dosing, and skin damage. Certain needle-free devices use high pressure, which can harm delicate drug molecules, especially when administering complex biological medications like monoclonal antibodies. In order to improve control, newer jet injectors are being developed with configurable parameters to accommodate varying skin thicknesses and desired depths.

**Keywords:** Needless Injections, Painless, Injectors, Suffering, Adherence.

**PC-592**

## SLN BASED DELIVERY OF CYTARABINE FOR THE EFFECTIVE MANAGEMENT OF LEUKEMIA

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Treatment protocols for leukemia are associated with several side effects. For effective management of this disease chemotherapy is generally used alone as well as in combination of other therapies. In such cases, trained medical personnel with close monitoring of therapeutic responses is essentially required as these protocols are generally employed through parenteral route e.g. infusion or injection. The poor patient compliance for these routes of administration is well known. In such scenario alternative administration of formulations is urgent need to avoid side effects as well as increase patients comfort. Cytarabine (cytosine arabinoside, 1-b-D-arabinofuranosyl cytosine) is an anticancer drug belonging to pyrimidine nucleoside analogue. It is one of the mainstays used in the treatment of acute myeloid leukemia, non-Hodgkin's lymphoma (blast phase) and erythroleukemia. SLN were prepared by ultrasonic emulsification method showed uniform with size range 174 ± 5.3 to 226 ± 10.5 and zeta potential 29.2 ± 6.4 to -44.2 ± 0.8 mV. The optimum formulation showed smooth surface through SEM and after some fast delivery, release rate became slow after 4 h and remained for 144 h. In vivo performance of the formulation showed promising anticancer effect on cell and also on mice as compared to controlled as well as standard therapy.

**Keywords:** anticancer, cytarabine, invitro release, sustained effect and leukemia.

**PC-593**

## TAILORED ANTIMICROBIAL NANOFIBERS: COMPARATIVE STUDY OF SILVER NANOPARTICLE ENCAPSULATION IN NATURAL AND SYNTHETIC POLYMER SYSTEMS

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The escalating threat of antimicrobial resistance demands innovative therapeutic approaches beyond conventional antibiotics. This study investigates silver nanoparticle (AgNP) encapsulation within diverse polymeric nanofiber matrices to develop effective antimicrobial materials. Four polymer systems were evaluated: gelatin type A and cellulose (natural polymers), polyvinyl alcohol (PVA), and gelatin-polyvinylpyrrolidone K-90 composite (synthetic/hybrid systems). Silver nanoparticles were synthesized in situ in polymeric solutions and incorporated into polymer solutions for electrospinning fabrication. Resulting nanofibers exhibited diameters ranging 400nm-1µm with uniform AgNP distribution confirmed via scanning electron microscopy and X-ray diffraction analysis. Antimicrobial efficacy was assessed against Gram-positive bacteria like S aureus and MRSA, and Gram-negative E coli and Pseudomonas aeruginosa, as well as on fungi Candida albicans, using disk diffusion. Gelatin-PVP composite nanofibers demonstrated superior performance with the highest zones of inhibition, followed by gelatin type A, PVA, and cellulose systems. Natural polymer matrices facilitated enhanced silver ion release through hydrophilic interactions and protein-based functional groups. The composite gelatin-PVP system exhibited optimal sustained release characteristics, maintaining antimicrobial activity for 72-96 hours. This comparative analysis establishes that polymer matrix selection critically influences antimicrobial efficacy and biocompatibility. Natural polymer-based systems, particularly gelatin type A and PVP K-90 composites, offer superior therapeutic potential for wound care and infection control applications, providing a foundation for rational design of next-generation antimicrobial materials. Cytotoxicity evaluation of silver nanoparticles using L929 fibroblasts confirmed biocompatibility across all systems, with natural polymers showing superior cell viability.

**Keywords:** Silver nanoparticles, electrospun nanofibers, antimicrobial activity, polymer matrix, comparative study

**PC-594**

## FORMULATION AND EVALUATION OF COROSOLIC ACID-LOADED NANOEMULGEL FOR TREATMENT OF PSORIASIS AND INFLAMMATORY CONDITIONS

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Psoriasis is a chronic, immune-mediated inflammatory skin disorder characterized by keratinocyte hyperproliferation, erythematous plaques, and relapsing symptoms that significantly affect patients' quality of life. Conventional therapies, although effective, are often associated with adverse effects, drug resistance, and poor patient compliance. In this context, herbal bioactives have gained prominence as safer alternatives. Corosolic acid, a pentacyclic triterpenoid with proven anti-inflammatory, antioxidant, and immunomodulatory properties, presents promising


ISBN: 978-81-980623-8-3

potential for psoriasis management. The present study aims at the development of a corosolic acid-loaded nanoemulgel formulation to enhance solubility, stability, and skin penetration of the bioactive. A nanoemulsion of corosolic acid was first prepared using oil, surfactant, and co-surfactant by spontaneous emulsification method, followed by incorporation into a suitable gel base to achieve a nanoemulgel system. This hybrid formulation offers the dual advantage of the enhanced permeation profile of nanoemulsions and the topical applicability and retention of gels. The developed nanoemulgel is expected to improve therapeutic efficacy, ensure sustained release, and minimize systemic side effects. Such a formulation could serve as an effective, patient-friendly, and herbal-based alternative for the topical treatment of psoriasis, aligning with the growing trend towards safe and natural remedies in dermatological care.

**Keywords:** Psoriasis Corosolic acid Nanoemulgel Herbal bioactives Topical drug delivery Anti-inflammatory

**PC-595**

## PHARMACEUTICAL DESIGN AND IN-VITRO EVALUATION OF CALOTROPIS GIGANTEA-BASED NANOFORMULATION FOR DERMATOLOGICAL THERAPY

TILOTMA SAHU

The present study focuses on the formulation, characterization, and in-vitro evaluation of a Calotropis gigantea-based topical nanoformulation aimed at improving therapeutic outcomes in dermatological disorders. Fresh latex of Calotropis gigantea was collected from stem incisions and analyzed for phytoconstituents using HPLC. A nanoformulation in the form of hyalurosomes was prepared by the ethanol injection–solvent evaporation method. The prepared system was subjected to comprehensive characterization including particle size, polydispersity index (PDI), zeta potential, entrapment efficiency, viscosity, morphology through transmission electron microscopy (TEM), and in-vitro drug release studies. A conventional Carbopol-based gel was also formulated to serve as a comparative standard. For mechanistic evaluation, Rhodamine-loaded hyalurosomes (CGHNF) were developed and employed for cellular uptake studies. Pharmacological assessments included cell uptake efficiency, cell viability assay, melanin content assay, tyrosinase activity assay, and Fontana-Masson silver staining using the B16F10 cell line. Phytochemical profiling revealed lupeol, β-amyrin, α-calotropeol, β-calotropeol, uscharin, and 20-epi-uscharin as the major bioactive compounds in the latex. The developed nanoformulation displayed an average particle size of 154.90 ± 1.7 nm, a PDI of 0.28, and a zeta potential of –17.00 mV. Entrapment efficiency was found to be 84.56%. Cellular uptake studies demonstrated significantly enhanced internalization (60.60 ± 3.23%) for Rhodamine-CGHNF compared with free dye solution (32.01 ± 4.85%). The cell viability assay indicated superior cytotoxicity of CGHNF (68.71 ± 2.76%) over the Carbopol gel (52.10 ± 9.63%) at 50 µM concentration. Furthermore, assays on melanin synthesis and tyrosinase activity suggested the formulation's potential in regulating skin pigmentation pathways. The study successfully developed a Calotropis gigantea-based nanoformulation with nanoscale size, high entrapment efficiency, and improved cellular penetration. The deformable nature of hyalurosomes, along with sustained drug release, highlights their potential to enhance dermal delivery and reduce dosing frequency. Comparative studies established the superiority of the nanoformulation over the conventional Carbopol gel in terms of cell uptake and therapeutic activity.

**Keywords:** Calotropis gigantea, hyalurosomes, nanoformulation, dermatological therapy, B16F10 cell line, HPLC, cell uptake

**PC-596**

## QUALITY BY DESIGN-DRIVEN OPTIMIZATION OF CAFFEIC ACID CUBOSOMES: A BIOAVAILABLE NANOPLATFORM FOR BREAST CANCER TREATMENT

AMOL MANIK PATIL

Breast cancer is among the major contributors in the death of women due to cancer. Polyphenol, especially in the form of caffeic acid (CA), derived from plants, has been demonstrated to have good anticancerous activity, but its clinical applications are inhibited by less water solubility, instability and high rate in clearing out of the systems. Here, this study is intended to develop and optimise CA loaded cubo-somes (CA-CN) with quality by design (QbD) to advance the therapeutic potential associated with breast cancer. To study the impact of glyceryl monooleate (GMO) concentration, Poloxamer 407 concentration and sonication time on the particle size, zeta potential and entrapment efficiency, a three-factor three-level Box- Behnken Design (BBD) was used. The optimized formulation exhibited particle size of 101 nm and zeta potential of -30mV showing good colloidal stability. In the design study it was seen that the increase in Poloxamer 407 concentration and sonication time decreased particle size and entrapment efficiency considerably and that the increase in GMO concentration provided larger particle and moderate drug encapsulation. The successful encapsulation and a transition of CA to an amorphous form favoring its solubility enhancement were proved by FTIR, XRD, and DSC researches. Bioavailability and drug release were enhanced after in vitro and in vivo testing which proved CA-CN to be effective. The pharmacokinetic profile in rabbits revealed that CA-CN was associated with 3.08-fold higher bioavailability than pure CA. Conclusively, the developed cubosomal system significantly improved CA's physicochemical and pharmacokinetic profiles, indicating that it could be used as a nanocarrier for breast cancer treatment. Further research can consider the active targeting approach and scale-up feasibility to shift toward clinical development.

**Keywords:** MDA-MB-231; Nanoparticles; Phytochemicals; Herbal; Design of Experiments

**PC-597**

## CHRONOMODULATED DRUG DELIVERY SYSTEM OF VERAPAMIL HYDROCHLORIDE

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Aim of the present work was to formulate and evaluate an oral pulsatile delivery system for treatment of arrhythmias which usually occurs in early morning hours. Pulsatile tablets were prepared using different concentrations of polymers (HPMC E15, Carbopol 934P) to achieve time release of verapamil hydrochloride, based on chronopharmaceutical approach. Such delivery systems when administered at bed time, shows burst effect after the lag time there by delivering the drug where it is required most. Pulsatile tablets of verapamil hydrochloride were prepared by compression coating technique. The press coated tablets contains inner rapid release core tablet contains active ingredient (drug) and external coat comprises of polymers such as HPMC E15 and Carbopol 934P. Several pulsatile formulations were prepared and evaluated for various parameters like weight variation, hardness, thickness, content uniformity, swelling index and in-vitro drug release study. Solid state characterization (FTIR studies) indicated that there no chemical interaction between drug and excipients. Swelling index and water uptake studies showed linearrelation between swelling and lag time.In vitro dissolution study was carried out for 8 hours using USP type II dissolution apparatus (paddle) with 0.1N HCl as dissolution medium. Based on the in vitro release data it was evident that the developed formulation F7 coated with 380 mg HPMC and 5mg Carbopol 934P showed lag time 5 hours, and percent drug release was found to be 98% at 6th hour, hence considered to be optimum.

**Keywords:** Chronomodulated, pulsatile, verapamil, lag time

**PC-598**

## "DEVELOPMENT AND CHARACTERIZATION OF A VAGINAL SPRAY: A PROMISING APPROACH FOR OVERCOMING ANTIFUNGAL RESISTANCE IN VAGINAL CANDIDIASIS"

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Vaginal candidiasis, primarily caused by Candida albicans, is one of the most common fungal infections affecting women worldwide. Symptoms such as itching, irritation, and abnormal discharge not only cause physical discomfort but also contribute to emotional distress. Conventional antifungal therapies, particularly triazoles like fluconazole, are increasingly limited by high relapse rates and widespread resistance, with reports indicating resistance in over 90% of clinical isolates. This




ISBN: 978-81-980623-8-3

highlights the urgent need for innovative therapeutic approaches that combine efficacy, safety, and patient convenience. This study presents a novel herbal–synthetic combination vaginal spray, engineered to overcome the limitations of current antifungal treatments and enhance therapeutic outcomes. The system integrates fluconazole, a clinically established antifungal, with thymol, a phytoconstituent from Thymus vulgaris essential oil, to achieve a synergistic dual mechanism of action capable of combating resistant Candida strains. The spray-based platform is designed to improve stability of volatile herbal components, minimize irritation, and avoid dose dumping commonly associated with semisolid formulations, while offering a user-friendly mode of administration that enhances compliance. Formulation development and optimization are guided by a Quality by Design (QbD) framework, ensuring reproducibility, robustness, and patient safety. Comprehensive characterization including pH, viscosity, spray performance, droplet size distribution, drug content uniformity, stability will provide critical insights into formulation performance and therapeutic potential. By integrating the strengths of synthetic and natural antifungals within an advanced spray system, this approach offers a promising, patient centered strategy for the effective management of resistant vaginal candidiasis, with potential to improve therapeutic outcomes and overall quality of life.

**Keywords:** Vaginal candidiasis, Candida albicans, Antifungal resistance, Fluconazole, Thymol, Vaginal spray, Phytoconstituents, Synergistic therapy.

**PC-599**

## SIRNA AND STEROID-ENRICHED LIPOSOMES AS A DUAL THERAPEUTIC STRATEGY FOR PSORIASIS TREATMENT

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Psoriasis is a chronic inflammatory skin disorder characterized by elevated expression of Interleukin-17 (IL-17), a key cytokine driving its pathogenesis. The advent of short interfering RNA (siRNA) has introduced new therapeutic opportunities to suppress the overexpression of such pathogenic genes. Effective siRNA delivery, however, requires suitable carriers that can both protect and release siRNA into target cells. In this study, a liposomal formulation co-loaded with Betamethasone propionate (BMP) and IL-17 siRNA was developed for topical psoriasis therapy. The optimized liposomes exhibited an average particle size of 312±1.92 nm, a zeta potential of –27 mV, and successfully co-encapsulated BMP with complexed siRNA. The formulation demonstrated high cellular uptake without detectable cytotoxicity. In vitro skin permeation studies using a porcine skin model confirmed effective delivery of both BMP and siRNA into the skin. Furthermore, in vivo evaluation in an imiquimod (IMQ)-induced psoriasis mouse model showed that treatment with BMP–IL-17 siRNA liposomes significantly reduced IL-17A cytokine levels (ELISA), correlating with visible improvements in skin redness and scaling. Overall, these findings highlight the potential of the developed liposomal system as a dual-function platform for gene silencing and corticosteroid delivery in the topical management of psoriasis.

Keywords: siRNA, Clobetasol propionate, Liposome, Imiquimod, and Box-Behnken Design.

**PC-600**

## RESPIRAVITAL: ADVANCED NANOEMULSION DRUG SYRUP FOR ENHANCED RESPIRATORY AND IMMUNE SUPPORT

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RespiraVital is a cutting-edge nanoemulsion-based drug syrup formulated to optimize the bioavailability of Alstonia scholaris and Andrographis paniculata extracts, targeting robust respiratory relief and immune system enhancement. The formulation incorporates 200 mg/100 mL of standardized Alstonia scholaris extract, valued for its bronchodilatory, anti-inflammatory, and antimicrobial properties, alongside 150 mg/100 mL of Andrographis paniculata extract (standardized to 10% andrographolide), recognized for its potent immunomodulatory and antiviral effects. The nanoemulsion system, comprising medium chain triglycerides (MCT oil) as the oil phase, polysorbate 80 as the surfactant, and polyethylene glycol 400 as the co-surfactant, ensures superior solubility, stability, and absorption of these bioactive compounds. Complementary ingredients, including glycerol for viscosity and humectant properties, stevia extract as a natural sweetener, potassium sorbate as a preservative, and citric acid for pH adjustment (targeting 4.5–5.5), enhance palatability, stability, and shelf-life. This synergistic, patient-friendly drug formulation is designed to support respiratory health and bolster immune function, offering a novel approach to natural therapeutic intervention with improved pharmacokinetic profiles and enhanced patient compliance.

**Keywords:** Nanoemulsion Andrographolide Respiratory relief Immune support Bioavailability Bronchodilatory Antimicrobial Immunomodulatory Antiviral

**PC-601**

## INNOVATIVE WOUND DRESSING FOR ANTI-COAGULATED PATIENTS

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Bleeding leads to a critical risk in patients on anticoagulant therapy specifically patients of heart diseases, which complicate wound management and causes problem in healing. Normal dressings fail in providing rapid hemostasis and real-time bleeding detection, especially in high-risk patients. The project focuses on the development of a novel smart wound dressing that integrates colorimetric bleeding detection such as ph. detecting solution of blood, with a herbal-based hemostatic matrix(CHITOSAN, MORINGA OLIFERA), designed specifically for anticoagulated individuals such as cardiac and diabetic patients. The dressing comprises an outer colorimetric layer that visually detects the presence of fresh bleeding through a pH-sensitive dye, providing an early detection. The inner layer incorporates Moringa oleifera extract and Chitosan, both known for their potent, coagulant, antimicrobial, and wound-healing properties. Moringa, a plant-based agent which is rich in tannins, flavonoids, and bioactive polyphenols, enhances clot formation while minimizing inflammation and infection. Chitosan, a natural polysaccharide derived from crustacean shells, contributes by accelerating clotting through platelet adhesion and aggregation, while forming a protective gel barrier to prevent microbial attack.The main idea is to get rapid clotting, biocompatibility, and structural integrity. The product gives best results promising results in clotting time reduction, improved wound closure, and controlled bleeding when compared with other dressings.This smart dressing not only addresses the urgent need for targeted bleeding control in anticoagulated patients, but also helps with the principles of sustainable, herbal-based wound care technologies. It can be used in emergency care, post-operative management, and home care settings. This product idea is patented and has been published. The innovation offers a cost-effective, accessible, and patient-friendly solution to improve clinical outcomes for heart patients specifically.

**Keywords:** wound dressing, ph. blood detection, Moringa oleifera, Chitosan, Hemostatic matrix, Anticoagulated patients, Rapid hemostasis and Herbal wound care.

**PC-602**

## TRANSDERMAL NANOPARTICLE DELIVERY OF LEVETIRACETAM: A PHARMACY-LED INNOVATION FOR SAFETY EPILEPSY CARE IN PREGNANCY

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Epilepsy during pregnancy increases maternal morbidity, preterm birth, and fetal risks due to uncontrolled seizures or fluctuating drug levels. Levetiracetam (LEV) is widely prescribed, but oral and parenteral routes show variable plasma concentrations and poor adherence during acute episodes. Nanoparticle-based transdermal delivery offers sustained release, improved compliance, and reduced fetal exposure, representing the first pharmacist-driven nanomedicine innovation in India with direct translational relevance. To develop and evaluate LEV-loaded solid lipid nanoparticle (SLN) transdermal patches as a safe, sustained, and patient-friendly therapy for pregnancy epilepsy. LEV-SLNs were prepared via solvent evaporation with stearyl amine and Tween-80, surface-modified




ISBN: 978-81-980623-8-3

with 3-carboxy phenyl boronic acid, and incorporated into hydrogel patches. Characterization included particle size, zeta potential, drug entrapment, in vitro release, ex vivo skin permeation, stability, and safety (HET-CAM, MTT). Experiments were performed in triplicate; statistical significance was assessed using ANOVA ($p < 0.005$). Optimized SLNs had 182 ± 12 nm size, +28 mV zeta potential, and 84.6% entrapment. Patches showed uniform thickness, high drug content (98.3%) and sustained biphasic release (78% at 24 h). Skin permeation flux exceeded that of plain LEV hydrogel (42.5 vs 25.1 µg/cm2/h, $p < 0.05$). Stability remained above 90% at 30 days, and no cytotoxicity or irritation was observed. LEV-SLN transdermal patches demonstrated controlled release, enhanced skin permeability, and favorable safety, providing a robust translational platform for pharmacist-led maternal epilepsy care in India. By potentially improving adherence and reducing fetal exposure, this approach bridges lab research and future clinical application, emphasizing its novelty and practical relevance.

**Keywords:** Epilepsy, Pregnancy, Levetiracetam, Solid Lipid Nanoparticles, Transdermal Delivery, Nanomedicine, Pharmaceutical Innovation

**PC-603**

## DEVELOPMENT, OPTIMIZATION AND CHARACTERIZATION OF NIOSOMES BASED DRUG DELIVERY SYSTEMS FOR SURGICAL WOUNDS

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Niosomes increase stratum corneum hydration and changes its properties by reducing trans epidermal water loss. This research focuses on the development, optimization and characterization of optimized niosomes containing hesperidin, with the aim of enhancing wound management. The study involves the design and preparation of niosomes using appropriate surfactants and cholesterol to encapsulate hesperidin efficiently. Characterization techniques such as size analysis, morphology assessment, encapsulation efficiency determination, melting point studies were carried out for the optimized formulation. The in vitro and in vivo evaluation of the optimized niosomes of hesperidin for wound healing were conducted in rat models. The optimized hesperidin niosomes had a particle size of 232 nm with a zeta potential of -16.32mV. The entrapment efficiency was found to be 90%. The peak at 3312.14 cm-1 corresponds to the stretching vibration of -OH groups. Another peak at 1639.17 cm-1 represents stretching vibrations of carbonyl groups. The DSC peaks are obtained 64.244°C and 92.614°C which indicates a phase transition or melting event. The cumulative (%) release in phosphate buffer saline (pH=7.4) of optimized hesperidin loaded niosomes showed 96.88% of the drug within 24 hours. The wound closure (%) for the control group after 7 and14 days were found to be 20 ± 0.88 cm and 72±0.69 cm for control group respectively, 52±1.18 cm and 98±1.2 cm for hesperidin loaded niosomal gel respectively. Hesperidin loaded niosomal gel produced maximum contraction of the wound, formation of epidermal layer and remodeling. The epidermal layer was totally formed, due to healing property of hesperidin.

**Keywords:** Hesperidin, niosomes, remodeling, wound healing, zeta potential,

**PC-604**

## FORMULATION AND EVALUATION OF A HERBAL SUNSCREEN MIST FOR BROAD-SPECTRUM UV PROTECTION

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This project focuses on the formulation and evaluation of a herbal sunscreen designed to provide broad-spectrum protection against both UVA and UVB rays. The product is prepared using natural ingredients such as aloe vera, carrot seed oil, and green tea, which are widely recognized for their antioxidant, soothing, and photoprotective properties. Carrot seed oil and wheat germ oil together expect to show synergistic effects.Unlike conventional chemical sunscreens, this herbal formulation offers safe and eco-friendly skin protection without parabens, synthetic additives, or artificial fragrances. It is lightweight, non-greasy, and ensures quick absorption, making it more comfortable for daily use. Along with sun protection, the herbal actives nourish the skin, help prevent oxidative damage, reduce premature aging, and maintain skin hydration. Being suitable even for sensitive skin, this herbal sunscreen aligns with the increasing demand for sustainable and natural skincare products.Overall, the formulation presents a safe, effective,and consumer-friendly alternative to chemical-based sunscreens.

**Keywords:** Herbal Sunscreen UV Protection Sunscreen Mist Carrot Seed Oil Wheat Germ Oil Natural Photoprotection

**PC-605**

## FORMULATION AND EVALUATION OF MATRIX-TYPE TRANSDERMAL PATCH CONTAINING ISTRDEFYLLINE

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Effective management of Parkinson's disease necessitates maintaining consistent plasma drug concentrations to mitigate "on-off" phenomena and enhance therapeutic outcomes. The present study focused on the development, optimization, and in vitro evaluation of matrix-type transdermal therapeutic system for the sustained delivery of istradefylline. Istradefylline, a selective adenosine $A_2A$ receptor antagonist, is used for treating Parkinson's disease. Transdermal patches were fabricated using solvent casting method incorporating polymers chitosan and CTC with dibutyl phthalate as plasticizer. The prepared transdermal patch was evaluated for thickness, weight variation, folding endurance, moisture content, and drug content uniformity and the results were 0.28 ± 0.02 mm, <5%, >200, 2.1 ± 0.3%, 98.5 ± 2.1% respectively In vitro drug release and permeation studies were conducted over 36 hours using Franz diffusion cells equipped with a synthetic cellulose acetate membrane. The formulation demonstrated a sustained release profile (92.1± 1.8%), which adhered to the Higuchi kinetic model ($R^2$ = 0.992), indicating a diffusion-controlled release mechanism. Permeation studies revealed a steady state flux of 12.5 ± 0.8 µg/cm²/h. These findings suggest that the developed transdermal patch offers a promising non-oral strategy for the continuous administration of istradefylline, with the potential to significantly improve patient compliance, minimize dosing frequency, and stabilize pharmacokinetics in treating Parkinson's disease.

**Keywords:** Parkinson's disease, transdermal patch, istradefylline, sustained release, solvent casting, Franz diffusion cell.

**PC-606**

## QUERCETIN AND RUTIN-LOADED NANOCARRIERS: A SYNERGISTIC STRATEGY FOR ANTIOXIDANT AND ANTI-AGING APPLICATIONS

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Background: Quercetin and rutin are flavonoids with strong antioxidant, anti-inflammatory, and anti-aging properties. However, their therapeutic potential is limited by poor aqueous solubility, instability, and inadequate skin penetration. Nanocarrier-based delivery systems can enhance dermal bioavailability and therapeutic efficacy. Objective: To develop and evaluate nanocarrier formulations of quercetin and rutin for improved stability, antioxidant activity, and anti-aging efficacy in dermal applications. Methods: Quercetin- and rutin-loaded liposomal systems were prepared using thin-film hydration and optimized for particle size, polydispersity index, zeta potential, and entrapment efficiency. Characterization was performed via dynamic light scattering, transmission electron microscopy, FTIR, and DSC. Antioxidant activity was assessed using DPPH and ABTS radical scavenging assays. Ex vivo skin permeation was studied using Franz diffusion cells, while in-vitro anti-aging potential was evaluated in fibroblast cultures through collagen synthesis and MMP inhibition assays. Results: The optimized formulations exhibited nanoscale particle size (<200 nm), high entrapment efficiency (>85%), and sustained release profiles. Encapsulated flavonoids demonstrated significantly enhanced antioxidant activity compared to free quercetin and rutin ($p < 0.05$). Skin permeation and retention studies confirmed improved dermal delivery.




ISBN: 978-81-980623-8-3

Fibroblast assays revealed increased collagen synthesis and reduced matrix metalloproteinase activity, indicating strong anti-aging efficacy. Conclusion: Nanocarrier-mediated delivery of quercetin and rutin enhances their stability, dermal penetration, and biological activity, offering a synergistic and effective approach for combating oxidative stress and delaying skin aging. These findings support the potential of dual-flavonoid nanocarriers as promising candidates for advanced cosmeceutical and therapeutic applications.

**Keywords:** Quercetin, Rutin, Liposomes, Anti-aging, Anti-inflammatory.

**PC-607**

**FORMULATION, OPTIMIZATION AND CHARACTERIZATION OF DUAL DRUG LOADED POLYELECTROLYTE NANOPARTICLES FOR THE TREATMENT OF CANCER**

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In the current research, dual drug-loaded polyelectrolyte nanoparticles (PENPs) were prepared using hyaluronic acid (HA) and chitosan (CS) polymers. Objective behind the research was to formulate and optimize dual drug-loaded system with significant drug entrapment and release. The PENPs was formulated spontaneously when oppositely charged polyelectrolytes interact via electrostatic attraction. Optimization was performed on design of expert (DoE), it was found that PENPs-2 with the smallest particle size (144.6 nm) and positive zeta potential (20.2) observed at a mass ratio of HA to CS was 4.68:4 and rotation speed of 3000. An equimolar amount of 5-fluorouracil (5-FU) and quercetin (QT) was loaded. It was found that the particle size 451.3 nm, the zeta potential was 29.7 mV, and the entrapment efficiency 69.83% for 5-FU and 98.73% for QT, with corresponding drug loading percentages of 21.63% and 15.27%. FTIR analysis validated the compatibility of drugs with the polymer matrix, ensuring the integrity of PENPs. Cumulative release studies conducted at pH 5.0 and 7.4 highlighted the superior release profile in acidic conditions. Interestingly, QT exhibited more pronounced release than 5-FU in both acidic and neutral conditions. Stability studies revealed that blank PENP experienced a notable increase in particle size (from 144.6 nm to 245.1 nm). However, the drug-loaded PENPs showed only a slight increase in particle size (from 451.3 nm to 463.5 nm) and zeta potential (from 29.7 mV to 29.1 mV), indicating good stability. Thus, it can be concluded that this study is beneficial for the formulation of dual drug-loaded PENPs.

**Keywords:** hyaluronic acid, chitosan, polyelectrolyte, 5-fluorouracil, quercetin.

**PC-608**

**NIOSOMAL BASED TRANSDERMAL GEL FOR ATTENTION-DEFICIT HYPERACTIVITY DISORDER**

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Methylphenidate is a drug of choice used in the treatment of attention-deficit hyperactivity disorder in children and for narcolepsy. The aim of present study was to develop niosomal based transdermal gels for controlled delivery of methylphenidate for prolonged period of time. Methylphenidate has very low bioavailability due to extensive first pass metabolism. Bioavailability of methylphenidate can be improved by transdermal delivery systems as drug directly reaches systemic circulation avoiding first pass metabolism. Non-ionic surfactant vesicles (niosomes) with different ratios (1:1-3:1) were prepared by thin-film hydration method using rotary flash evaporator and then incorporated in to 3% w/v Carbopol 934 gel base. Niosomal based gel had good consistency, spreadability and pH was around 6.5. FTIR and DSC studies revealed that there were no physical and chemical interactions between drug and excipients. Niosomes were analyzed for morphological aspects like vesicle size, vesicle shape, drug content, entrapment efficiency and in vitro diffusion studies. Vesicles were spherical in shape having uniform size in range of 1-3µm. Formulation (F1) containing 1:1 ratio of mole/mole span 60 and cholesterol showed highest entrapment efficiency of 98.6% and drug content was found to be within the limits. In vitro diffusion studies were conducted using Franz diffusion cell with 7.4 pH phosphate buffer as diffusion media. The formulation F1 showed greater drug release of 98.73% in 9 h compared to other formulations which released less than 80 % of drug in 9 h. Flux obtained for F1 formulation was higher (0.012±0.002µg/cm2/hr) than those obtained for formulation F2- F6.

**Keywords:** Methylphenidate, Transdermal Gel, Attention-deficit hyperactivity disorder

**PC-609**

**MECHANOCHEMICAL SYNTHESIS OF MEDICINALLY IMPORTANT HETEROCYCLIC COMPOUNDS USING GREEN CATALYST**

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In this present study, multiple kind of quinoxaline derivatives were synthesized by employing a solvent-free mechanochemical approach. Quinoxaline derivatives are a significant family of nitrogen-containing heterocyclic compounds that have numerous biological and pharmacological applications. They show antitubercular, anticancer, antibacterial, antiviral, antidiabetic, antifungal, and anti-inflammatory properties. Mechanochemistry, common approach for organic synthesis, which reduces the environmental waste and achieves sustainable development goals in pharmaceuticals and agrochemicals. The reaction had been carried out by mechanically grinding of substituted 1,2-diamines with substituted 1,2-diketones in a mortar and pestle, using green catalysts and excluding the use of standard solvents. The environment friendly process resulted in reduction of reaction time, higher yields and also include different benefits of mechanochemistry like operational simplicity, less environmental impact, and enhanced atom economy. The synthesized compounds were purified and analyzed using FT-IR, 1H NMR, 13C NMR, and Mass spectrometry, confirming the production of the intended heterocyclic structures.

**Keywords:** Quinoxaline derivatives, mechanochemistry, green chemistry, sustainable synthesis, green catalyst.

**PC-610**

**DEVELOPMENT AND EVALUATION OF A CARBOPOL-BASED ETHOSOMAL GEL OF PONGAMIA PINNATA EXTRACT FOR ENHANCED TOPICAL DELIVERY**

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This study aimed to develop and evaluate a Carbopol-based ethosomal gel of Pongamia pinnata for enhanced topical delivery. Pongamia pinnata a medicinal plant known for its anti-inflammatory, antimicrobial, and antioxidant properties, but its therapeutic efficacy in conventional topical formulation is restricted due to skin penetration and limited stability. To overcome limitation, Ethosomes – Flexible nanovesicles comprising phospholipids, ethanol, cholesterol, and propylene glycol were prepared by a modified cold technique. The plant extract and excipients were first dissolved in ethanol, followed by gradual incorporation of the aqueous phase under continuous stirring to form stable vesicles. The ethosomal suspension was subsequently incorporated into Carbopol 940 gel base, neutralized with triethanolamine and stabilized with suitable preservative to yield the final formulation. The ethosomal gel was evaluated for physical appearance, PH, viscosity, drug content, entrapment, spread ability, stability, efficiency and drug release profile. The formulation exhibited a uniform, lump free texture with a physiologically acceptable PH [5.5-6.5] and optimal viscosity for dermal use. Drug content and entrapment efficiency were within acceptable limits, confirming consistent drug incorporation into ethosomal vesicles. Spreadability testing demonstrated smooth and uniform application, while stability studies confirmed good retention of physiochemical characteristics overtime. Invitro release and Invivo permeation studies further revealed enhanced sustained release of extract compared with conventional gel. The Carbopol based ethosomal gel proved to be promising nanocarrier system capable of improving skin penetration and prolonging




ISBN: 978-81-980623-8-3

therapeutic benefits of Pongamia pinnata, supporting its potential using dermatological application.

**Keywords:** Ethosomal gel, Pongamia pinnata extract, Topical delivery, Carbopol 940, Entrapment efficiency.

**PC-611**

**DEVELOPMENT OF FLAVONOID ENCAPSULATED PH RESPONSIVE GLYCOSYLATED NANOLIPOSOMES FOR PRECISE THERAPEUTIC APPLICATION IN HEPATOCELLULAR CARCINOMA**

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Hepatocellular carcinoma (HCC), the third leading cause of cancer-related mortality, represents a major global health burden. Conventional treatments—including targeted agents, chemotherapy, and radiotherapy—are frequently limited by systemic toxicities such as alopecia, bone demineralization, emesis, and anaemia, highlighting the need for alternative therapeutics with improved efficacy and safety. Flavonoids, a diverse class of natural polyphenolic compounds, exhibit potent anticancer, antioxidant, and hepatoprotective properties; however, their clinical utility is hindered by poor solubility, low bioavailability, rapid degradation, and difficulties in tumour-specific delivery, particularly within the heterogeneous microenvironment of HCC. To address these limitations, a pH-responsive glycosylated nano-liposomal system was developed for apigenin, a promising but poorly bioavailable flavonoid. This formulation was designed to enhance intracellular uptake in hepatocellular carcinoma cells via precise, pH-sensitive release, thereby optimizing therapeutic activity. Physicochemical characterization confirmed nanoscale particles (~150 nm) with smooth morphology and stable surface properties. The delivery system demonstrated controlled, pH-dependent drug release under in vitro and in vivo conditions, suggesting sustained availability at the tumour site. Anticancer efficacy will be assessed in a diethyl nitrosamine (DENA)-induced HCC animal model. Collectively, these findings underscore the potential of apigenin-loaded pH-responsive glycosylated nanoliposomes as an effective, targeted strategy for HCC management.

**Keywords:** Encapsulated flavonoid Hepatocellular Carcinoma

**PC-612**

**OPTIMIZING VENLAFAXINE DELIVERY: A TRANSDERMAL PATCH WITH ENHANCED UNIFORMITY AND PERMEATION**

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A novel kind of transdermal patch for the gradual delivery of the widely used anti-depressant venlafaxine is shown by this invention. The half-life of venlafaxine is normally about five hours, but this patch attempts to distribute the medication gradually and steadily over the course of 24-hour period, allowing patients to continue their treatment without having to take extra doses. Venlafaxine is embedded in a unique ethyl cellulose membrane in the patch, which regulates the drug's release rate. To facilitate drug absorption through the skin, a permeation enhancer such as oleic acid is included in the formulation. This method minimizes the possibility of adverse effects by skipping the digestive system and allowing the medication to enter the bloodstream straight through the skin. The patch is also formulated with a silicone adhesive layer to ensure strong adherence to the skin, along with a protective backing layer to maintain its integrity and effectiveness. Patients may experience better compliance, more stable drug levels, and fewer gastrointestinal side effects with this transdermal system compared to traditional oral pills. The patch may be a good candidate for patent protection due to its creative formulation and design, which offer a promising new method of venlafaxine delivery.

**Keywords:** Transdermal patch, Venlafaxine, Drug delivery.

**PC-613**

**FORMULATION AND EVALUATION OF NANOSPONGES IMPREGNATED BANDAGE FOR DIABETIC WOUND HEALING**

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Introduction: Delayed wound healing is a common complication in diabetes mellitus due to hyperglycaemia, impaired circulation, and infection risk. Even small injuries can become severe. Metronidazole is effective against anaerobic bacteria but shows poor site retention and rapid clearance. To overcome these issues, Metronidazole-loaded β-cyclodextrin nanosponges were developed and incorporated into bandages for diabetic wound care. Methodology: Nanosponges were synthesized by the hot melt method using dimethyl carbonate as a crosslinker. Formulation optimization was performed using Box–Behnken Design under Response Surface Methodology. Characterization was carried out using FT-IR, DSC, XRPD, and NMR. The nanosponges were then impregnated into sterile bandages by the solvent casting method. Discussion and Results: The optimized nanosponges exhibited a mean particle size of 390.3 nm, entrapment efficiency of 83.4%, and zeta potential of –22.0 mV. The prepared bandages showed a drug content of 82.3%, moisture retention of 79.6%, and tensile strength of 3.71 MPa, indicating mechanical suitability for wound application. Antibacterial studies confirmed significant inhibition against Staphylococcus aureus and Escherichia coli. In vitro release studies demonstrated sustained drug release of 89.9% over 48 hours, following a diffusion-controlled pattern. These findings highlight the multifunctional nature of nanosponge-impregnated bandages in wound healing. Conclusion: The nanosponge-loaded bandages present a multifunctional dressing system with prolonged release, antimicrobial activity, and good mechanical strength, making them a promising approach for diabetic wound management.

**Keywords:** Nanosponges; Diabetic wound healing; Metronidazole; β-Cyclodextrin; Controlled drug release.

**PC-614**

**TRIPLE COMPONENT BIO-BANDAGES FOR MANAGEMENT OF CHRONIC WOUNDS**

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Chronic wounds are major healthcare challenges that affect a significant number of people, often characterized by persistent inflammation, recurrent infection, and impaired tissue regeneration, leading to prolonged healing times and substantial morbidity. Recent wound care strategies often plunge short in addressing the multifaceted pathologies inherent to these complex lesions. This abstract presents the characterization and potential impact of triple-component bio-bandages as an advanced therapeutic approach for the comprehensive management of chronic wounds. These innovative bio-bandages are designed to synergistically integrate three critical functional components: a biologically active matrix, providing a scaffold for cell adhesion and proliferation; integrated antimicrobial protection, to combat persistent bacterial colonization; and responsive drug delivery molecules, enabling continuous monitoring of key wound parameters (e.g., pH, temperature). This approach promises to Characterization assessing mechanical properties (e.g., tensile strength), chemical structure (FTIR), surface morphology (SEM), water vapor transmission rates, in vitro antibacterial activity, and in vivo wound healing efficacy. By combining these elements, triple-component bio-bandages aim to actively modulate the wound microenvironment, accelerate re-epithelialization, mitigate infection, and reduce inflammation, thereby overcoming the critical barriers to chronic wound closure.

**Keywords:** Wound healing, Synergistic, Remodeling, Antimicrobial, Bandages

**PC-615**

**DEVELOPMENT AND EVALUATION OF A BIOCOMPATIBLE SPIRULINA–CHITOSAN HYDROGEL LOADED WITH GREEN-SYNTHESIZED SILVER NANOPARTICLES FOR ANTIMICROBIAL WOUND DRESSING APPLICATIONS**

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ISBN: 978-81-980623-8-3

The present study focuses on developing a new wound dressing material by incorporating green-synthesized silver nanoparticles (AgNPs) into a Spirulina–chitosan hydrogel matrix. Spirulina extract was used as a natural reducing and stabilizing agent for synthesizing AgNPs, offering an eco-friendly method with enhanced biocompatibility. The nanoparticles were successfully integrated into a chitosan-based hydrogel, which was further strengthened with Spirulina-derived bioactive compounds to enhance structural and functional qualities. Extensive physicochemical tests confirmed the even distribution of AgNPs within the hydrogel and showed good swelling capacity, porosity, and mechanical stability suitable for wound healing. In vitro antimicrobial tests against Gram-positive and Gram-negative bacteria demonstrated significant broad-spectrum activity, while cytocompatibility assessments indicated minimal toxicity to normal cells. The combination of AgNPs, Spirulina biomolecules, and chitosan gave the hydrogel excellent antimicrobial action and wound-friendly biocompatibility, underscoring its potential as a cost-effective, sustainable, and innovative wound dressing.

**Keywords:** Spirulina, Chitosan hydrogel, Green synthesis, Silver nanoparticles, antimicrobial activity, Biocompatibility, Wound dressing

**PC-616**

**NOVEL BIORELEVANT EVALUATION STRATEGIES FOR TRANSMUCOSAL ORODISPERSIBLE FILMS IN NEUROPSYCHIATRIC THERAPY**

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The therapeutic management of neuropsychiatric disorders often requires rapid-onset formulations that overcome limitations posed by dysphagia, cognitive impairment, poor solubility, and extensive first-pass metabolism associated with conventional oral dosage forms. Orodispersible films (ODFs) offer a promising transmucosal platform, yet standardized in-vitro evaluation methodologies remain underdeveloped. This study aimed to formulate and optimize a mucoadhesive ODF of a poorly water-soluble neuroactive agent and compare conventional versus modified biorelevant in-vitro assessment approaches. Films were prepared via solvent casting, optimized using Box–Behnken statistical design, and characterized for physicochemical attributes including drug content uniformity, mechanical strength, pH, and moisture behavior. Disintegration was evaluated through a modified slide-frame and ball method simulating lingual force, while dissolution testing employed simulated saliva using USP basket (Apparatus I), paddle–glass disk (PGD), and punch-and-filter (PAF) modifications. Optimized films exhibited consistent drug distribution (CV < 2%), rapid disintegration (<14 s), and tensile strength >5 MPa confirming both patient acceptability and manufacturability. The novel PAF method demonstrated superiority by achieving >90% drug release within 10 minutes. The PGD model yielded ~85% release at 15 minutes, whereas the basket apparatus lagged significantly. Ex-vivo permeation studies on porcine buccal mucosa validated efficient transmucosal transport. Short-term stability under ICH conditions showed no significant variations in performance. These findings highlight the benefits of adopting physiologically relevant dissolution and disintegration models for ODF evaluation, establishing improved quality control tools and translational potential for patient-centric, rapid-action transmucosal therapies in neuropsychiatric care.

**Keywords:** Orodispersible films, Transmucosal delivery, Biorelevant dissolution, Neuropsychiatric therapy, Modified USP apparatus

**PC-617**

**ECO-FRIENDLY TABLET STRIPS: A SUSTAINABLE ALTERNATIVE TO PLASTIC PHARMACEUTICAL PACKAGING**

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This study introduces biodegradable tablet strips as a sustainable alternative to plastic pharmaceutical packaging. The aim was to reduce environmental and health risks from plastic waste while maintaining pharmaceutical usability. Strips were developed using renewable natural fibers such as cotton rag, hemp, jute, flax, and mulberry, bonded with gum arabic. To enhance durability, a dual coating of carnauba–beeswax (70:30) was applied, improving mechanical strength and water resistance. The manufacturing process involved fiber cleaning, blending, lamination, sheet casting, and surface waxing. The strips were evaluated for tensile strength, folding endurance, biodegradability, water resistance, and compatibility with pharmaceutical printing inks. Findings showed that the strips offered sufficient strength, flexibility, and printability. They underwent complete biodegradation within 6–8 weeks under composting conditions, unlike plastic strips which persist for decades. The system was cost-effective and adaptable for eco-labeling and green branding. Despite these advantages, limitations such as moderate oxygen and moisture barrier properties, scalability issues, and lack of pharmacopeial compliance remain hurdles for large-scale adoption. Nonetheless, the eco-strips demonstrate strong potential as an environmentally friendly alternative, contributing to sustainable healthcare practices and aligning with UN Sustainable Development Goals 12 and 13. Future improvements through nanocellulose reinforcement and natural polymer blends could further enhance performance and establish industry benchmarks.

**Keywords:** Eco-friendly packaging, biodegradable tablet strips, pharmaceutical packaging, natural fibers, sustainability.

**PC-618**

**FORMULATION AND EVALUATION OF CONTROLLED RELEASE MUCOADHESIVE BUCCAL PATCHES OF ROSUVASTATIN TO ENHANCE THE BIOAVAILABILITY BY FORMING A CYCLODEXTRIN COMPLEX**

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This study explores the effectiveness of cyclodextrin complexation with rosuvastatin, a statin inhibitor, and assesses its performance through in-vitro drug release and ex-vivo permeation studies. The results confirm the formation of inclusion complexes between cyclodextrin and rosuvastatin, showing that patches formulated with the drug–β-cyclodextrin binary system improve drug permeation compared to patches without an enhancer. Mucoadhesive patches act as controlled drug delivery systems by adhering to mucosal surfaces and gradually releasing the drug. Rosuvastatin, commonly prescribed for familial hyperlipidemia, dyslipidemia, hypertriglyceridemia, atherosclerosis, osteoporosis, benign prostatic hyperplasia, and Alzheimer's disease, benefits from such systems. β-cyclodextrin, a cyclic oligosaccharide, enhances drug solubility, bioavailability, and stability through complexation. The design of mucoadhesive buccal patches of rosuvastatin requires a multidisciplinary approach that integrates formulation, characterization, and evaluation processes.

**Keywords:** Cyclodextrin, Rosuvastatin, Mucoadhesive patches, Controlled Drug Delivery.

**PC-619**

**FORMULATION AND IN-VITRO EVALUATION OF DOMPERIDONE LOADED NANOSTRUCTURED LIPID CARRIERS BY QBD**

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Domperidone is a prokinetic and antiemetic drug that belongs to the dopamine antagonist class. In this study, nanostructured lipid carriers (NLCs) were developed using the high-pressure homogenization method to improve domperidone delivery. Stearic acid and oleic acid were used as solid and liquid lipids, respectively. The prepared NLCs were characterized using Fourier Transform Infrared Spectroscopy (FTIR), and encapsulation efficiency ranged between 64% and 86%. In-vitro release studies showed sustained drug release for up to 12 hours, with higher release observed as the solid-to-liquid lipid ratio increased. Among the nine formulations, F9 demonstrated the highest drug release. Visualization studies confirmed the spherical shape and smooth surface of the NLCs. A $3^2$ factorial design using Design Expert 13 software evaluated variables such as zeta potential, particle size, and drug release. Results indicated that increasing stabilizer concentration and sonication cycles decreased zeta potential (-14.0 mV) and particle size (243 nm) while enhancing drug release (96.33 ± 0.02%). These findings suggest




ISBN: 978-81-980623-8-3

that domperidone-loaded NLCs could provide controlled and sustained release, potentially reducing dosing frequency and improving patient compliance.

**Keywords:** FTIR, Domperidone, Nanostructured lipid carriers, Oleic acid, Stearic acid.

**PC-620**

**ORAL SUSPENSION OF DIPHENHYDRAMINE AND ITS ANTI-ALLERGIC ACTIVITY IN GUINEA PIGS**

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To formulate an oral suspension of diphenhydramine hydrochloride and evaluate its anti-allergic activity using histamine-induced bronchoconstriction in guinea pigs. Diphenhydramine suspension was prepared using sodium carboxymethyl cellulose as a suspending agent, with glycerine and sorbitol for palatability. The formulation was tested for sedimentation rate, redispersibility, and pH. Six guinea pigs were divided into control and test groups. Animals were exposed to 0.2% histamine aerosol, and the onset of respiratory distress was recorded. The test group received diphenhydramine suspension 30 minutes prior to exposure. The diphenhydramine suspension was stable and palatable. Treated animals showed delayed onset of bronchoconstriction and reduced severity of symptoms compared to controls. This simple pharmacological study confirms the efficacy of diphenhydramine suspension in preventing histamine-induced allergic reactions. It offers pharmacy students a practical approach to formulation and basic pharmacodynamic evaluation.

**Keywords:** Diphenhydramine, Guinea pigs, Anti allergic, Histamine, Bronchoconstriction

**PC-621**

**DESIGN AND OPTIMIZE A BILAYER TABLET OF ANTIHYPERTENSIVE DRUGS USING A 32 FACTORIAL DESIGN**

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This research aimed to aimed to develop a bilayer tablet of telmisartan and Cilnidipine using a factorial design approach. Telmisartan is an angiotemin II receptor antagonist, while Cilnidipine is a calcium channel blocker. By combining these drugs in a bilayer tablet, the physicochemical differences between them could be overcome, reducing the need for frequent dosing. The compatibility of the active ingredients and excipients in each layer is critical to the success of a bilayer tablet. One of the major challenges of bilayer tablet formulation is ensuring that the two layers remain separate and do not mix during manufacturing, storage, or handling. The tablet was formulated using Croscarmellose sodium and sodium starch glycolate as super disintegrates for the Telmisartan layer, and HPMC K-100M, methylcellulose, and dicalcium phosphate for the Cilnidipine layer. The optimized batch of immediate release F7 showed 95.51% drug release, while the sustained-release FS batch showed 96.46% drug release. Compatibility studies using FTIR and different scanning calorimetry analyses confirmed compatibility between drug and excipients. Evaluation tests, including tablet dimension, dimer hardness, friability, weight uniformity, drug content, and in-vitro dissolution, yielded satisfactory results, indicating the potential effectiveness of the optimized bilayer tablet for treating hypertension.

**Keywords:** Bilayer tablet, HPMC K100m, Telmisartan, Cilnidipine, Factorial design

**PC-622**

**FORMULATION AND OPTIMIZATION OF AMIDATED PECTIN NANOPARTICLES OF MESALAMINE FOR TARGETED COLON DELIVERY IN ULCERATIVE COLITIS**

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Ulcerative colitis is a persistent inflammatory condition limited to the colon and rectum, marked by mucosal ulceration and oxidative stress. Mesalamine remains the first-line therapy for mild to moderate cases, but conventional delivery systems are prone to premature drug release and require higher doses, resulting in increased side effects. In this study, polysaccharide (amidated pectin) nanoparticles of mesalamine were created using ionotropic gelation with calcium chloride, and formulation parameters were optimized using a Box Behnken design to maximize drug entrapment and control release. The optimized nanoparticles had an average size of 534 nm and achieved 73% entrapment efficiency. Drug release studies showed minimal leakage under acidic conditions and pronounced release in simulated colonic fluid. Structural and compatibility analyses confirmed amorphization of the drug and stable incorporation within the matrix. In vivo pharmacokinetic studies in rats indicated significantly higher and sustained mesalamine concentrations in colon tissue from the nanoparticles compared to conventional suspension. Additionally, rats treated with the nanoparticle formulation exhibited enhanced antioxidant enzyme activities including catalase, glutathione, and superoxide dismutase as well as reduced oxidative stress markers such as nitrite and malondialdehyde. These results demonstrate that amidated pectin nanoparticles effectively target mesalamine to the colon, improving local bioavailability and therapeutic efficacy while minimizing systemic exposure. The study supports the potential of this nanocarrier system as a promising strategy for improved management of ulcerative colitis.

**Keywords:** Colon-targeted drug delivery, Mesalamine nanoparticles, Amidated pectin, Ulcerative colitis, Antioxidant activity

**PC-623**

**DEVELOPMENT, OPTIMIZATION AND CHARACTERIZATION OF NIOSOMES BASED DRUG DELIVERY SYSTEMS FOR SURGICAL WOUNDS**

POOJA M RAJ

Surgical wounds need gentle and effective care so they can heal fast and stay free from infection. This study explains how niosomes, which are tiny bubble-like carriers made from safe surfactants, were developed and optimized to deliver medicine directly to surgical wounds in a better way. First, different niosome formulations were prepared by changing ingredients like surfactant type, cholesterol amount and hydration conditions. These factors were adjusted to get niosomes that were small, stable and able to hold the drug properly. The prepared niosomes were then checked for size, shape, drug-entrapment efficiency, surface charge and stability. Tiny particles were observed under special microscopes to confirm that they were round and uniform. The drug release pattern was also studied to see how slowly and steadily the medicine came out from the niosomes. The best formula released the drug in a controlled way, which is helpful for keeping the wound moist, protected and supplied with medicine for longer time without repeated applications. Tests on wound models showed that the niosome-based system improved healing, reduced inflammation and helped form healthy tissue faster compared to normal formulations. Because niosomes can stick gently to the skin and protect the drug from breaking down, they can make wound care easier and more comfortable for patients. Overall, the study shows that niosome drug delivery systems can be a promising and friendly method to support surgical wound healing. More studies will help improve them further and check their safety for wider use.

**Keywords:** Niosomes, Drug Delivery, Surgical Wounds, Wound Healing, Nanotechnology, Controlled Release, Formulation, Optimization, Characterization.

**PC-624**

**SMART GOLD: HISTIDINE-LINKED NANOPARTICLES FOR NEXT-GEN DRUG DELIVERY**

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In this study, gold nanoparticles (GNPs) were surface functionalized with dithiocarbamate (DTC) derivatives of amino acids to explore their potential as nanoscale carriers. Histidine (His) was selected as a model ligand and converted into its DTC salt by reaction with carbon disulfide under alkaline and low-temperature conditions. The reaction progress was monitored by instant thin-layer chromatography using methanol:chloroform (9:1) as the mobile phase. The reaction




ISBN: 978-81-980623-8-3

parameters like pH, temperature, time, and reactant concentrations were optimized to achieve a high yield. The His-DTC derivative was obtained as a yellow-brown solid with an 87% yield. Formation of the DTC moiety was confirmed by characteristic absorption peaks at 260 nm and 290 nm in UV–visible spectroscopy, N–C, S–S, and S–C–S stretching vibrations in FTIR spectra, a signal at 214.04 ppm in the ^13C NMR spectrum, and a parent ion at m/z 232 in mass spectrometry. In the consecutive step, gold (III) ions were reduced to form GNPs, which were then conjugated with His-DTC. The resulting His-DTC–GNP nano-conjugates were characterized by UV–visible spectroscopy, FTIR, and transmission electron microscopy, confirming successful functionalization and nanoscale morphology. The strong bidentate binding of the DTC group stabilized the gold nanoparticles and facilitated effective histidine conjugation. This approach highlights the potential of DTC chemistry for stable and efficient anchoring of biomolecules to metallic nanostructures. The His-DTC–GNP conjugates provide a versatile platform for developing targeted nanocarriers, with potential applications in drug delivery, biosensing, and biomedical nanotechnology.

**Keywords:** Gold nanoparticles, Histidine, Dithiocarbamate, Surface functionalization, nanocarriers

**PC-625**

## FAST-DISSOLVING NANOSUSPENSION FILMS FOR SCHIZOPHRENIA: A PATIENT-CENTRIC APPROACH TO LURASIDONE DELIVERY

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In the current research, nanosuspension-based oral dissolving films (ODFs) of Lurasidone HCl, a BCS Class II antipsychotic drug, were formulated with the objective of enhancing solubility, bioavailability, and patient compliance in the treatment of schizophrenia. Nanosuspensions were prepared using High Pressure Homogenization by screening various stabilizers, among which Poloxamer 407 was selected based on particle size and polydispersity index (PDI). The optimized nanosuspension was incorporated into ODFs using the lyophilization technique. Hydroxypropyl methylcellulose (HPMC E15) and glycerine were selected as the film-forming polymer and plasticizer, respectively, based on preliminary screening studies. The freeze-dried oral dissolving films of Lurasidone HCl demonstrated rapid disintegration, enhanced drug release (96.11% at 15 minutes), and superior performance compared to both heat-dried and marketed formulations. This fast-acting, easy-to-administer dosage form improves bioavailability and offers greater convenience, making it highly beneficial for patients with schizophrenia by supporting better adherence and therapeutic outcomes.

**Keywords:** Lurasidone HCl, Nanosuspension, ODFs, Freeze dried, solvent casting.

**PC-626**

## DESIGN, DEVELOPMENT AND EVALUATION OF LIPOSOMAL DRUG DELIVERY FOR BRAIN DISORDERS

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Oxcarbazepine is an antiepileptic drug used primarily for the treatment of partial and generalized seizures. It acts by stabilizing hyperexcited neuronal membranes and inhibiting repetitive neuronal firing. Despite its effectiveness, Oxcarbazepine has limited brain bioavailability due to poor permeability across the blood-brain barrier. Advanced drug delivery systems, such as liposomes, are being explored to enhance its CNS targeting. In this study, a liposomal drug delivery system for Oxcarbazepine was developed and optimized using the Box-Behnken Design (BBD), a response surface methodology approach, to overcome these limitations. Three key formulation variables—phospholipid concentration, cholesterol content, and drug-to-lipid ratio—were selected as independent factors, while encapsulation efficiency (%EE), particle size (nm), and cumulative drug release over 24 hours (%CDR) were evaluated as dependent responses. BBD generated 17 experimental runs, and statistical analysis confirmed a significant quadratic model ($p < 0.05$) for all responses. The optimized liposomal formulation exhibited an encapsulation efficiency of 86.2%, particle size of 139.6 nm, zeta potential of –27.1 mV, and 24-hour cumulative drug release of 74.3%, indicating efficient encapsulation, colloidal stability, and sustained release. Transmission electron microscopy revealed uniform, spherical vesicles. Oxcarbazepine liposomes offer a promising strategy for targeted and sustained delivery in the management of epilepsy and related brain disorders. Further In-vivo studies are recommended for therapeutic purpose.

**Keywords**: Oxcarbazepine, Box-Behnken Design, Transmission electron microscopy.

**PC-627**

## "INNOVATING ELDERLY CARE: A PATIENT-FRIENDLY ORODISPERSIBLE BLADDER TABLET OF MIRABEGRON"

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Overactive bladder (OAB) is a common disorder among elderly patients, often accompanied by discomfort, frequent urination, and reduced quality of life. Mirabegron, a novel β3-adrenoceptor agonist, is an effective treatment option but exhibits low bioavailability (25–40%) and is generally available as conventional tablets, which can be difficult to swallow for geriatric patients suffering from dysphagia. To overcome these limitations, the present research focused on developing and optimizing a patient-friendly lyophilized Orodispersible tablet (ODT) of Mirabegron. The freeze-drying technique was employed, and a Box–Behnken design was used for formulation optimization. Gelatin (X1), Mannitol (X2), and Menthol (X3) were selected as independent variables, while disintegration time (R1) and percentage drug content (R2) were dependent variables. The prepared formulations were evaluated for friability, weight uniformity, wetting time, in-vitro disintegration time, and dissolution behavior. Among all, the F7 batch was optimized, showing a disintegration time of 9 seconds and 97% drug content. In-vitro dissolution studies revealed significantly faster drug release compared to the pure drug, with 45.9% in phosphate buffer (pH 6.8) at 15 minutes and 97.1% in 0.1N HCl buffer at 16 minutes. These findings highlight that the lyophilized Mirabegron ODT is not only effective in enhancing drug dissolution but also highly convenient for elderly patients due to its rapid disintegration and ease of administration, making it a promising and innovative patient-centric approach to improve compliance, therapeutic performance, and overall quality of geriatric care.

**Keywords:** Overactive bladder, Mirabegron, Orodispersible tablet, Lyophilization, Geriatric care

**PC-628**

## INNOVATIVE MUCOADHESIVE MICROSPHERES FOR PROLONGED THIOCOLCHICOSIDE RELEASE

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Microsphere-based drug delivery systems have gained attention as effective tools to overcome the limitations of conventional oral pharmacotherapy. Muscle relaxant therapies often face rapid drug metabolism, which reduces clinical effectiveness and patient convenience. Thiocolchicoside, despite its therapeutic potential, suffers from poor oral bioavailability, creating a need for advanced delivery approaches. To address this, the present study developed a novel mucoadhesive microsphere system designed to enhance gastric retention and achieve sustained drug release. Sodium alginate was employed as the primary polymer, with chitosan and carbopol 934P incorporated to improve mucoadhesion, swelling, and gastric residence time. Five formulations (F1–F5) were prepared by varying polymer concentrations. The microspheres obtained were pale yellow, spherical,




ISBN: 978-81-980623-8-3

and exhibited good flow properties, with an overall production yield of 69.23%. Among all formulations, F5 demonstrated the highest entrapment efficiency (91.22%), attributed to increased viscosity from higher chitosan and carbopol levels. Swelling studies in phosphate buffer (pH 7.4) revealed greater swelling with higher polymer content, with F5 reaching 95.4%. In vitro drug release studies further confirmed that F5 provided the most controlled and sustained release of Thiocolchicoside over time. Overall, formulation F5 emerged as the most promising candidate, combining superior mucoadhesion, entrapment efficiency, swelling behavior, and sustained release. This optimized system not only addresses the bioavailability challenges of Thiocolchicoside but also offers potential as a platform technology for developing sustained-release formulations of other drugs, ultimately improving therapeutic efficacy and patient compliance.

**Keywords:** Thiocolchicoside, Microspheres, Drug delivery, Sodium alginate, Mucoadhesion, Controlled release

**PC-629**

## DEVELOPMENT AND EVALUATION OF TRANSDERMAL BIOADHESIVE SPRAY CONTAINING ESSENTIAL OIL FOR THE TREATMENT OF ACNE

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Acne vulgaris (acne) is one of the most prevalent dermatological diseases in the world. It is a chronic inflammatory disease of the Pilosebaceous unit. It affects upto 85% of teenagers and can occur in any age group persisting into adulthood. Conventional agents that target multiple pathological processes belongs to synthetic agents with various side effects, therefore, use of alternative and complementary therapy is recommended. One of the therapies can include use of essential oil for the treatment of acne. The aim of the present study was to develop and evaluate a transdermal bio adhesive spray containing essential oil for treatment of acne vulgaris. Standardization of oil was done by HPTLC method. Suitable carrier system with various oils , surfactant and cosurfactant to be incorporated in SMEDDS was selected based on solubility / miscibility on essential oil . Thermodynamic stability testing was carried out to test the best prototype formulation. SMEDDS is formulated in order to increase the oil solubility and permeability via skin. Bioadhesive spray by incorporating bioadhesive polymers was developed to improve residence time. Precautions to maintain drug release through SMEDDS patches were evaluated. The formulation was evaluated with skin irritancy test to check suitability for application on skin. Results obtained at various formulation stage specific evaluation parameters were within acceptable ranges. This concludes that bioadhesive spray with essential oils is a good alternative for treatment of acne rather than using synthetic agents.

**Keywords**: Acne vulgaris, Propionibacterium acnes, Essential oil, Transdermal Bio adhesive spray, SMEDDS

**PC-630**

## FORMULATION AND EVALUATION OF MOUTH DISSOLVING FILM CONTAINING MELOXICAM & RIZATRIPTAN

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Patient compliance is a major concern in pharmaceutical research, encouraging the development of novel oral dosage forms that do not require water. Mouth-dissolving films (MDFs) are gaining attention for their rapid disintegration, ease of use, and improved bioavailability. Meloxicam, a poorly water-soluble NSAID (BCS Class II), has limited dissolution and delayed therapeutic onset, while Rizatriptan, a serotonin (5-HT1B/1D) agonist (BCS Class I), is highly water soluble and rapidly absorbed. Combining these drugs in MDFs may enhance patient convenience and therapeutic efficacy. MDFs were prepared by solvent casting using hydroxypropyl methylcellulose (HPMC-15 cps) and polyvinyl alcohol (PVA) as film-forming agents. Glycerin served as a plasticizer, polysorbate 80 as surfactant, menthol as flavoring agent, and aspartame as sweetener. Drugs were uniformly dispersed in the polymeric solution before casting. Films were evaluated for appearance, thickness, folding endurance, disintegration time, and in vitro drug release. The prepared MDFs showed smooth appearance, adequate mechanical strength, and flexibility. Optimized films disintegrated within 30 seconds and released both drugs completely within 1 minute. The rapid hydration and dissolution suggested suitability for oromucosal as well as gastrointestinal absorption. These properties highlight MDFs as an effective delivery platform for poorly soluble drugs like Meloxicam while ensuring fast release of Rizatriptan.

**Keywords**: Mouth-dissolving films, Meloxicam, Rizatriptan, HPMC, solvent casting.

**PC-631**

## AN INJECTABLE CUBOSOMES BASED DELIVERY SYSTEM FOR TREATMENT OF AGE-RELATED MACULAR DEGENERATION

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Age-related macular degeneration (AMD) is a major cause of irreversible central vision loss, with existing therapies limited by frequent invasive injections and poor bioavailability. This study aimed to design Rosuvastatin-loaded cubosomes (RSV-cubosomes) as a sustained, non-irritant ocular delivery system. Cubosomes were prepared via a top-down approach using glyceryl monooleate and Pluronic F127 and optimized through central composite design. Characterization included particle size, polydispersity index (PDI), zeta potential, and entrapment efficiency (EE). Structural analysis was performed by FT-IR, DSC, XRD, SEM, and TEM. In vitro drug release, ex vivo permeation through goat sclera–choroid–retina, 3-month stability, and HET-CAM ocular safety studies were conducted. Optimized RSV-cubosomes exhibited particle size 108.4 nm, PDI 0.181, zeta potential −12.8 mV, and EE 92.46 ± 2.12%. In vitro release showed biphasic kinetics with 87.62 ± 0.29% cumulative release over 84 h, best fitting was Higuchi model ($R^2 = 0.967$), confirming diffusion-controlled behavior. Ex vivo permeation achieved cumulative transport of 141.09 ± 0.69 µg/cm² with permeability coefficient 0.009 cm/h and flux 18.15 µg/cm²/h. Stability testing at 4°C revealed minimal deviations in particle size (6.5%), PDI (37%), and EE (10.9%). HET-CAM assay demonstrated irritation scores ≤ 0.9, classifying the formulation as non-irritant. SEM/TEM confirmed uniform cubic morphology, while FT-IR, DSC, and XRD verified complete drug encapsulation and amorphization. RSV-cubosomes displayed high entrapment, sustained release, controlled permeation, stability, and ocular safety, highlighting their potential as a nanocarrier for AMD therapy with improved efficacy and patient compliance.

**Keywords:** Rosuvastatin, Cubosomes, AMD, Ocular Delivery, Sustained Release

**PC-632**

## EXPLORING OKRA MUCILAGE AS BIODEGRADABLE AND SUSTAINABLE TUMOUR-RESPONSIVE NANOCARRIER

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Biodegradable and sustainable natural polymers are increasingly recognized as promising substitutes for synthetic excipients in modern drug delivery. This study investigates okra (Abelmoschus esculentus) gum as a natural pharmaceutical excipient, with emphasis on its potential for novel formulation approaches in tumour therapy. Fresh okra pods were authenticated, and the gum was extracted through aqueous maceration followed by acetone precipitation. The dried gum underwent comprehensive evaluation, including organoleptic assessment, phytochemical screening, and physicochemical analysis covering pH, solubility, loss on drying, and ash value. Functional groups in okra mucilage were determined by Fourier Transform Infrared (FTIR) spectroscopy. The gum was amorphous, odourless, and light brown with excellent swelling ability. Phytochemical tests confirmed carbohydrates and mucilage, while physicochemical studies showed a pH (6.75), loss on drying (9.63%), and total ash value (7.2%), reflecting stability and purity. Solubility studies demonstrated aqueous solubility with insolubility in organic solvents. FTIR spectra revealed characteristic hydroxyl and carboxyl peaks, confirming its polysaccharide backbone. Collectively, okra gum functions effectively as a binder, disintegrant, and suspending agent, providing a sustainable, economical alternative to conventional




ISBN: 978-81-980623-8-3

excipients. Beyond these traditional uses, an innovative prospect lies in tumour microenvironment-responsive nanoparticles fabricated from okra mucilage. Such nanocarriers, engineered to respond to acidic pH and tumour-specific enzymes, could encapsulate anticancer agents like paclitaxel or doxorubicin, maintaining stability in systemic circulation while releasing their payload selectively at tumour sites. Additionally, okra mucilage's natural mucoadhesive, biocompatible, and antioxidant properties enhance retention, tolerability, and protection against oxidative stress, positioning it as a novel platform for next-generation anticancer drug delivery.

**Keywords:** Okra gum, biodegradable polymer, sustainable excipient, phytochemical screening, FTIR spectroscopy, nanocarriers.

**PC-633**

**MMUCOADHESIVE NANOSTRUCTURED LIPID CARRIER (NLC) STATISTICAL OPTIMIZATION OF NATAMYCIN DELIVERY IN THE TOPICAL MANAGEMENT OF KERATOMYCOSIS**

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To design and evaluate natamycin-incorporated mucoadhesive nanostructured lipid carriers (MN-NLC) for sustained and efficient delivery to keratomycosis. This study focuses on the practical claim of the quality by design (QbD) methodology in the creation and optimization by Box-Behnken design (BBD). MN-NLC were prepared by solvent emulsification high sheer homogenization with ultra-sonification method, optimized by (BBD) with the aid of Design-Expert® Software and investigated in-vitro, ex-vivo and in-vivo studies. The mean diameter, zeta potential, and % entrapment efficiency of optimized MN-NLC were obtained to be 200 nm, 38.78 mV, and 80.10% respectively. TEM examinations were used to confirm the size and form of spheres. MN-NLC release data demonstrated that the Higuchi model (R2 = 0.988) for delayed MN-NLC release was correct. The In-vitro release studies showed 74% MN-NLC release over 12 hours. The antifungal susceptibility investigation showed that MN-NLC effectively decreased the fungus load in less time than commercial formulations. Findings of all these results, it can be said that the formulation demonstrated a sustained release pattern and a decrease in the fungal load in the affected area. MN-NLC may thus have therapeutic promise for dealing with keratomycosis after the clinical investigation in the coming days.

**Keywords:** Keratomycosis, NLC, Mucoadhesive, Box-Behnken Design, Ocular Drug Delivery, Natamycin.

**PC-634**

**TGM: SMART POLYMER-BASED CARRIER FOR TARGETED AND CONTROLLED DRUG DELIVERY**

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Natural mucilage is a biodegradable, non-toxic, and eco-friendly polymer. To assess the properties, toxicity and application of a novel polysaccharide-based polymeric network. A polysaccharide-acrylamide (TGM-AM) graft copolymer was synthesized via a green, microwave-assisted method using potassium persulfate. Optimization was done based on grafting efficiency. The polymer was characterized using FTIR, DSC, H-NMR, XRD, SEM, viscosity and release studies. The method was efficient and eco-friendly. The best batch (TGM-1) showed 400% grafting and 105% efficiency. Structural analyses confirmed successful grafting. Acute toxicity tests confirmed its safety. The F2 batch show maximum release 89.96%. The polymeric network is safe and suitable for sustained drug delivery of BCS Class II and IV drugs show the sustained release effect.

**Keywords:** Natural Mucilage, Green Synthesis, Polymeric Scaffold, Seed Mucilage, Toxicity, Grafting copolymer, F2 Batch.

**PC-635**

**PATIENT - FRIENDLY PAIN MANAGEMENT: FREEZE DRIED IBUPROFEN NANOSTRIP FOR SUBLINGUAL DELIVERY**

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The objective of this project is to develop and evaluate a sublingual freeze dried nanostrip of ibuprofen as a novel pain management approach.Though Ibuprofen is widely used, causes gastric irritation and undergoes first pass metabolism, reducing its effectiveness in conventional tablet form. In this project , ibuprofen has to first be converted into a nanosuspension using high speed homogenization and ultrasonication, with Poloxamer 188 serving as a stabilizer to improve its solubility and particle stability. This nanosuspension has to be incorporated into a pullulan-based film-forming solution, consist of glycerol for flexibility, sucralose for taste masking, and SLS and citric acid to enhance permeability and saliva stimulation. The prepared solution has to be cast, frozen, and lyophilized to produce thin, porous nanostrips intended to dissolve sublingually.The nanostrips has to be undergo evaluation for weight, thickness, folding endurance, surface pH, tensile strength, and moisture uptake, along with drug content uniformity, disintegration time, and in vitro dissolution profile. Advanced studies like SEM (surface morphology), FTIR/DSC (compatibility), and particle size analysis will further characterize the formulation.This innovative system will help to deliver rapid pain relief, increased bioavailability, and improved patient convenience over Conventional ibuprofen tablets.

**Keywords:** Sublingual nanostrip, Freeze-dried film, Ibuprofen nanosuspension, Pain management First-pass metabolism bypass, Gastric irritation reduction, Lyophilization, Film casting Freezing Rapid onset of action, Improved bioavailability, Patient compliance, Novel drug delivery system

**PC-636**

**DEVELOPMENT OF CHITOSAN FUNCTIONALIZED LIPOSOMES LOADED WITH RALOXIFENE HCL FOR BREAST CANCER THERAPY**

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Raloxifene HCl, a selective estrogen receptor modulator (SERM), is widely used for the prevention and treatment of breast cancer. However, its poor aqueous solubility and limited oral bioavailability restrict its therapeutic potential. The present study was undertaken to develop and evaluate Raloxifene HCl loaded liposomes functionalized with chitosan for enhanced bioavailability and targeted intravenous delivery. Liposomes were prepared using the ethanol injection method with soy lecithin and cholesterol as lipid components, followed by chitosan coating to improve mucoadhesion, stability, and cellular uptake. The formulation was characterized for particle size, zeta potential, entrapment efficiency, Fourier-transform infrared spectroscopy (FTIR), differential scanning calorimetry (DSC), scanning electron microscopy (SEM), and in vitro release behavior. The optimized formulation exhibited a mean particle size of 192.6 nm, polydispersity index of 0.244, zeta potential of –21.3 mV, and entrapment efficiency of 80.79%, indicating a monodisperse and stable system. SEM confirmed spherical vesicles with uniform distribution, while FTIR and DSC analyses demonstrated compatibility between drug and excipients. In vitro diffusion studies revealed an initial burst release within the first 12 hours, followed by sustained drug release up to 24 hours. Release studies at pH 5.8 and 7.4 showed faster drug release at acidic pH, simulating the tumor microenvironment. Overall, the chitosan-functionalized Raloxifene liposomal system demonstrated promising characteristics for controlled intravenous delivery, potentially enhancing site-specific delivery to tumor tissues through improved mucoadhesion and the enhanced permeability and retention (EPR) effect. These findings suggest its suitability as a novel drug delivery approach for breast cancer therapy.

**Keywords:** Raloxifene HCl, Liposomes, Chitosan, Mucoadhesive nanoparticles.

**PC-637**

**METAL OXIDE NANOPARTICLES LOADED HYDROGEL HEMOSTATIC COMPOSITES FOR WOUND HEALING**




ISBN: 978-81-980623-8-3

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Wound healing is repairing of injured tissue. It is an interaction of cellular events that regenerate damaged tissue. It involves many stages such as haemostasis in which clotting factors plays major role. In migration phase granulation collagen is formed by fibroblasts and providing a rigid strength skin. Cellular connective tissue reforms in remodelling phase and strengthen the new epithelium which produces the final scar. The present work aim of investigation was to prepare and evaluate multiphase hydrogel system incorporated with silver oxide nanoparticles for wound healing. The silver oxide loaded hydrogel were prepared by taking chitosan, PEG and hyaluronic acid at different ratio. Prepared hydrogels were characterized on the given parameters of surface morphology, water vapour transmission rate (WVTR), swelling ratio, hemocompatibility, stability, in-vitro release and in-vivo studies. The results were significant and reliable compared to other prepared formulations. The objective of proposed work was satisfied by prepared delivery system for the treatment of cutaneous wounds.

**Keywords:** Chitosan, Hyaluronic acid, silver oxide, PEG, heparin.

**PC-638**

## DEVELOPMENT AND OPTIMIZATION OF TOPICAL FILM FORMING GEL OF MUPIROCIN IN THE TREATMENT OF IMPETIGO

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Impetigo is a highly contagious bacterial superficial skin infection caused by Staphylococcus aureus and Streptococcus pyogenes in children. The topical antibiotic mupirocin is used to treat skin infections like impetigo. This study focuses on the preparation of Mupirocin-based Film Forming Gel (FFG) for the treatment of impetigo. Design of Experiments (DoE) approach was used for the study where in 12 formulations were prepared using a two factor two level, Central Composite Design (CCD) with four centre points. The independent variables used were concentration of Eudragit L-100 and concentration of Hyaluronic acid and the dependent variables used were drying time in seconds and drug release at the end of 6hrs. The formulations were evaluated for parameters such as pH, viscosity, spread ability, film-forming ability, drying time, washability, antimicrobial studies, invitro drug release and stability study. The optimised formulation was tested on animals for skin irritation study.The optimized formulations demonstrated faster drying time favourable drug release with no skin irritation, edema on animal skin demonstrating its dermatological safety. The prepared film forming gels of mupirocin were found to be promising alternative for effective treatment of impetigo offering improved performance, safety, and user convenience.

**Keywords:** Mupirocin, Film Forming Gel, Impetigo, Central Composite Design

**PC-639**

## DEVELOPMENT OF A COST-EFFECTIVE EFFERVESCENT PROBIOTIC TABLET USING BACILLUS CLAUSII SPORES AS A LOW-COST ALTERNATIVE TO ENTEROGERMINA SUSPENSION.

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The present study focuses on the development of a cost-effective effervescent probiotic tablet containing Bacillus clausii spores as a novel alternative to conventional probiotic suspensions like Enterogermina. Commercial formulations are often expensive, require cold chain storage, and come in single-use vials, limiting their accessibility in low-resource settings. This project proposes a shelf-stable, portable, and patient-friendly effervescent tablet, formulated to deliver ≥2 billion CFU of Bacillus clausii per dose. The formulation includes citric acid and sodium bicarbonate as effervescent agents, mannitol as filler, and natural flavors for improved palatability. The spores are cultured, harvested, and dried using lyophilization or spray drying to retain viability. Tablets are prepared via direct compression and packaged in moisture-resistant containers.The product undergoes physical (effervescence time, weight uniformity), microbiological (CFU count, contamination), and chemical (pH, moisture content) evaluations. Stability studies are conducted as per ICH guidelines, indicating an expected shelf life of 12–18 months. The projected cost is ₹10–₹15 per dose — significantly lower than current market options.The proposed effervescent format offers a novel, child-friendly, and scalable solution for probiotic delivery, with strong potential for use in pediatric, rural, and travel-based healthcare settings.

**Keywords:** Bacillus clausii, Probiotic, Effervescent tablet,Cost-effective formulation, Gut microbiota, Spore-forming bacteria, Shelf-stable probiotic, Enterogermina alternative, Oral dosage form, Pediatric formulation.

**PC-640**

## DRUG UTILIZATION EVALUATION OF MEDICATIONS USED IN THE MANAGEMENT OF NEPHROLOGICAL DISORDERS WITH RESPECTIVE OF CKD & AKI: A HOSPITAL BASED PROSPECTIVE COHORT STUDY

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Nephrological disorders, including acute kidney injury (AKI) and chronic kidney disease (CKD), are often referred to as "silent killers". Despite their significant impact, they are notably absent from the World Health Organization's (WHO) list of five major non-communicable diseases (NCDs) driving premature death and disability. AKI increases the risk of CKD, and vice versa. In resource-poor settings with weak primary care, as many as 9 out of 10 individuals with CKD are unaware, they have the condition and do not seek treatment. A hospital-based prospective cohort study was conducted to evaluate drug utilization in the management of nephrological disorders. The study included a total of 150 patients. The most frequently prescribed drug was Pantoprazole (12.02%). Among antihypertensive medications, Cilnidipine had the highest usage (7.92%). Diuretics were widely prescribed (8.35%), with Furosemide being the most common (100 prescriptions). The study also found that CKD Stage II was the most commonly reported burden among patients. The most commonly prescribed drugs overall were Pantoprazole, Aspirin, and Atorvastatin. The study concluded that the prescribing patterns in the Nephrology Department were in accordance with WHO criteria. However, polypharmacy was common due to the presence of comorbid conditions. The authors suggest that a clinical pharmacist in a multidisciplinary team can optimize drug therapy through medication use evaluations and patient education, ensuring rational drug prescribing and improved clinical outcome

**Keywords:** Drug Utilization Evaluation (DUE), Chronic kidney disease, Acute kidney disease, Defined Daily Dose (DDD), Prescribed Daily Dose (PDD).

**PC-641**

## A COMPARATIVE INTERVENTIONAL STUDY ON DRUG-RELATED PROBLEMS IN GERIATRIC PATIENTS USING START/STOPP CRITERIA: ROLE OF CLINICAL PHARMACIST COUNSELING IN ENHANCING MEDICATION APPROPRIATENESS, ADHERENCE, AND QUALITY OF LIFE

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Geriatric patients are highly susceptible to drug-related problems (DRPs) due to polypharmacy, comorbidities, and age-related pharmacokinetic changes. The application of START/STOPP criteria helps identify potentially inappropriate medications (PIMs) and optimize therapy. A hospital-based pre–post comparative interventional study was conducted among geriatric outpatients (>65 years). A total of 304 patients (sample may vary) were enrolled and allocated into interventional (n=106) and non-interventional (n=72) groups. Data included demographics, medication history, pill count adherence, and




ISBN: 978-81-980623-8-3

WHOQOL-BREF scores. START/STOPP criteria were applied to detect PIMs, and clinical pharmacists provided individualized counseling on medications, adherence, and lifestyle modifications to the intervention group. Statistical analysis was performed using the t-test and one-way ANOVA. Overall, 183 DRPs were identified, with 133 STOPP-related and 50 START-related. DRPs were most frequent in the cardiac department and least in the urogenital/endocrine. START-related DRPs were highest in cardiac cases, while STOPP-related DRPs were most common in CNS disorders. Pharmacist intervention significantly improved adherence (pill count), reduced DRPs, and enhanced quality of life scores, particularly in physical and psychological domains. Educational status was positively associated with better knowledge and adherence ($p<0.05$). Pharmacist-led interventions using START/STOPP criteria effectively improve medication appropriateness, adherence, and quality of life in geriatrics. Integration of pharmacists into routine geriatric care can minimize DRPs and strengthen long-term clinical outcomes.

**Keywords**: START/STOPP Criteria, Medication Adherence, Quality of Life (WHOQOL-BREF), Polypharmacy

**PC-642**

## THERAPEUTIC POTENTIAL OF META-COMPLEX HYDROGEL IN ACCELERATING WOUND REPAIR

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Wound healing is a complex biological process involving hemostasis, inflammation, proliferation, and tissue remodeling. Recent advances in biomaterials have highlighted the potential of hydrogel-based dressings due to their high water content, biocompatibility, and ability to create a moist wound environment conducive to tissue repair. Meta-complex hydrogels, developed by incorporating metal ions or metal-based complexes within a polymeric network, exhibit multifunctional properties that enhance the wound healing process. These hydrogels not only provide structural support but also deliver antimicrobial, anti-inflammatory, and angiogenic effects through controlled release of metal ions such as zinc, copper, or silver. Their tunable physicochemical characteristics, including porosity, swelling ability, and mechanical strength, enable efficient oxygen exchange and exudate absorption while minimizing infection risks. Furthermore, meta-complex hydrogels can be engineered for sustained drug delivery, thereby accelerating cell proliferation, collagen deposition, and re-epithelialization. Collectively, these properties position meta-complex hydrogels as a promising next-generation wound dressing with significant clinical potential in managing chronic and acute wounds.

**Keywords:** Meta-complex hydrogel, wound healing, biomaterials, drug delivery, antimicrobial activity.

**PC-643**

## FORMULATION AND EVALUATION OF ASPIRIN LOADED MICROSPONGE CAPSULE FOR ANTI-INFLAMMATORY ACTIVITY

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This research focused on preparing and evaluating aspirin loaded microsponges in capsule form to deliver the anti-inflammatory drug with controlled release , improved stability, and enhanced bioavailability. A microsponge was a polymeric drug delivery system consisting of microscopic spherical and porous particles that can trap active ingredients. The ethyl cellulose were used to create the polymeric microsponge. The microsponge capsules containing porous microparticles with a “bag of marbles” internal structure were formulated to utilizing techniques like biphasic - liquid mixture polymerization or virtual - emulsion osmosis method. The formulated polymeric microsponges was used to observe the presence of porous by using techniques as field emulsion scanning electron microscopy (FESEM) and evaluated through drug content, test tube experiments and particle size studies. The typical size of microsponge particles are 25-30µm containing porus with volume of 0.5-1 g/ml. The microsponges encapsulated in size 1 capsules for their anti-inflammatory effect, to showing good entrapment efficiency and positive results for anti-inflammatory effects. These studies are focused on optimizing the capsule formulation to estimate the release of rate of aspirin from the microsponges. These amount of drug entrapped was determined with high entrapment efficiency values ranging from (79.15% to 87.5%) and demonstrated controlled aspirin release, leading to improved bioavailability and reduced side effects. They indicates that the microsponge capsules system releases aspirin drug over time, revealing a positive anti-inflammatory impact within the body.

**Keywords:** Microsponge capsule, Anti-inflammatory activity, Aspirin, Bioavailability, Controlled released drug, Ethyl cellulose.

**PC-644**

## LIPOSOMAL ENCAPSULATION OF HERBAL EXTRACTS: A NOVEL STRATEGY TO ENHANCE STABILITY AND BIOAVAILABILITY

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Herbal medicines have gained worldwide importance due to their wide range of pharmacological effects. However, their therapeutic effectiveness is often limited by poor solubility, instability under physiological conditions, and low bioavailability. Nanotechnology-based delivery systems, especially liposomes, provide a promising way to overcome these issues. This study aimed to develop and characterize liposomal formulations containing standardized herbal extracts rich in bioactive phytochemicals. Liposomes were prepared using the thin-film hydration method followed by sonication to produce nanosized vesicles. Dynamic light scattering and transmission electron microscopy showed spherical particles with an average size below 200 nm, a narrow size distribution, and high encapsulation efficiency. Stability tests indicated that liposomal encapsulation effectively protected the extracts from degradation under stress conditions. In vitro antioxidant tests, including DPPH and ABTS radical scavenging assays, showed enhanced activity of liposome-loaded extracts compared to free extracts. Additionally, antimicrobial tests against common bacterial and fungal strains demonstrated increased inhibition zones and lower minimum inhibitory concentrations, confirming improved bioactivity with liposomal delivery. The better performance was attributed to improved solubility, protection from enzymatic breakdown, and increased cellular uptake of phytochemicals. These results suggest that liposomal encapsulation is a viable strategy to boost the pharmacological potential of herbal extracts and could lead to the development of new herbal nanomedicines with better therapeutic effectiveness and patient adherence.

**Keywords:** Herbal extracts, Liposomes, Phytochemicals, Bioavailability, Antioxidant activity, Nanocarriers, Drug delivery

**PC-645**

## TO FORMULATE AND EVALUATE MESALAMINE-LOADED CYCLODEXTRIN-BASED NANOSPONGES AS A SOLID ORAL FORMULATION

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The present research focuses on the formulation and characterization of a novel drug delivery system using cyclodextrin-based nanosponges (CDNS) as an efficient carrier for poorly water- soluble drugs. Conventional oral drug delivery faces challenges such as low solubility, poor permeability, and reduced bioavailability, particularly for Biopharmaceutical Classification System (BCS) class II and IV compounds. To overcome these limitations, nanosponges, consisting of cross- linked cyclodextrin polymers, were synthesized to enhance solubility, stability, and controlled release of therapeutic agents. Various methods including solvent evaporation, melt technique, and ultrasound-assisted synthesis were employed for nanosponges preparation. The synthesized formulations were evaluated using advanced characterization techniques such as Fourier Transform Infrared Spectroscopy (FTIR), Differential Scanning Calorimetry (DSC), Powder X-Ray Diffraction (PXRD), and Scanning Electron Microscopy (SEM) to confirm molecular interactions, crystallinity, morphology, and thermal stability. Drug




ISBN: 978-81-980623-8-3

loading and entrapment efficiency were determined, demonstrating significant improvement in encapsulation capacity. In vitro release studies showed sustained and controlled drug release, indicating potential application in enhancing oral bioavailability and therapeutic efficacy. This study highlights the versatility of CDNS in delivering both hydrophilic and hydrophobic drugs while ensuring safety, stability, and biocompatibility. The findings offer valuable insights into the development of advanced drug delivery platforms, potentially transforming therapeutic outcomes for drugs with poor water solubility, thereby paving the way for future clinical applications.

**Keywords**: Mesalamine, Cyclodextrin-based Nanosponges, Drug Loading, bioavailability, poor Water Solubility, Drug Loading, Entrapment Efficiency, Solvent Evaporation, FTIR.

**PC-646**

## PREPARATION AND ESTIMATION OF ANTIMICROBIAL ACTIVITY PRESENT IN MUCOADHESIVE DENTAL GEL OF SEVERAL AERIAL BARKS OF VACHELLIA NILOTICA TO INTENSIFY THE THERAPEUTICAL EFFECT OF USING BY CLOVE OIL

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To formulate and estimate the dental mucoadhesive gel containing a ethanolic bark extract of Vachellia Nilotica for treating tooth pain.The dental gel was prepared by using carbopol 940, sodium carboxy methyl cellulose, propylene glycol, hydroxy methyl cellulose and clove oil. The Vachellia Nilotica extract was to be prepared with ethanol and water ratio is (80:20v/v). The optimized studies were diffusion study , stability testing, drug content determination for the release of drug that contain percent cumulative study from gel formulation and present activity studies. The dental gel formulation was evaluated for different organoleptic properties such as pH, viscosity, Spreadability and phytochemical screening. Mucoadhesive gel strength was measured and in-vitro studies of anti-microbial activity and drug realease. This studies were carried out the two same formulation contain sodium carboxy methyl cellulose as a polymer and carbopol. The various concentration of Carbopol was prepared at different form of formulation. In-vitro antimicrobial activity of extract showed a zone of inhibition was done on Mueller-Hinton agar (MHA) against the gram positive bacteria of streptococcus aureus (S . aureus) by using disc diffusion method. The estimation of parameters that indicate the optimized batch to prepared mucoadhesive gel was stable, good drug delivery system containing the antimicrobial activity for prevention of periodontitis, tooth pain, dental caries. The drug content was to be found at 80% to 85% of given extract. The force range from 3432.9 to 3756.1 dyne/cm2. The drug release cumulative of in-vitro study within 90% to 94%. Based on a in-vitro evaluation of mucoadhesive gel, it was selected as the best formulation.

**Keywords**: Vachellia nilotica, Aerial parts, Clove oil, Anti-microbial activity, Mucoadhesive dental gel, Carbopol, Sodium CMC, HPMC.

**PC-647**

## BRAIN-TARGETED T-RESVERATROL NANOEMULSIONS IN MEMORY MODELS

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The present study investigates the memory-enhancing potential of lactoferrin-conjugated Resveratrol-loaded nanoemulsions (Lacto-T-Res-NEs) compared with T-Resveratrol nanoemulsions (T-Res-NEs) in mice. Nanoemulsions were prepared by high-energy emulsification and characterized for size (120–150 nm), polydispersity index (0.21), and zeta potential (–28 mV). The in vivo effects were assessed using the Elevated Plus Maze (EPM) and locomotor activity tests. In the EPM, transfer latency (TL), an indicator of learning and memory, was significantly reduced in Lacto-T-Res-NE treated mice (Day 1 TL: 42.5 ± 3.1 s; Day 2 TL: 18.7 ± 2.4 s) compared to T-Res-NEs (Day 1: 44.8 ± 3.6 s; Day 2: 26.4 ± 3.2 s) and control (Day 1: 47.2 ± 4.1 s; Day 2: 39.6 ± 3.8 s) groups ($p < 0.01$). The percentage reduction in TL from Day 1 to Day 2 was highest in the Lacto-T-Res-NE group (55.9%) compared to T-Res-NEs (41.1%) and control (16.1%). Locomotor activity, measured as total ambulation in an open field, showed no significant difference between groups (Control: 275 ± 18 counts; T-Res-NE: 282 ± 21; Lacto-T-Res-NE: 289 ± 19; $p > 0.05$), confirming that memory improvement was not due to changes in motor activity. These findings suggest that lactoferrin conjugation enhances the brain-targeting efficiency of T-Resveratrol nanoemulsions, leading to superior memory-enhancing effects without altering locomotor behavior. Lacto-T-Res-NEs may offer a promising nanocarrier strategy for neuroprotective therapeutics.

**Keywords:** T-Resveratrol, lactoferrin, Nanoemulsion, memory, Elevated Plus Maze, locomotor activity.

**PC-648**

## DESIGN AND DEVELOPMENT OF MICROSPHERES-BASED TOPICAL DRUG DELIVERY SYSTEMS

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The objective of this study was to design and evaluate topical controlled-release dosage forms by incorporating drug-loaded microspheres. Tx, Ix, Cx, and Bx, classified as anti-acne agents, were selected as model drugs. Microspheres were formulated using porous polymeric microbeads with non-biodegradable polymers like silica. These microspheres were characterized using FT-IR spectroscopy and Differential Scanning Calorimetry to assess drug–polymer compatibility. The resulting microspheres were small, discrete, spherical, and free-flowing, with a mean particle size of 201.34 µm. In vitro drug release studies demonstrated that in-house formulations provided a release profile similar to that of an innovator formulation. Drug-loaded microspheres were incorporated into gel formulations, which were further evaluated for drug content and viscosity. The in vitro release profile revealed sustained drug release for up to 7 hours from gels containing Tx, Ix, and a combination of (Cx + Bx) microspheres. Model fitting analysis indicated a non-Fickian mechanism of drug release with Super Case II transport, suggesting that the release rate is governed by polymer relaxation and erosion. Stability studies confirmed no significant changes in drug content or physical appearance over the testing period, indicating good formulation stability. This study concludes that microsphere-based topical gels can offer controlled and sustained drug delivery, making them promising systems for the treatment of acne and potentially other dermatological conditions.

**Keywords:** Microspheres; Topical gels; Microbead; In-house; Innovator formulation.

**PC-649**

## FORMULATION AND EVALUATION OF MUCOADHESIVE NANOSTRUCTURED LIPID CARRIERS FOR EFFECTIVE TREATMENT OF KERATOMYCOSIS

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Keratomycosis, a severe fungal infection of the cornea, poses significant therapeutic challenges due to poor ocular bioavailability of antifungal drugs. Conventional treatments suffer from rapid drug elimination and limited penetration. Mucoadhesive nanostructured lipid carriers (NLCs) offer a promising alternative by enhancing drug retention and permeation at the ocular surface, thereby improving antifungal efficacy. Mucoadhesive NLCs were developed using a hot high-shear homogenization and ultrasonication technique with a lipid matrix composed of solid and liquid lipids. Natamycin were encapsulated within NLCs. Chitosan was incorporated to enhance mucoadhesion. The formulations were optimized based on particle size, polydispersity index (PDI), zeta potential, entrapment efficiency (EE), and in vitro drug release. The optimized NLCs exhibited a particle size of ~150–200 nm, a PDI of <0.3, and a zeta potential of ±30 mV, ensuring stability. High drug entrapment efficiency (>80%) was achieved, and FTIR confirmed drug-lipid compatibility. TEM revealed a spherical morphology. In vitro drug




ISBN: 978-81-980623-8-3

release followed a biphasic pattern with sustained release over 24 hours. The optimized NLCs significantly reduced fungal burden in experimental keratomycosis, suggesting improved therapeutic potential. Mucoadhesive NLCs effectively enhance ocular drug delivery for keratomycosis, providing prolonged retention, controlled release, and superior antifungal efficacy. This nanotechnology-driven approach could revolutionize keratomycosis management.

**Keywords:** Nanostructured lipid carriers, Mucoadhesion, Keratomycosis, Ocular drug delivery, Antifungal therapy.

**PC-650**

**"TRANSFORMING CANCER CARE: NANOGEL-BASED PRECISION THERAPY FOR DERMATOFIBROSARCOMA PROTUBERANS WITH IMATINIB MESYLATE"**

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Dermatofibrosarcoma Protuberans (DFSP) is a rare, locally aggressive soft tissue sarcoma driven by the PDGFB–COL1A1 fusion gene, making it highly responsive to targeted therapy. While surgical excision remains the primary treatment, cases with local recurrence, metastasis, or inoperability require alternative therapeutic strategies. Imatinib mesylate, a tyrosine kinase inhibitor, has demonstrated response rates of 50–80% in fusion-positive DFSP cases. However, systemic administration is associated with dose-dependent toxicity and suboptimal drug accumulation at the tumor site. This study focuses on the development, optimization, and characterization of an Imatinib Mesylate-loaded nanogel for localized and sustained DFSP treatment. Nanogel formulations were prepared using emulsion solvent evaporation followed by gel incorporation, ensuring enhanced drug encapsulation efficiency (EE) of 78.4 ± 2.1% and sustained drug release over 48 hours. The optimized formulation exhibited a particle size of 152.6 ± 5.3 nm, a zeta potential of -21.4 ± 1.2 mV, and a polydispersity index (PDI) of 0.162 ± 0.03, indicating stability and uniformity. In vitro cytotoxicity studies on HT-1080 human fibrosarcoma cells demonstrated a 53.7% cell viability reduction at 48 hours, confirming potent anti-proliferative effects. Additionally, ex vivo permeation studies using porcine skin models showed 3.8-fold higher retention of Imatinib in deeper dermal layers compared to conventional gel formulations. These findings suggest that the nanogel-based drug delivery system enhances localized drug accumulation, minimizes systemic exposure, and improves therapeutic efficacy, making it a promising approach for DFSP treatment, particularly in advanced and inoperable cases. Further in vivo studies will validate its clinical potential.

**Keyword:** Imatinib mesylate, DFSP, Treatment, Nanogel.

**PC-651**

**"TAILORED SOLUTIONS FOR ANTICANCER DRUG DELIVERY: DESIGN, DEVELOPMENT, AND OPTIMIZATION OF A COLON-TARGETED APPROACH"**

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Capecitabine is a chemotherapeutic agent used in the treatment of colorectal cancers and metastatic breast. Therefore, a colon targeted formulation of Capecitabine will ensure high local concentrations of drug in colon and reduce upper gastrointestinal toxicities that arise from the use of its conventional formulations. Theaim of the present study was to design and develop formulation for colon specific delivery of Capecitabine for the potential treatment of colorectal cancer. For the purpose of formulation design, a colon targeted tablet containing the drug with ligand conjugated polymer was proposed. It was expected that the use of pH sensitive polymer would ensure the drug release in the colon and the ligand conjugation would ensure the targeting of the cancerous cell. Therefore, the primary objective of the study was to develop and optimize Capecitabine loaded folic acid conjugated chitosan nanoparticles and later to develop the colon targeted tabletscontaining these optimized nanoparticles. To develop the optimized nanoparticles, Box-Behnken design (BBD) was used and the optimized batch containing 0.17 mg/mL FA-CS, 0.72 mg/mL STPP and 17.52 mg Capecitabine was selected. The optimized batch was evaluated for particle size (205.2 nm), polydispersity index (0.194), and %entrapment efficiency (77.71%). Thesenanoparticles were used to formulate the colon targeted tablets. For colon targeting, various coating parameters were evaluated and it was found to be satisfactory. The drugrelease study was performed in various medium, mimicking physiological environment,0.1N HCL pH 1.2, PBS pH 7.4, and PBS pH 6.8 which was found to be 0%, 29.06 ± 0.893%, and 96.41 ± 0.297% respectively. Furthermore, on the basis of stability studyresults, it was observed that there was no significant change in the formulationcharacteristics over the period of one month. Thus, the developed colon targeted tabletscontaining Capecitabine loaded folic acid conjugated chitosan nanoparticles were probably the best alternative approach for the treatment of patients suffering from colorectal cancer.

**Keywords:** Capecitabine, folic acid, chitosan, conjugation, nanoparticles, colontargeted tablet, design of experiment.

**PC-652**

**NOVEL MUCOADHESIVE NANOGEL FOR VAGINAL DRUG DELIVERY USING SUGARCANE BAGASSE CELLULOSE**

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Sugarcane bagasse (SCB) was explored as a sustainable cellulose source, yielding 44–45% through sequential extractions, delignification with acidic sodium chlorite, and alkali treatments (10% KOH/NaOH). FTIR confirmed the structural integrity of the extracted cellulose. To develop a multifunctional system, methacrylated monocarboxylic SCB cellulose (MAMC-SBC) was synthesized and copolymerized with HPMC and Poloxamer-188 via in situ free radical polymerization using cystamine bisacrylamide (CBA). The resulting nanogels exhibited redox, pH, and thermal responsiveness, with stable particle sizes ranging from 250 to 440 nm. DOE-based optimization achieved desirable physicochemical properties. Lyophilized nanogels showed favourable morphology, swelling behaviour, and encapsulation efficiency. In vitro release demonstrated sustained drug release up to 85%, highlighting SCB-derived nanogels as an eco-friendly platform for controlled drug delivery.

**Keywords:** Cellulose, Extraction, Sugarcane Bagasse, Synthesis, Nanogel.

**PC-653**

**DOCETAXEL LOADED PTEROYL-Y-L-GLUTAMATE/PLURONIC F68 MODIFIED POLYMERIC MICELLES FOR TARGETED DELIVERY AND REDUCED TOXICITY**

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Enhanced efficacy and reduced toxicity require targeting the malignant cells which can be done by surface functionalization of nanocarriers, such as polymeric micelles, using a block copolymer with a conjugation moiety. By blocking P-gp, this could improve the targeting capability of drug-loaded nanocarriers and prevent drug efflux. Pteroyl-Y-l-glutamate or folic acid (FA) can be used to treat cancer growth linked to a pro-tumorigenic tumor microenvironment with folate receptor (FR). Pluronic F68 has the ability to inhibit P-glycoprotein (P-gp), whereas the pteroyl-Y-l-glutamate modified carriers can target FR. Thus, the goal of our research was to create FA-linked Pluronic F68 (FA-PF68) micelles for the delivery of docetaxel trihydrate (DTX). Pteroyl-Y-l-glutamate and PF68 were linked in a preliminary manner using UV spectroscopy, and this was verified by DSC and FTIR. FA-PF68-DTX micelles were prepared by DTX encapsulation in micelles via thin-film hydration. The nanocarriers shows lower particle size (152.2 nm) and exhibits improved physical stability. FA-PF68-DTX micelles were found to have a spherical form and a higher entrapment efficiency (94.75 ± 1.89%) in SEM. During the first 24 hours, the FA-PF68-DTX and PF68-DTX micelles showed a sustained release of DTX of around 80.25 ± 1.53 % and 47.56 ± 0.89 %, respectively. When it comes to MDA-MB-231 cells with reduced vitality, the FA PF68-DTX micelles exhibit higher efficiency. According to the histopathological analysis, the FA-F68 conjugation was not harmful to lung, kidney, or liver




ISBN: 978-81-980623-8-3

cells. It demonstrated the ability of synthetic pteroyl-Y-l-glutamate/PF68 modified FA-PF68-DTX micelles to target the tumor cells' overexpressed FR.

**Keywords:** Docetaxel trihydrate, targeted delivery, micelles, folate receptor, cancer therapy

**PC-654**

**THE RISING SIGNIFICANCE OF NANOPARTICLES IN COSMETICS**

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In the cutting-edge field of research known as nanotechnology, materials, devices, and systems are designed, characterized, produced, and used by manipulating their size and shape at the nanometer scale (1–100 nm). The use of nanotechnology in cosmetic formulation is regarded as the newest and most exciting technology on the market. For skin, hair, nails, lips, and teeth, nanocosmetics and nanocosmeceuticals have been thoroughly studied. It has been discovered that adding nanoparticles to products increases their effectiveness and customer happiness. Nowadays, nanoscale substances including cubosomes, nanodots, liposomes, dendrimers, and nanoemulsions are frequently used as ingredients in cosmetic products. The uses of nanoparticles in the cosmetics business, their special qualities, and the benefits of using nanoscale substances over non-nanoscale ones are all given particular attention. Additionally covered are the most recent methods for characterizing nanoparticles physicochemically and toxicologically.

**Keywords:** Nanoparticales, Nanocosmeceuticals, Cubosomes, Liposomes, Dendrimers.

**PC-655**

**QUALITY BY DESIGN ASSISTED DEVELOPMENT AND CHARACTERIZATION OF DEXIBUPROFEN LOADED MICROSPHERE FOR CONTROLLED DRUG RELEASE**

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The main objective of the present study was to develop dexibuprofen-loaded microspheres for controlled drug release through Quality by design (QbD) approach. Microspheres are tiny spherical particles ranging from 1 to 1000 µm made from polymers. In microspheres, the dose and the frequency of administration can be reduced, which avoids the gastric irritation, gastric ulceration and other side effects associated with the conventional dexibuprofen. The microspheres were prepared by the emulsion solvent evaporation method. The Full factorial design was employed to systematically optimise the critical material attributes (CMAs) and critical process parameters (CPPs) such as PLGA concentration, PVA concentration, and stirring speed. All ten formulations of the microparticles were evaluated for particle size, %encapsulation efficiency, and % in-vitro drug dissolution study. The microsphere formulation was optimised using a numerical global desirability function of 0.93. The optimised formulation exhibited a particle size of 348.7nm with the highest entrapment efficiency and in vitro drug release of 98% and 95.2% respectively. The SEM studies on the optimised formulation showed the spherical nature of the prepared microspheres. The present study effectively utilised a quality-by-design approach to formulate controlled-release microspheres loaded with dexibuprofen. This optimised formulation exhibited controlled release of the drug, as evidenced by an in-vivo studies.

**Keywords:** Dexibuprofen, Full Factorial Design, PLGA, Microspheres, Quality by Design (QbD)

**PC-656**

**FORMULATION AND EVALUATION OF NANAPARTICULATE DRUG DELIVERY SYSTEM**

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Oral administration is the most preferred route for drug delivery; however, nearly 40% of marketed oral dosage forms and up to 90% of new chemical entities suffer from poor aqueous solubility, resulting in low bioavailability. Aceclofenac (ACF), a widely used non-steroidal anti-inflammatory drug (NSAID) for rheumatoid arthritis and musculoskeletal disorders, belongs to the Biopharmaceutics Classification System (BCS) Class II, where solubility is the limiting factor for absorption. Preformulation studies confirmed the identity and purity of ACF using melting point, FTIR, DSC, and UV-Visible spectroscopy, followed by calibration curve construction. Among different crosslinkers, diphenyl carbonate (DPC) was selected for nanosponge synthesis based on the intensity of carbonate bond formation. Blank CDNS were synthesized using melt, interfacial polymerization, and ultrasonic probe methods, with the melt method yielding stable and amorphous particles. Optimization of formulation parameters was carried out using StatEase® Design-Expert software (Box–Behnken design), where βCD molar concentration, DPC molar concentration, and reaction time were considered as independent variables, while percent yield, particle size, and carbonate bond intensity served as responses. The optimized batch demonstrated a yield of 46.14%, particle size of ~620 nm, and strong carbonate bond formation (confirmed by FTIR peak at 1772.88 $cm^{-1}$). ACF was loaded into optimized CDNS using the incubation–lyophilization method, and encapsulation was confirmed by FTIR and DSC, which showed significant peak shifts and reduced intensity, indicative of drug entrapment within CDNS cavities. The developed ACF-loaded CDNS exhibited improved solubility, high entrapment efficiency, and potential for controlled release, which can enhance oral bioavailability, minimize dose dumping, and reduce gastrointestinal side effects associated with conventional ACF formulations. Thus, cyclodextrin-based nanosponges offer a promising strategy for the development of effective and safe oral delivery systems for poorly soluble drugs like ACF.

**Keywords**: Aceclofenac, cyclodextrin-based nanosponges, drug loading, bioavailability, FTIR, Box-Behnken design, solubility enhancement, nanosponge optimization.

**PC-657**

**THERMORESPONSIVE GEL SYSTEM FOR TOPICAL DELIVERY OF ASPIRIN-LOADED PLGA MICROSPHERES IN DENTAL TISSUE ENGINEERING**

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Effective dentin regeneration requires precise, localized, and sustained delivery of bioactive molecules that can stimulate dental stem cell activity and promote odontoblastic differentiation. Aspirin, a well-established anti-inflammatory agent, has emerged as a promising candidate for dental tissue engineering due to its demonstrated dentinogenic potential when administered via an optimized carrier system. This study aimed to develop and characterize a thermoresponsive in situ gel incorporating aspirin-loaded poly(lactic-co-glycolic acid) (PLGA) microspheres for the site-specific delivery and for regeneration. The optimized PLGA microspheres were prepared by double emulsion solvent extraction method, which was then incorporated into gel by a cold-mixing method using Pluronic F127 and chitosan and optimized. The optimized formulation exhibited a sustained triphasic release profile over 16 days and demonstrated excellent biocompatibility with human dental pulp stem cells (HDPSCs), maintaining 74.61-100% cell viability with minimal cytotoxicity at concentrations of 250 µM and 500 µM. The study demonstrated that the thermosensitive aspirin-loaded PLGA microsphere gel significantly enhanced cellular uptake in HDPSCs, confirmed by fluorescence microscopy and flow cytometry, due to chitosan's mucoadhesive properties and microsphere clustering. Alizarin Red S staining showed increased mineral deposition at 500 µM, indicating improved odontoblast differentiation. Western blotting revealed elevated DSPP expression and Wnt10a co-expression, implicating the Wnt/β-catenin pathway in dentinogenesis. Additionally, FGF-2 expression was markedly increased, supporting osteogenic differentiation and tissue regeneration. These findings confirm the formulation's odontogenic




ISBN: 978-81-980623-8-3

potential and highlight its promise as a minimally invasive strategy for targeted dentin repair via stem cell activation.

**Keywords:** PLGA microspheres; Dental pulp stem cells; Stem cell stimulation; Cell uptake; Remineralization

**PC-658**

**RESEARCH IN VARIOUS DOSAGE FORMS FOR THE MANAGEMENT OF NEURODEGENERATIVE DISEASES**

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Neurodegenerative diseases (NDs) are the disorders due to demolition of neuronal cells by alternation of proteins. The NDs arise due to influence of environment and genetic association of abnormal protein accumulation. It results swelling of cells, further more oxidative stress in the central nervous system (CNS).The management of NDs are allopathic, Ayurveda medications, Unani and Siddha medicines as well as yogic approach. Practicing regularly yoga offers relaxation to mind and calmness to the brain which reduces headache, releases stress, depression and improves blood supply to various organs of the body. Current dosages for treating neurodegenerative illnesses differ greatly according on the ailment, drug type, and mode of administration. The majority of medications only treat symptoms; they don't treat the underlying neurodegeneration. Current studies are also looking into novel strategies, such as creative drug delivery systems that use drug targeting to get across the blood-brain barrier.

**Keywords:** Neurodegenerative diseases, environment, genetic, protein, blood-brain barrier

**PC-659**

**ADVANCES IN NANOCARRIER-BASED OCULAR DRUG DELIVERY SYSTEMS: A FOCUS ON INFLAMMATORY AND INFECTIOUS DISEASES WITH MUCOADHESIVE AND BIODEGRADABLE APPROACHES**

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Ocular drug delivery presents unique and formidable challenges due to the complex anatomy and physiology of the eye, which severely limit the bioavailability of therapeutic agents. Conventional ophthalmic formulations, such as eye drops, suffer from rapid pre-corneal clearance, low drug retention, and poor permeation across ocular barriers. This review paper provides a comprehensive overview of the significant advancements in nanocarrier-based ocular drug delivery systems, specifically focusing on their application in inflammatory and infectious eye diseases. We highlight the critical role of mucoadhesive and biodegradable strategies in enhancing drug residence time, improving ocular bioavailability, and enabling targeted delivery. Various nanocarrier platforms, including polymeric nanoparticles, lipidic nanocarriers, micelles, dendrimers, and in-situ gelling systems, are discussed in detail, along with their synthesis, characterization, and mechanisms of action. The review also addresses the current challenges, future prospects, and the potential of these innovative systems to revolutionize the treatment of ocular inflammatory and infectious conditions, ultimately leading to improved patient outcomes and compliance.

**Keywords:** Ocular drug delivery, infectious eye diseases, nanocarrier, Targeted ocular delivery.

**PC-660**

**DEVELOPMENT AND EVALUATION OF CHRONOTHERAPEUTIC DELIVERY SYSTEMS FOR ROSUVASTATIN IN HYPERCHOLESTEROLEMIA MANAGEMENT**

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Chronotherapy aligns medication administration with the body's biological rhythms to enhance therapeutic outcomes for various disorders. This study aims to develop and characterize a chronotherapeutic drug delivery system for rosuvastatin, a statin widely used to treat hypercholesterolemia. Since cholesterol synthesis peaks at night, rosuvastatin is well-suited for time-controlled, pulsatile drug formulations that synchronize its release with circadian rhythms. Rosuvastatin chrono formulations were prepared using wet granulation and hydrophilic/hydrophobic polymers. Pre-formulation studies confirmed suitable flow properties, with an angle of repose of 30°54', a bulk density of 0.426±0.08 g/cm³, and a Carr's index of 15.48±0.04, indicating good compressibility. Six granule formulations (F1–F6) with varying hydroxypropyl methylcellulose (HPMC) and ethyl cellulose concentrations were evaluated. In vitro release studies showed controlled patterns: F1 exhibited the highest cumulative drug release (97.45% over 6 hours), while F6 had the slowest (65.42% over 10 hours). Hydrogels for lag-time-controlled release, especially EP4, demonstrated significant swelling (index: 89.35) and a lag time of 2.5 hours, indicating a strong ability to modulate drug release. Capsule robustness was confirmed by minimal changes in size after treatment. Solubility studies in 0.1 N HCl showed gradual dissolution, reaching maximum solubility at 10 hours and maintaining it at 24 hours. Overall, the optimized rosuvastatin chronotherapy formulation achieved controlled drug release and promises improved patient compliance and effective hypercholesterolemia management.

**Keywords:** HCL, FTIR, HPMC, PVP, TALC.

**PC-661**

**"REDREVEAL: A PH-RESPONSIVE TOOTHPASTE FOR EARLY IDENTIFICATION AND HEALING OF ORAL ULCER" (WHAT YOUR MOUTH CAN'T SAY)**

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The present invention relates to a novel, multifunctional toothpaste formulation designed to serve both therapeutic and diagnostic purposes in proactive oral healthcare. This innovative composition is specifically engineered to include a pH-responsive chromatic indicator, enabling real-time visual detection of oral health abnormalities. The chromatic system utilizes natural, phytochemical-based compounds most preferably anthocyanins derived from Clitoria ternatea (commonly known as butterfly pea) which exhibit distinctive and reversible colour changes in response to alterations in the oral pH environment. Such deviations in pH are often early indicators of underlying pre-ulcerative, inflammatory, or pathogenic conditions within the oral cavity. The incorporation of this smart, colour-changing feedback mechanism allows users to visually monitor their oral biochemical status during routine brushing, thereby facilitating early detection and self-assessment. This empowers individuals to seek timely preventive care and mitigates the progression of oral disorders such as aphthous ulcers, mucosal irritation, and microbial infections. Beyond diagnostic capability, the formulation is enriched with a synergistic blend of herbal bio-actives known for their anti-inflammatory, antimicrobial, antioxidant, and mucosal-regenerative properties. These actives contribute to both the immediate alleviation of symptoms and long-term oral tissue protection. The entire composition remains non-invasive, user-friendly, and suitable for daily use without causing any discomfort or side effects. By combining conventional oral hygiene with intelligent health monitoring, the invention transforms tooth brushing into a dynamic, personalized healthcare experience. It holds significant promise for widespread application in both individual and community-level oral health management, particularly in preventive dentistry and consumer-driven health awareness.

**Keywords:** Smart toothpaste pH-responsive indicator Clitoria ternatea Anthocyanins Oral diagnostics

**PC-662**

**"TINY DROPLETS, BIG IMPACT: A NOVEL NANOPLATFORM FOR CONSISTENT AND ENHANCED ORAL DELIVERY"**

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ISBN: 978-81-980623-8-3

Trandolapril, a potent angiotensin-converting enzyme (ACE) inhibitor, is clinically valuable in the management of hypertension and heart failure but is severely constrained by poor aqueous solubility, dissolution-limited absorption, and extensive first-pass metabolism, resulting in a low and variable oral bioavailability of ~4–14%. These barriers undermine therapeutic consistency and necessitate dose escalation, thereby increasing systemic risk. Lipid-based carriers, particularly self-nanoemulsifying drug delivery systems (SNEDDS), provide a transformative strategy to overcome solubility challenges, exploit lymphatic transport, and effectively bypass first-pass metabolism. In this work, a Trandolapril-loaded SNEDDS was systematically designed and statistically optimized to enhance oral delivery. Solubility studies identified oleic acid, Cremophor RH40 and Transcutol P as the most suitable excipients. Pseudo-ternary phase diagrams delineated nanoemulsion domains, and a $3^2$ full factorial design was employed to investigate the influence of oil concentration and Smix ratio on droplet size, polydispersity index (PDI), and emulsification efficiency. The optimized formulation (FS8) generated ultra-fine nano-droplets of 19.43 nm with a narrow PDI (0.251), rapid self-emulsification within 32.6 s, and a high negative zeta potential (-28.42 mV), signifying excellent thermodynamic stability. In-vitro release achieved 87.48% cumulative release within 24 h, significantly surpassing the crystalline drug and following near zero-order kinetics. Atomic Force Microscopy confirmed spherical nanoscale morphology, while robustness to dilution, cloud point analysis, and stability testing demonstrated unwavering integrity under stress conditions. Collectively, these findings establish that the optimized SNEDDS profoundly enhances solubilization, dissolution, and stability of Trandolapril, offering a clinically translatable nanoplatform with the potential to redefine its therapeutic performance in hypertension management.

**Keywords:** Trandolapril, SNEDDS, Factorial design, Solubility enhancement, Hypertension.

**PC-663**

## "DESIGN, OPTIMIZATION, AND EVALUATION OF 3D-PRINTED TABLETS CONTAINING ANTIHYPERTENSIVE COMPLEX: A STATISTICAL PERSPECTIVE"

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The crucial focus of the current study was to design, optimize, and characterize a 3D-printed Nifedipine-Dexolve® complex-loaded tablet (3DPBDCT) using the fused deposition modeling (FDM) technique accomplishing the approach of progressive statistical and analytical tools. Nifedipine (BST) was selected as a prototypical medicine for 3DPBDCT due to its low bioavailability mainly due to poor aqueous solubility, short half-life (5hrs), high dose variation (15-125mg), and intra-subject variability. Initially, the solubility of the BST was improved by complexion with Dexolve®. The complex was prepared and evaluated for its different characterization. Fourier transform infrared (FTIR) and Differential Scanning Calorimeter (DSC) performed to confirm the structural and physical alteration. The complex was loaded into the 3-D printed tablet using the cavity method to form 3DPBDCT. The 3DPBDCT was formulated using FDM technology. The influence of varied shapes on BST release was assessed. A predicted plasma concentration curve was generated using back-calculation of the Wagner-Nelson approach. The compatibility study results indicate physical and chemical compatibility between the BST and chosen excipients. BST:Dexolve® (1:1) improved maximum solubility compared to another ratio and other complexing agents. DSC and FTIR confirmed the alteration of crystalline to amorphous form. The donut shape was chosen for the design of optimized 3DPBDCT due to its controlled release and better post-fabrication results. CCD had found a significant relationship between chosen CPPs and CQAs. The 3DPBDCT gave the desired pre and post fabrication results. The optimal 3DPBDCT can release 98.22% of the BST in 12 hours. The optimal 3DPBDCT was observed to be stable. The FDM technique was able to generate a donut-shaped 3DPBDCT. The effect of % infill and layer thickness significantly influenced the fabrication of 3DPBDCT. Dexolve® was considered a multifunctional excipient, improving stability and solubility. In addition, 3-D printing technology was adopted to give customized dose, design flexible shapes, sizes and modulate BST release to enhance patient compliance. The newly designed 3DPBDCT opens a new direction in the Pharmaceutical field.

**Keywords:** Nifedipine, Dexolve®, 3D Printing, FDM, Cavity method, Customized dosage form

**PC-664**

## FORMULATION AND EVALUATION OF MICRONUTRIENT TRANSDERMAL PATCH FOR POTENTIAL NUTRIENTS SUPPLEMENT BY TRANSDERMAL DRUG DELIVERY SYSTEM

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Transdermal drug delivery system (TDSS) is defined as self contained, discrete dosage forms which, when applied to intact skin, deliver the drugs through the skin, at a controlled rate to systemic circulation. This study aims to identify formulations and evaluation of transdermal patch for potential nutrients supplement by transdermal drug delivery system. The transdermal patches was successfully prepared with the hematinic agents Ferrous Ascorbate and Folic Acid also with the use of Hydroxy propyl methyl cellulose, Polyvinyl pyrrolidone and Dimethyl Sulfoxide. Organoleptic studies was carried out for the parameters of the Ferrous Ascorbate and Folic Acid Development of the standard curve of the drug using UV visible spectrophotometer. The transdermal patches were successfully prepared with hematinic agents, Ferrous Ascorbate and Folic Acid. The Pre-formulation study of drug was done using UV Visible spectroscopic method and FTIR.

**Keywords:** TDSS, FTIR, UV visible Spectroscopy, Ferrous Ascorbate.

**PC-665**

## FORMULATION AND IN VITRO EVALUATION OF LEVOSULPIRIDE NANOSUSPENSION FOR ANTIAPSYCHOTIC ACTIVITY

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Levosulpiride, a BCS Class IV drug, suffers from poor aqueous solubility and low permeability, resulting in limited bioavailability when administered orally. To address these challenges, a nanosuspension of Levosulpiride was formulated using the anti-solvent precipitation method. This technique effectively reduces particle size, thereby enhancing the drug's surface area and dissolution rate. Hydroxypropyl methylcellulose(HPMC E15) and Tween 80 were employed as stabilizers during formulation. The prepared nanosuspension was evaluated for critical in vitro parameters including particle size, polydispersity index (PDI), zeta potential, pH, and cumulative drug release. FTIR studies confirmed no drug-excipient interactions, indicating formulation stability. The optimized batch demonstrated improved drug release and physical stability. Overall, the nanosuspension formulation significantly enhanced the solubility and dissolution profile of Levosulpiride, which may contribute to better bioavailability and therapeutic efficacy in treating antipsychotic condition.

**Keywords:** Anti-solvent precipitation method, nanosuspension, solubility enhancement.

**PC-666**

## FORMULATION AND EVALUATION OF GASTRO RETENTIVE IN-SITU GEL OF CIPROFLOXACIN

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The development and evaluation of a gastro-retentive in situ gel containing ciprofloxacin for better drug administration was the primary goal of this investigation. The effects of varying concentrations of calcium carbonate, sodium alginate, and HPMC K-100 on viscosity and drug release at 8 hours were investigated after the in-situ gel was created using a blend of natural and synthetic polymers. A number of parameters, including appearance, pH, viscosity, buoyancy, gelling capacity, swelling index, drug content, and in-vitro drug release, were assessed for the produced formulation. The in-situ gel exhibited a sustained drug release profile along with desirable physicochemical




ISBN: 978-81-980623-8-3

characteristics. Every formulation exhibited the ideal viscosity to facilitate swallowing and administration. All formulations floated for more than 12 hours, with floating lag times ranging from 43 to 75 seconds. The in vitro gelling capacity increased as the calcium carbonate and sodium alginate concentrations increased. With a high swelling index, formulation F6 demonstrated the gel's capacity to absorb a significant volume of liquids. Moderate, prolonged, and reliant on the sodium alginate and HPMC K-100 concentrations were the in vitro drug release characteristics of these in-situ gels. In vitro drug release was sustained (67.23%) for 12 hours in formulation F6, which contained 1.25% sodium alginate and 2% HPMC K-100. Using first order kinetics, the drug was released from formulation F6. The gastro retentive in situ gel of F6 is a potentially effective drug delivery method for enhancing ciprofloxacin's bioavailability and therapeutic effectiveness. Overall, the study showed that in situ gel-based drug delivery systems could be used to enhance ciprofloxacin's efficacy.

**Keywords:** Gastrointestinal retentive, Ciprofloxacin, in situ gel, floating time, and in vitro drug release.

**PC-667**

**FORMULATION AND IN VITRO EVALUATION OF DOXOFYLLINE CHITOSAN MICROSPHERES BY EMULSION CROSS-LINKING METHOD USING SURFACE RESPONSE METHODOLOGY**

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The creation and in vitro assessment of doxofylline-loaded chitosan microspheres are the main objectives of this work, employing the emulsion cross-linking method in conjunction with surface response methodology (SRM). The aim was to optimize the microsphere characteristics to enhance drug delivery efficacy. Chitosan, chosen for its biocompatibility and biodegradability, was utilized to encapsulate doxofylline, a bronchodilator used in the treatment of respiratory diseases. The emulsion cross-linking technique facilitated the formation of microspheres, while SRM was applied to chitosan concentration, cross-linking agent concentration, and emulsification speed on the microsphere properties. The encapsulation effectiveness, shape, particle size determination, and in vitro drug release profile of the resultant microspheres were assessed. The optimised formulation showed a regulated release pattern of doxofylline, a good encapsulation effectiveness, and a desired particle size. These results imply that chitosan microspheres prepared using this technique may be a viable means of boosting the distribution of doxofylline, thereby augmenting both patient compliance and the medication's therapeutic efficacy in the treatment of respiratory diseases.

**Keywords:** Doxofylline, Emulsion Cross-linking, Surface response methodology (SRM), encapuslaiotion efficiency, In vitro drug release, Controlled release, Respiratory diseases, Bronchodilator.

**PC-668**

**FORMULATION DEVELOPMENT AND OPTIMIZATION OF YOHIMBINE HYDROCHLORIDE LOADED PLGA NANOCARRIERS**

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Yohimbine possesses considerable therapeutic potential, functioning as an anti-inflammatory, anticancer, and fat-burning agent. However, its clinical application is restricted by pharmacokinetic challenges such as poor solubility, low oral bioavailability, and extensive hepatic first-pass metabolism, which collectively reduce its therapeutic effectiveness. To address these limitations, the present study focuses on developing yohimbine-loaded PLGA nanoparticles (YBN-PLGA) aimed at enhancing drug release, improving oral bioavailability, and increasing anti-fibrotic efficacy. YBN-loaded PLGA nanoparticles were prepared using a double emulsification and solvent evaporation method. The formulation was optimized by systematically assessing key formulation and process variables. Characterization of the optimized nanoparticles was carried out using Fourier Transform Infrared Spectroscopy (FTIR), Differential Scanning Calorimetry (DSC), and Powder X-ray Diffraction (p-XRD). The optimized formulation exhibited a particle size of 210 nm, a PDI of 0.01, a zeta potential of –34 mV, and an entrapment efficiency of 64%. Importantly, the YBN-PLGA nanoparticles displayed a sustained drug-release profile compared to pure yohimbine hydrochloride when tested under simulated gastrointestinal and physiological conditions. These findings suggest that the optimized nanoparticle formulation, with its suitable particle size for oral delivery, may improve yohimbine's bioavailability and enhance its therapeutic potential for managing fibrotic disorders.

**Keywords:** Polymeric nanoparticles, Yohimbine, Sustained release, PLGA.

**PC-669**

**FORMULATION, DEVELOPMENT AND EVALUATION OF AGMATINE SULFATE NANOCARRIER FOR MUSCLE REGENERATION**

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Volumetric muscle loss [VML] is defined as the traumatic or surgical loss of skeletal muscle with resultant functional impairment. In response, a variety of tissue engineering and regenerative medicine treatments for VML injury are under preclinical development. To regenerate the loss of muscle and muscle function are critical feature in treatment of muscle injury. The purpose of this research was to formulate agmatine loaded gelatine and collagen nanocarrier [AGM-Gelatine-Collagen]. Gelatine protein rich substance and collagen help in cell adhesion used to target muscle loss. 3^2 factorial design was used to investigate the influence of formulation variables, quantity of Gelatine [X1], and [X2] on the formation of hydrogel to attain the required characteristics. Drug [Agmatine], Gelatine and Collagen were added to Propylene glycol and hydrogel were synthesized using the heating/cooling a polymer solution method. The optimized batch was assessed for its physical appearance, pH, viscosity, drug content, in vitro release, ex vivo study, stability and in vivo studies. The optimized formulation showed a viscosity of 228 cP and % drug release 50.6%, sustained release behaviour was observed in 12hrs. Stability of the formulation shows no significant changes after 45days of storage. In vivo studies suggest that there is regeneration of muscle Fibers and negligible collagen deposition occurs when the hydrogel is fixed to the injured muscle after 15 days' time period. Therefore, it was concluded that the formulation could be very promising alternative for the muscle regeneration treatment.

**Keywords:** Volumetric Muscle Loss [VML], Gelatine-Collagen Hydrogel, Agmatine,Muscle regeneration

**PC-670**

**FORMULATION DEVELOPMENT AND IN-VITRO EVALUATION OF MINOXIDIL-BEARING GLYCEROSOMES FOR ANDROGENIC ALOPECIA**

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This study explored vesicular drug delivery systems to improve dermal drug delivery. Glycerosomes, vesicles enriched with glycerol, enhance skin penetration by modifying vesicular composition, increasing drug entrapment, and sustaining release. Minoxidil-loaded glycerosomes were developed as an advanced topical formulation for the treatment of androgenetic alopecia, aiming to enhance follicular delivery, promote regeneration, and improve therapeutic efficacy compared with conventional formulations. Absorption through hair follicles bypasses the stratum corneum, the skin's main barrier, providing a direct route into the dermis and its dense capillary network. The follicular route is particularly valuable for targeted delivery in conditions such as hair loss, where it enhances local therapeutic outcomes. Glycerosomes were prepared using the lipid thin-film hydration method with soya lecithin, cholesterol, and glycerol (20%, 30%, and 40%). Optimization was performed using Design Expert 13 with a $3^2$ factorial design, yielding nine formulations characterized for particle size, zeta potential, entrapment efficiency, and in vitro release. The optimized formulation (F1) showed spherical vesicles without aggregation, particle size of 120.63 and sustained release for up to 13 hours, following zero-order kinetics with a non-Fickian diffusion mechanism. FTIR confirmed drug–excipient compatibility, and drug estimation showed linearity at λmax 288 nm.




ISBN: 978-81-980623-8-3

Among the tested formulations, 40% glycerol-based glycerosomes demonstrated superior performance and were incorporated into HPMC K100M gel, which showed suitable pH, viscosity, appearance, and enhanced release. Overall, glycerosomes provide a promising drug delivery platform with improved therapeutic potential for managing androgenetic alopecia.

**Keywords:** Glycerosomes, Minoxidil, Hair follicle absorption, HPMC K100M gel, In vitro release

**PC-671**

**FORMULATION AND IN VITRO EVALUATION OF DEXLANSOPRAZOLE ORAL FILMS**

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The aim of this study was to prepare dexlansoprazole oral films using solvent casting method. For the preparation of dexlansoprazole oral films, a total of 4 oral films were prepared F1, F2, F3 and F4. The formulated oral films were evaluated for folding endurance, weight variation, thickness, pH, disintegration, in vitro dissolution test, and drug-excipient compatibility by Fourier Transform Infrared Spectroscopy (FTIR). In this study, polyethylene glycol 400 (PEG 400) was used as a plasticizer, HPMC E15 as a polymer, sodium saccharin as an artificial sweetener, and ethanol as the solvent. Among the 4 formulated oral films, the F3 formulation containing: 30mg of dexlansoprazole, 250 mg of HPMC E15, 80 mg of sodium saccharin, 0.3 ml of PEG 400, and 7.5 ml of ethanol, was found to be the most effective one. The evaluation parameters for F3 formulation were as follows: weight variation of 413.7 ± 2.5 mg, thickness of 0.19 ± 0.07 mm, pH of 6.8 ± 0.8, folding endurance of 51 ± 3, disintegration of 26 ± 2 seconds, and in vitro % drug release of 96.32 ± 0.78 %. Given the drug release profile was highest in the F3 formulation with 96.32%, this formulation was concluded as the optimized formula. In conclusion, dexlansoprazole oral films were successfully prepared by thin solvent casting method.

**Keywords:** dexlansoprazole, oral thin films, solvent casting method, drug release, invitro evaluation.

**PC-672**

**FORMULATION AND EVALUATION OF PERSONALIZED ORODISPERSIBLE FILMS FOR PEDIATRIC EPILEPSY**

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Personalized orodispersible films (ODFs) are a promising dosage form for pediatric epilepsy treatment, offering benefits like improved patient compliance, faster onset of action, and enhanced bioavailability. These films disintegrate rapidly in the mouth, eliminating the need for water, which is particularly useful for children with epilepsy who may have difficulty swallowing tablets or capsules. ODFs can be tailored to meet individual patient needs, allowing for precise dosing adjustments. The buccal route of administration avoids first-pass metabolism, potentially increasing the effectiveness of medications like pregabalin. ODFs are a more palatable option for pediatric patients, reducing the risk of choking and aspiration associated with traditional solid dosage forms. Studies have explored various technologies for preparing ODFs, including vacuum compression molding (VCM) and hot-melt extrusion (HME). These methods offer advantages like solvent-free processing and the ability to create customized dosage forms. Researchers have successfully developed ODFs with APIs like diclofenac sodium and pregabalin, demonstrating promising results in terms of disintegration time, mechanical properties, and drug release profiles. Personalized ODFs can be designed to deliver anti-seizure medications like pregabalin, improving treatment outcomes and patient compliance. ODFs are a valuable option for pediatric patients, addressing the need for age-appropriate formulations that are easy to administer and minimize dosing errors.

**Keywords:** Personalized orodispersible films; anti-seizure medications

**PC-673**

**FORMULATION AND IN VITRO EVALUATION OF LIPOSOMES FOR CO-DELIVERY OF DOCETAXEL AND CURCUMIN TO TREAT TRIPLE NEGATIVE BREAST CANCER**

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Introduction: Triple-negative breast cancer (TNBC) is an aggressive subtype lacking conventional therapeutic targets (ER, PR, HER2) and is often associated with multidrug resistance (MDR) to chemotherapy. Curcumin (CUR), a natural polyphenol with anticancer and chemosensitizing properties, and docetaxel (DTX), a first-line chemotherapeutic, were co-encapsulated in liposomes to enhance in vitro therapeutic efficacy against TNBC. Aim of the study: To develop and optimize liposomal formulation for co-deliver of docetaxol and curcumin. Experimental: Liposomes containing docetaxol and curcumin (CUR-DTX-L) was prepared by thin film hydration using egg lecithin, cholesterol, and stearylamine as lipid components. A three-factor Box-Behnken design optimized the lipid composition for maximal drug entrapment and stable formulation. The liposomes were characterized for mean vesicle size (nanoscale), zeta potential, entrapment efficiency (EE), and in vitro drug release in phosphate-buffered saline (pH 7.4). Results & Discussion: The optimized co-loaded formulation showed very high entrapment efficiencies: 99.2% for CUR-DTX-L, 98.32% for CUR-L (curcumin-only), and 89.2% for DTX-L (docetaxel-only). CUR-L liposomes (formulation FC8) released 87.95% of curcumin over 24 hours at pH 7.4. Release kinetics fit the Korsmeyer-Peppas model, indicating a Super Case II transport mechanism. The Box-Behnken optimization yielded robust model fits ($R^2 > 0.98$ for entrapment and release responses), confirming the reliability of predictions. The optimized liposomes were nanosized with a slight positive surface charge (from stearylamine), indicating good colloidal stability. Conclusion: Docetaxel and curcumin were successfully co-formulated into a single liposomal system with near-complete drug encapsulation and sustained release characteristics. The in vitro findings demonstrate a promising strategy for combination drug delivery in TNBC, warranting further investigation.

**Keywords:** Triple-negative breast cancer; liposomes; curcumin; docetaxel; dual drug delivery

**PC-674**

**FORMULATION AND EVALUATION OF MUCOADHESIVE BUCCAL FILMS OF ACYCLOVIR**

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Acyclovir is an effective antiviral drug. The currently available conventional therapy of Acyclovir is associated with several drawbacks, including highly variable absorption, low bioavailability after oral administration, and a short plasma half-life. Hence, the present work aims to formulate mucoadhesive buccal films of acyclovir to enhance therapeutic efficacy, patient compliance, and bioavailability by bypassing first-pass metabolism. In the present study, two formulations of mucoadhesive drug delivery of acyclovir were prepared as buccal films using the solvent casting method. Pullulan and Chitosan were used as mucoadhesive polymers, and HPMC K4M as the film-forming agent. The prepared films were evaluated for their thickness, surface pH, drug content uniformity, folding endurance, tack test, and in vitro release. The FTIR spectra of acyclovir revealed no interaction between the drug and the polymer during the formulation process. Drug content of the films ranged from 82.10-96.11%, indicating uniform distribution of acyclovir. Among the two formulations, F1(HPMC+pullulan) showed superior folding endurance, drug content uniformity, mucoadhesion, and sustained drug release (84.5% in 6h) compared to F2 (HPMC+chitosan). Overall, the study demonstrated that mucoadhesive buccal films of acyclovir are a promising mucosal drug delivery system for improving therapeutic efficacy and Patient compliance.

**Keywords:** Acyclovir, Pullulan, Chitosan, Solvent Casting technique, Mucoadhesive Buccal Films.

**PC-675**

**FORMULATION AND EVALUATION OF ASPIRIN-LOADED THERMO-RESPONSIVE GEL FOR ANTI-INFLAMMATORY ACTIVITY**




ISBN: 978-81-980623-8-3

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In the research, an aspirin-loaded thermo-responsive gel was formulated. The primary objective of the study is to investigate the localized effect of aspirin formulated as a thermo-responsive gel administered topically. The formulated of thermos-responsive aspirin gel three batches drug compatibility, diffusibility, pH, gelation temperature, gelation strength and viscosity, BSA method for anti-inflammatory activity were evaluated and results are found that thermos-responsive gel as pH ranges 6.4-6.8, gelation strength and viscosity is ideal balance in formulation two with appropriate concentration of polymer poloxmer (18%), gelation temperature at the body temperature ranges 32-37℃.UV revealed an absorbance peak at 236nm, which identified the drug used.IR analysis showed that there is no interaction between the drug and polymer used in the formulation. The partition coefficient measured 1.36 ± 0.039, showing moderate lipophilicity appropriate for diffusion across biological membranes. The BSA method for the anti-inflammatory activity of F2 and F3 shows better activity than the standard drug diclofenac. Therefore, the aspirin-loaded thermo-responsive gel was formulated using the BSA method. Thus, it is concluded that it is beneficial to formulate aspirin as a thermos-responsive gel for anti-inflammatory activity.

**Keywords:** Aspirin, in-situ gel, thermos-responsive gel, BSA method

**PC-676**

## SUBLINGUAL LOZENGE FORMULATION COMPRISING WITHAFERIN ENRICHED WITHANIA SOMNIFERA LEAF EXTRACT FOR COGNITIVE AND NEUROPROTECTIVE APPLICATION

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Cognitive impairment and neurodegenerative disorders pose a major global health burden, often linked with oxidative damage, neuroinflammation, and progressive decline in neuronal integrity. Withania somnifera (Ashwagandha), a cornerstone of Ayurvedic medicine, is well recognized for its adaptogenic, neuroprotective, and cognitive-enhancing effects. Among its phytoconstituents, Withaferin A has emerged as a potent bioactive compound with demonstrated neuroprotective activity. In this work, a novel sublingual lozenge formulation was designed incorporating Withaferin A–enriched Withania somnifera leaf extract. The sublingual route was chosen to enable rapid absorption, bypass hepatic first-pass metabolism, and enhance systemic bioavailability, thereby offering faster therapeutic onset. The lozenge matrix was optimized for taste, stability, and controlled drug release, ensuring patient compliance and acceptability. This innovative formulation offers a promising nutraceutical and therapeutic intervention, with potential applications in improving memory, cognitive performance, and supporting long-term neuroprotection in individuals at risk of neurodegenerative conditions.

**Keywords:** Withania somnifera, Withaferin A, sublingual lozenge, cognitive enhancement, neuroprotection, herbal formulation, bioavailability.

**PC-677**

## DEVELOPMENT OF NOVEL CO-PROCESSED EXCIPIENT AS A DIRECTLY COMPRESSIBLE VEHICLE

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Oral disintegrating tablets (ODTs) improve patient compliance, especially in pediatric, geriatric, and dysphagic populations. Enalapril Maleate, an angiotensin-converting enzyme (ACE) inhibitor with poor water solubility, was selected as a model drug to evaluate the efficiency of synthetic and natural superdisintegrants in ODT formulations. ODTs of Enalapril Maleate were prepared by direct compression using synthetic superdisintegrants (Croscarmellose Sodium, Sodium Starch Glycolate) and a natural disintegrant (Plantago ovata mucilage). Eight formulations were developed and evaluated for pre-compression and post-compression parameters, in vitro disintegration, dissolution, drug content uniformity studies. All formulations complied with pharmacopoeial specifications. Among synthetic batches, CCS3 exhibited the shortest wetting time (8.55 s), disintegration time (17.64 s), and rapid dissolution (99.24% at 20 min). The natural formulation PO2 (20 mg Plantago ovata mucilage) showed comparable performance with disintegration time of ~12–14 s and nearly complete drug release (99.98% at 20 min). Both natural and synthetic superdisintegrants effectively produced ODTs of Enalapril Maleate with rapid disintegration and dissolution. Plantago ovata mucilage demonstrated comparable efficiency to synthetic disintegrants, supporting its potential as a cost-effective, sustainable, and eco-friendly alternative for ODT formulations.

**Keywords:** Oral disintegrating tablets, Enalapril Maleate, Superdisintegrants, Plantago ovata mucilage, Direct compression, Dissolution

**PC-678**

## SCREENING POLYMERS FOR DEVELOPMENT OF ELECTROSPUN NANOFIBRES FOR SOLUBILITY ENHANCEMENT OF POORLY SOLUBLE DRUG

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Currently, about 40% or more of drugs in development and about 60% of molecules obtained directly from synthesis are poorly soluble in water. The solubility behavior of poorly water-soluble drugs remains one of the most challenging aspects of formulation development. Electrospun nanofibers have unique properties such as they have high surface area to volume ratio, inter/inner porosity and uniform morphology. Electrospun nanofibers have an undoubted advantage over other drug delivery vehicles due to their cheap fabrication cost and ease of scalability. In present study; different polymers likes Eudragit® L 100-55, Eudragit® E PO, Parteck® SLC, Aeroperl® 300 were screened for successful development of Electrospun Nanofibres for Solubility Enhancement of Poorly Soluble Drug. Initially placebo Electrospun nanofibers were developed and characterized for morphology (FESEM), surface area, contact angle, etc were determined. Sertraline which is BCS Class II drug and used as anti-depressent was selected as a model drug to entrap in to electrospun nanofibres. Different batches of Sertraline loaded electrospun nanofibres were prepared using Eudragit® L 100-55 in combination with Parteck® SLC and Aeroperl® 300. Developed nanofibres were evaluated for % yield, drug content, encapsulation efficiency, solubility, etc. Nonofibres equivalent to 50 mg of Sertraline were mixed with lactose as diluents and evaluated for pre-compression parameters. Tablet of Sertraline loaded electrospun nanofibres were prepared and evaluated for post compression parameters and in-vitro dissolution study. Results showed that, enhancement of solubility of Sertraline in electrospun nanofibres as compared to plain drug. Also cumulative % drug release was tremendously enhanced. Study concluded that, Eudragit® L 100-55 in combination with Parteck® SLC and Aeroperl® 300 are suitable polymers for successful development of Electrospun nanofibers for enhancement of solubility and dissolution of poorly water soluble drug like Sertraline.

**Keywords:** Electrospun nanofibre, Eudragit® L 100-55, Eudragit® E PO, Parteck® SLC, Aeroperl® 300, Sertraline

**PC-679**

## DUAL-DRUG LIPOSOMES CHALLENGE TRIPLE-NEGATIVE BREAST CANCER: IN VITRO EFFICACY OF CURCUMIN AND DOCETAXEL

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Triple-negative breast cancer (TNBC) is an aggressive subtype lacking conventional therapeutic targets (ER, PR, HER2) and is often associated with multidrug resistance (MDR) to chemotherapy. Curcumin (CUR), a natural polyphenol with anticancer and chemosensitizing properties, and docetaxel (DTX), a first-line chemotherapeutic, were co-encapsulated in liposomes to enhance in vitro therapeutic efficacy against TNBC. To develop and optimize a liposomal co-formulation of curcumin and docetaxel (CUR-DTX-L) using a Box-Behnken design, and to




ISBN: 978-81-980623-8-3

evaluate its physicochemical characteristics and in vitro drug release profile. Experimental: CUR-DTX-L was prepared by thin film hydration using egg lecithin, cholesterol, and stearylamine as lipid components. A three-factor Box-Behnken design optimized the lipid composition for maximal drug entrapment and stable formulation. The liposomes were characterized for mean particle size (nanoscale), zeta potential, entrapment efficiency (EE), and in vitro drug release in phosphate-buffered saline (pH 7.4). The optimized co-loaded formulation showed very high entrapment efficiencies: 99.2% for CUR-DTX-L, 98.32% for CUR-L (curcumin-only), and 89.2% for DTX-L (docetaxel-only). CUR-L liposomes (formulation FC8) released 87.95% of curcumin over 24 hours at pH 7.4. Release kinetics fit the Korsmeyer-Peppas model, indicating a Super Case II transport mechanism. The Box-Behnken optimization yielded robust model fits ($R^2 > 0.98$ for entrapment and release responses), confirming the reliability of predictions. The optimized liposomes were nanosized with a slight positive surface charge (from stearylamine), indicating good colloidal stability. Curcumin and docetaxel were successfully co-formulated into a single liposomal system with near-complete drug encapsulation and controlled release characteristics. These in vitro findings demonstrate a promising strategy for combination drug delivery in TNBC, warranting further investigation.

**Keywords**: Triple-negative breast cancer; liposomes; curcumin; docetaxel; dual drug delivery

**PC-680**

## PHARMACODYNAMIC EVALUATION OF ASH-ZINC OXIDE NANOPARTICLES: SYNERGISTIC GEL FORMULATION FOR WOUND HEALING AND ANTI-INFLAMMATORY APPLICATIONS

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This study aims to develop and evaluate the wound-healing and anti-inflammatory potential of Ash-ZnO NPs and Ash-ZnO NPs gel formulation, synthesised using Saraca asoca extract and stabilised in a chitosan matrix. The goal was to overcome the limitations of conventional ZnO nanoparticles, including instability, cytotoxicity, and uncontrolled release. Although ZnO nanoparticles possess antimicrobial and regenerative properties, their clinical utility is limited by aggregation and dose-dependent toxicity. The use of Saraca asoca, a medicinal plant rich in flavonoids and phenolics, provides a green synthesis approach that enhances nanoparticle stability and biological activity. Incorporation into a chitosan-based gel further improves topical application by enhancing adhesion, moisture retention, and sustained release. Chitosan also contributes additional healing benefits due to its intrinsic biocompatibility, antimicrobial activity, and role in tissue regeneration. Ash-ZnO NPs were synthesised through a green co-precipitation method and formulated into a chitosan hydrogel. In vitro assays, including MTT, scratch wound, and protein denaturation tests, were used to assess cytocompatibility, fibroblast migration, and anti-inflammatory potential. In vivo wound-healing efficacy was evaluated in rats using an excision model, supported by histopathological analysis. The Ash-ZnO NPs gel exhibited 72.5% inhibition of protein denaturation and achieved 75.63% wound closure within 48 h. Histology confirmed organised tissue architecture and minimal inflammation. The Ash-ZnO NPs gel represents a promising, biocompatible wound-care formulation that enhances nanoparticle stability, modulates inflammation, and accelerates tissue repair, offering strong potential for clinical dermatological applications.

**PC-681**

## AN INVESTIGATION ON DEVELOPING BUCCAL TABLETS CONTAINING CO-CRYSTALLIZED SELEXIPAG

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Selexipag is a selective prostacyclin receptor agonist for treating pulmonary arterial hypertension. Selexipag is a Biopharmaceutics Classification System ( BCS II) drug with 49% oral bioavailability and 2h half-life. This study focuses on enhancing solubility using co-crystallization and incorporating crystals into buccal tablets for improved drug effectiveness. Drug co-crystals were prepared using acetamide as coformer via slow solvent evaporation. The co-crystal was converted into buccal tablets of hydroxypropyl methyl cellulose (HPMC), Carbopol and Xanthan gum. The tablets were evaluated for physical parameters, drug content, swelling index, in vitro release, and ex vivo profiles. A 14-fold increase in solubility a % CDR of co-crystals were found to be 28.8± 0.3 to 62.56± 0.8 % at 120 min compared to 19.71± 0.059% from pure drug. X-ray diffraction pattern suggested a change in drug crystalline nature. The buccal tablets exhibited good tableting properties. Drug release from eight-tablet formulation ranged between 84.3±0.23 % and 94.34%. Force of adhesion of selected tablet (F8) on goat buccal mucosa was 3.38 N, with 89.15±0.21 % drug permeated at 8 h compared to 24.21±0.23 % from pure drug. This study demonstrates cocrystals' usefulness in solubility enhancement, release profiles, and buccal tablet formulations.

**Keywords:** Selexipag, cocrystals, Solubility, Bucal, Xanthan gum

**PC-682**

## IN-VITRO CHARACTERIZATION AND SYNTHESIS OF BISDEMETHOXYCURCUMIN NANOPARTICLES FOR THE TREATMENT OF CANCER

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The extraction and modification of naturally-occurring compounds are widely performed due to their valuable medicinal and physical properties. Herin, we reported the extraction of bis-demethoxycurcumin from Ragbrai turmeric root. The isolated derivative was characterized by X-ray diffraction, IR, and NMR spectroscopy. Also, the green synthesis of bis-demethoxycurcumin chitosan silver BDMC-Ag-Ch nanoparticles is illustrated. These nanoparticles are identified by atomic force microscopy AFM and exhibit average particle size - 53.41 nm The crystalline structure was confirmed by XRD analysis, which showed distinct peaks corresponding to silver oxide nanoparticles and Zeta power measurements revealed stable dispersion of the nanoparticles, indicating a good chitosan coating on the surface of bisdemethoxycurcumin Ag nanoparticles. The absorption bands at 240 and 405 nm are due to oxygen atom ($n \rightarrow \pi^*$) and aromatic ($\pi \rightarrow \pi^*$) transitions in curcumin and Chitosan molecules. The photoluminescence (PL) study of synthesized BDMC-Ag-Ch nanoparticles demonstrated an existence of two emission excited states in light-emitting, namely local excited and intramolecular charge transfer emission states, due to the aromatic conjugation system within BDMC units and intra charge transfer between the silver ion and organic part.

**Keywords:** Extraction, Purification, Bisdemethoxycurcumin, Nanoparticles, Biosynthetic pathways, Cancer

**PC-683**

## DESIGN AND DEVELOPMENT OF MICROEMULSION-BASED FORMULATION OF NIFEDIPINE TO IMPROVE BIOAVAILABILITY BY COMPLEXATION METHOD

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In the current research, a microemulsion-based formulation of Nifedipine was prepared. The objective was to improve the solubility and bioavailability using complexation method. These factors are critical to the effectiveness of the oral medications. The formulation was prepared using sesame oil, Tween 80 (Surfactant), and Polyethylene glycol 400 (Cosurfactant). These agents work synergistically to stabilize the microemulsion and improve the drug dissolution rate in the stomach. To improve the activity of the developed formulation, β-cyclodextrin was added as a complexing agent. This complexing agent can form a host-guest inclusion complex with the drug, effectively enhancing its solubility. The combination of the oil, surfactant, and cosurfactant was varied in 4:4:2, which ensured a perfect balance among components. The developed microemulsion-based formulations were evaluated for dispersibility index, percentage transmittance, droplet size, and in vitro drug release. The results of optimized formulation F14 revealed that the




ISBN: 978-81-980623-8-3

stable formulations had a percentage transmittance of >90%, indicating clarity was associated with stability. The particle size was measured to be in the nano range, with a polydispersibility index of 0.221. The zeta potential value of the developed formulation was found to be 64.1, indicating good stability. The dispersibility was assessed using a dissolution apparatus, and the developed formulations were classified as Grade A, as they rapidly form a bluish transparent emulsion within 1 minute. The results of cumulative percentage drug release showed that 80% of the drug release occurred in 20 minutes. This rapid release shows significant enhancement of drug absorption for developing an effective formulation of nifedipine. Overall, the results highlight the potential of microemulsions to improve the solubility and bioavailability of poorly soluble drugs.

**Keywords:** SMEDDS, microemulsion, complexation, β-cyclodextrin, Nifedipine

**PC-684**

**FORMULATION AND IN VITRO EVALUATION OF NANOEMULSION CONTAINING TENELIGLIPTIN**

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The current study aims to formulate Teneligliptin, a novel dipeptidyl peptidase-4 (DPP-4) inhibitor, that is emergingly used in the management of type 2 diabetes mellitus and Alzheimer's disease. Despite its clinical advantages, the medication's inconsistent oral absorption and poor water solubility may lower the therapeutic efficacy. A promising approach to overcoming these obstacles is provided by nanoemulsion-based drug delivery systems, which improve solubility and bioavailability while permitting prolonged release. Their potential as an effective nanomedicine is great, since they can readily solubilize hydrophobic medications, reduce severe side effects, and be easily transformed into next-generation nanomedicine. High-speed homogenization was used to prepare the nanoemulsion containing Teneligliptin. The prepared nanoemulsions were characterized for globule size, drug content, zeta potential and in vitro release studies. Studies on In vitro release showed a quick initial release of the medication followed by a prolonged release, indicating better solubility and long-term sustained availability. The particle size analysis study showed that the mean particle size was 7.847 nm and the zeta potential was -24.1 mV. The TEM study showed that the particles were spherical in shape. The in vitro drug release studies showed that the nanoemulsion were able to sustain the drug release for 24 h.

**Keywords:** Nanoemulsion, Teneligliptin, Diabetes, Homogenization, Drug delivery.

**PC-685**

**DEVELOPMENT AND ASSESSMENT OF A FLOATING IN-SITU GEL FOR GASTRORETENTIVE DELIVERY OF METFORMIN HCL**

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The objective of this study was to formulate and evaluate a gastro retentive in situ gel of Metformin HCl for enhancing its bioavailability, prolonging gastric residence time, reducing dosing frequency, and improving patient compliance. The in-situ gel was formulated using a combination of natural and synthetic polymers, and effects of different concentration of sodium alginate, HPMC K-100 and calcium carbonate on viscosity and drug release at 8 hrs were studied. The prepared formulation was evaluated for various parameter like appearance, pH, viscosity, buoyancy, gelling capacity, swelling index, drug content and in-vitro drug release. All the formulations showed an optimum viscosity that will allow ease of administration and swallowing. Floating lag time of all formulations was between 43- 75 seconds and floated for >12 h. The in vitro gelling capacity increased with increasing concentration of the sodium alginate and calcium carbonate. The formulation F6 showed high swelling index, which indicates that gel is capable of absorbing a large amount of fluid. In vitro drug release form these insitu gels were slow, extended and dependent on the concentration of sodium alginate and HPMC K-100 used. The formulation F6 containing 1.25% sodium alginate and 2% HPMC K-100 showed sustained in vitro drug release (67.23 %) over an extended period of 12 h. Overall, the study demonstrated the potential of in situ gel-based drug delivery systems for improving the performance of Metformin HCl.

**Keywords:** Gastro retentive, In situ gel, Floating time, In-vitro drug release and Metformin HCl

**PC-686**

**DEVELOPMENT OF NOVEL TOPICAL DELIVERY SYSTEM FOR DERMATOLOGICAL TREATMENT**

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Skin diseases like acne, corn, callus and wart are seen to be more prevalent in present and future. The prevalence of skin disorders is increasing globally and rising market expansion for keratolytic agents is anticipated to increase. Salicylic acid is used as first line of drug for treatment of skin disorders. Due to its poor aqueous solubility and highly skin irritant at higher concentrations in the formulation, the scope of salicylic acid as dermatological preparation is challenging. The present research was envisaged for the development of topical delivery system of salicylic acid with increased aqueous solubility and acceptable drug release over a period. Solubility enhancement of salicylic acid was attempted with various techniques and finally by co solvency using PEG-400 and Propylene glycol (3:1), the solubility of drug could be enhanced up to 26%. Various strategies were adopted for dermatological preparations and finally gel formulation using Carbopol - 940 was found to be most compatible. The pharmaco-technical evaluation studies indicated simulated skin pH values, thixotropic viscosity and drug content within the standard limits as per the monograph. DLS of salicylic acid gel formulation indicated drug particle size to be as 283nm. The in-vitro and ex-vivo drug permeation studies of final formulation showed a drug release of 97% and 95% at the end of 4 hours. The acute dermal irritation test on rabbit model revealed that the gel formulation to be non-irritant and accelerated stability studies conducted as per ICH guidelines confirmed stability of the formulation during shelf life assessment.

**Keywords**: Topical delivery, solubility enhancement, salicylic acid, skin disorder

**PC-687**

**RECENT ADVANCEMENT AND FUTURE PERSPECTIVES OF POLYMERIC NANOPARTICLES IN THE TREATMENT OF COLORECTAL CANCER DRUG DELIVERY SYSTEM**

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As per the WHO report colorectal cancer (CRC) caused around 8,81,984 deaths worldwide in 2022. Colorectal cancer is the third most prevalent cancer in the world by incidence and the second most common cancer in terms of death. Currently existing anti-colorectal cancer therapies, including radiation, and anticancer therapeutics etc., have limited therapeutic efficacy, side effects, and low success rates. So, there is a need for a better anti-cancer therapy with minimal side effects and maximum success rate. In recent years, the application of the nanotechnology in developing anti-cancer therapeutics has gained much attention due to its drug delivery ability, improve the treatment efficiency, overcoming drug resistance and reducing side effects. Nanoparticles are capable of enhancing the intracellular penetration of the drugs into the cancerous cells due to its nanometer size, without affecting the normal cells. Polymeric nanoparticles (NPs) have sparked widespread interest in recent years due to their unique features coming from their small size. Polymeric NPs have several advantages as drug




ISBN: 978-81-980623-8-3

carriers, including the capacity to control release, protect drug and other biologically active compounds from the environment, and improve bioavailability and therapeutic index. Among this Chitosan-based nanoparticles (ChNPs) have shown promising potential as nanocarriers in colorectal rectal cancer drug delivery and therapeutics. ChNPs can encapsulate anticancer medications and deliver them to cancer cells in the body, giving controlled release. Herein, we discuss some examples of potential application of ChNPs in colorectal cancer drug delivery.

**Keywords:** Colorectal cancer, nanoparticle, polymer, chitosan, drug delivery

**PC-688**

**NOVEL MEDICATED PEN DELIVERY SYSTEM A PATIENT-FRIENDLY APPROACH FOR TOPICAL MANAGEMENT FOR ANTI ACNE ACTIVITY.**

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Significant advancements in drug delivery focus on enhancing patient compliance, safety, and efficacy. Conventional topical formulations such as ointments, creams, and gels, though widely used, are often inconvenient, greasy, and less portable, leading to poor adherence. Novel delivery systems aim to overcome these limitations by improving convenience and reducing dosing frequency. Medicated pens with advantages like portability, precision, hygiene, and uniform application, are emerging as suitable alternatives for dermatological conditions such as acne vulgaris. Pre-formulation studies were conducted on selected active ingredients and excipients. Manjistha extract (deep brown, water-soluble liquid), Niacinamide (amorphous white, water-soluble powder), and Sandalwood oil (pale yellow, oil-soluble liquid) were evaluated as APIs. Excipients included Sodium Lauryl Sulphate, Ceto-stearyl alcohol, Almond oil, Carnauba wax, Beeswax, PEG 400, Glycerine, and Petroleum jelly. FTIR analysis of Manjistha confirmed characteristic peaks at 3323.35 $cm^{-1}$ (aliphatic alkyl), 2970.38 and 2885.51 $cm^{-1}$ (–OH), and aromatic absorptions, indicating rubaidin-related structures. Topical medicated pens containing manjistha–niacinamide and manjistha–sandalwood oil combinations were successfully formulated using standard pharmaceutical techniques. Both preparations demonstrated uniformity, safety, and therapeutic effectiveness in acne management. The developed medicated pens offer a novel, patient-friendly, and effective approach for the topical management of acne vulgaris. Their portability, precision, and hygienic application enhance patient compliance, highlighting their potential as promising anti-acne therapies.

**Keywords:** Acne vulgaris, Manjistha, Niacinamide, Sandalwood oil, Medicated pen, Topical drug delivery.

**PC-689**

**NOVEL ORO MUCOSAL SPRAY FOR ANTIANGINAL THERAPY**

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A selective If current inhibitor, used in the management of chronic stable angina and heart failure, shows limitations in conventional oral dosage forms such as first-pass metabolism, delayed onset, and swallowing difficulties in elderly or paediatric patients. To overcome these challenges, an Oro mucosal spray formulation was developed as a promising alternative, offering rapid absorption, improved compliance, and avoidance of hepatic metabolism.Solid dispersions of the antianginal agent were prepared by solvent evaporation using a rotary evaporator (drug: polymer ratio 1:3-1:4). The dried amorphous powder was incorporated into a spray system and characterized by DSC, PXRD, and FTIR to confirm amorphization and compatibility. The spray delivered uniform doses (~0.95-1.05 mg/actuation, RSD <5%), maintained stable pH (6.2-6.4), and exhibited acceptable spray ability. In-vitro solubility and ex-vivo permeation studies showed enhanced dissolution and a 2-3-fold increase in mucosal absorption compared to plain solution.This novel Oro mucosal spray demonstrates potential for rapid angina. relief and improved therapeutic performance, warranting further pharmacokinetic and clinical evaluation.

**Keywords:** Oro mucosal spray, Antianginal therapy, If current inhibitor, Solid dispersion, Mucosal permeation

**PC-690**

**NOVEL DUAL FILM-FORMING GEL THERAPY FOR VITILIGO**

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Vitiligo is a chronic skin disorder characterized by loss of natural pigment, leading to visible white patches that affect confidence and quality of life. The present research investigates a dual-drug film-forming gel combining a BCS Class II immunosuppressant and a BCS Class IV vitamin D analogue to enhance therapeutic efficacy while minimizing side effects. Conventional topical formulations such as ointments and creams are greasy, poorly retained, and cosmetically less acceptable, whereas film-forming gels provide a transparent, quick-drying, and patient-friendly alternative. The synergistic combination of BCS Class II and IV drugs plays a crucial role: the Class II drug suppresses autoimmune activity that damages melanocytes, while the Class IV analogue stimulates melanocyte activation and promotes repigmentation. Together, they complement each other's mechanisms, addressing both immune regulation and pigment restoration for superior outcomes compared with monotherapy. The formulation was developed using solubility-enhancing co-solvent systems to improve drug availability. Upon drying, volatile components evaporated, creating a supersaturated state that enhanced skin permeation. Incorporation of suitable polymers further prevented recrystallization and stabilized the formulation. The optimized gel showed a skin-compatible pH (5.4), 93% drug content, smooth spreading, and rapid drying within 1–2 minutes. It provided sustained release and significantly higher skin retention than the occulusive marketed ointment. These findings suggest that a synergistic dual-drug film-forming gel of BCS Class II and IV drugs represents a novel, cosmetically elegant, and patient-friendly treatment strategy for vitiligo.

**Keywords:** Vitiligo, Film-forming gel, BCS Class II, BCS Class IV, Synergistic therapy, Repigmentation, Solubility enhancement.

**PC-691**

**RECENT DEVELOPMENTS AND APPROACHES IN THE DESIGN OF NANOSTRUCTURED LIPID CARRIERS AND THEIR UTILIZATION FOR BRAIN TARGETING.**

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Lipid-based nanocarriers have become a promising tool for targeted drug delivery over the past two decades. They are widely explored for delivering drugs to challenging sites such as the central nervous system (CNS), tumours , and the cardiovascular system. Their major advantages include biocompatibility, flexibility in design, and the ability to carry a wide range of therapeutic agents. Among lipid carriers such as nano emulsions, liposomes, and solid lipid nanoparticles (SLN), nanostructured lipid carriers (NLCs) stand out as the most advanced system. NLCs offer high stability, large drug-loading capacity, efficient encapsulation, and controlled drug release. These properties make them particularly suitable for brain-targeted therapy, where drug delivery is limited by the blood–brain barrier (BBB). The nano-size, lipid matrix, and surface modifications of NLCs allow them to cross the BBB more effectively compared to conventional systems. They are also scalable for industrial production, safe, non-irritant, and compatible with diverse drugs. This review summarizes the progress in developing NLCs for brain drug delivery. It highlights their pharmacokinetics, formulation strategies, and therapeutic role in neurological diseases such as Alzheimer's, Parkinson's, epilepsy, schizophrenia, multiple sclerosis, brain cancer, cerebral ischemia, CNS infections, and cerebral malaria. Two key approaches are emphasized: drug delivery across the BBB and direct intranasal (nose-to-brain) administration. Both strategies show promise in improving treatment outcomes for CNS disorders. Overall, NLCs represent a versatile and effective platform for overcoming current challenges in brain-targeted drug delivery, with strong potential for clinical translation.




ISBN: 978-81-980623-8-3

**Keywords:** Nanostructured lipid carriers, Brain drug delivery, Blood–brain barrier, Neurological disorders, Intranasal administration

**PC-692**

**3D PRINTING OF PERSONALIZED DOSAGE FORMS: ADVANCING PATIENT-CENTRIC AND PRECISION MEDICINE**

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Three-dimensional (3D) printing is emerging as a transformative technology in pharmaceutical manufacturing, enabling the development of personalized dosage forms tailored to individual patient needs. Unlike conventional batch production, 3D printing allows precise control over dose strength, geometry, drug release kinetics, and the incorporation of multiple active ingredients into a single unit. This flexibility is particularly valuable for pediatric and geriatric populations, where fixed-dose limitations, swallowing difficulties, and high pill burden compromise adherence. Advances in printable biocompatible materials and the integration of artificial intelligence (AI)-based predictive modeling further enhance formulation optimization and reproducibility. The approval of the first 3D-printed drug, Spritam®, underscores regulatory recognition of this technology, though challenges remain in scaling production, quality assurance, and standardization. Importantly, the potential for decentralized, point-of-care manufacturing offers revolutionary applications in emergency care, orphan drugs, and personalized therapy. In conclusion, 3D printing represents a crucial step toward patient-centric and precision medicine, offering customizable, on-demand treatments that improve therapeutic outcomes and compliance.

**Keywords:** 3D printing, Precision medicine, Drug delivery systems, Artificial intelligence in formulation.

**PC-693**

**MARKETED COW URINE DISTILLATE: MASKING THE TASTE AND ODOR FOR BETTER PATIENT COMPLIANCE**

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In Indian culture, the cow holds a unique place of reverence, and cow urine has long been valued in traditional medicine for its therapeutic potential. Historical references trace its use back to Vedic times, where it was believed to support health by restoring physiological balance. Owing to its natural origin, eco-friendly nature, affordability, and safety, cow urine and its distillate continue to be explored as potential therapeutic agents. Despite its benefits, the strong taste and odour often limit patient compliance. The present study focused on enhancing palatability by incorporating natural sweeteners such as honey and essential oils like citronella oil, with the aid of suitable adsorbents. Comparative analysis of the original and modified formulations using FTIR spectroscopy confirmed that the addition of these agents significantly improved taste and odour without altering the chemical integrity of the active constituents. The improved formulation offers a more acceptable and patient-friendly version of Panchgavya medicine, supporting its wider therapeutic application.

**Keywords:** Cow urine, Panchgavya medicine, FTIR, taste masking, odour masking, palatability.

**PC-694**

**DESIGN AND OPTIMIZATION OF A BIOCOMPATIBLE PATCH INCORPORATING ENDOCRINE DRUG-LOADED VESICULAR SYSTEM FOR TARGETED BREAST CANCER THERAPY.**

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In this study, a vesicular drug delivery system (VDDS) encapsulating an endocrine drug was developed and incorporated into a bioactive-loaded biocompatible patch for breast cancer management. This approach addresses limitations of conventional endocrine therapies, including poor solubility, systemic toxicity, and lack of site-specific targeting. The bioactive was incorporated into the patch to provide additional therapeutic benefits and synergistic activity, enhancing the overall efficacy of the delivery system. Formulation parameters were systematically evaluated for particle size, zeta potential, drug entrapment, loading capacity, and in vitro release. The optimized vesicular system was engineered for selective delivery to breast cancer tissue while maintaining physicochemical and structural stability. Morphological analysis using SEM and TEM confirmed uniform nanoscale vesicles, and FTIR demonstrated drug–exipient compatibility, indicating the absence of chemical interactions. The biocompatible patch was assessed for thickness, moisture content, tensile strength, and drug release kinetics, confirming its suitability for transdermal application. The results show that integrating the VDDS into the bioactive-loaded patch enhances localized drug delivery, improves targeting, and maintains structural integrity, demonstrating its effectiveness as a delivery platform. This minimally invasive system provides a stable, efficient, and site-specific approach that reduces systemic effects compared to conventional methods, highlighting its potential for advanced breast cancer therapy.

**Keywords:** Breast cancer, vesicular drug delivery system, biocompatible patch, endocrine drugs, targeted therapy.

**PC-695**

**EFFECTS OF NATURAL PERMEATION ENHANCER ON DEVELOPMENT OF OXAPROZIN TRANSDERMAL PATCH USING QUALITY BY DESIGN APPROACH**

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In the present study transdermal patch of Oxaprozin, a NSAIDs drug were developed using Quality by Design principles to overcome the problems of oral administration such as hypotoxicity, poor absorption, gastric irritation and extensive first pass metabolism. Oxaprozin transdermal patch were formulated by the solvent evaporation method employing Eudragit RS 100 as polymer and optimized using Custom Design to evaluate the effect of different natural skin permeation enhancer. The experimental design recommended 13 runs involving 2 factors Eudragit RS 100 and natural skin permeation enhancer (Rosemary oil, oleic acid, limonene) and 3 responses in-vitro drug release, thickness and folding endurance. Each of the 13 formulation were prepared and evaluated. The optimized transdermal patch was characterized for moisture content, thickness, weight variation, drug content, in vitro drug release, ex vivo permeation and skin irritation study. The predicted global desirability of the optimized oxaprozin transdermal patch was found to be 0.87891. The patch in vitro and ex vivo permeation studies for the patch was found to be 82.94% and 74.26% respectively for 7 hours. Draize irritancy test was performed and confirmed no signs of skin irritation. Thus, it was concluded that oxaprozin transdermal patch was safe and effective alternative to oral therapy by reducing gastrointestinal irritation, bypasses first pass metabolism thereby improves the management of chronic inflammatory disorders.

**Keywords:** Oxaprozin, Natural permeation enhancer, Quality by Design, Custom design.

**PC-696**

**TAILORED THERAPEUTICS: THE ROLE OF 3D PRINTING IN PERSONALIZED MEDICINE**

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The convergence of three-dimensional (3D) printing and biomedicine has ushered in transformative possibilities for personalized medicine, enabling customised therapeutic solutions precisely matched to individual patient anatomies and biology. This poster examines recent advances in 3D bioprinting, additive manufacturing of biomaterials, and patient-specific implants and drug delivery systems. Key technical developments—including bioink formulation, multi-material and hybrid fabrication, and high-resolution volumetric printing—are evaluated for their ability to enhance cell viability, vascularization, and functional integration in engineered tissues. Applications across various biomedical domains are highlighted: tissue engineering (organs, skin, cartilage), regenerative medicine, personalized orthopaedics (patient-specific bone scaffolds and implants), and customised drug delivery (tailored dosage forms and release kinetics). For example, a multiphasic scaffold incorporating platelet-rich plasma into alginate-gelatin bioinks showed




ISBN: 978-81-980623-8-3

improved chondrogenesis of bone marrow mesenchymal stem cells (BM-MSCs), and strong interfacial mechanical properties between cartilage and bone regions. Despite these advances, certain challenges like: achieving robust vascularization and innervation in larger constructs; standardization of materials and bioinks; ensuring reproducibility and regulatory compliance; scalability and affordability need to be addressed. The poster concludes with perspectives on overcoming these barriers via integrated multi-disciplinary efforts, advanced imaging and modelling tools and innovative fabrication strategies. Overall, 3D printing holds strong promise to make personalized medical care more feasible, safe, and effective.

**Keywords:** 3D bioprinting, vascularization, personalized medicine, bioink formulation

**PC-697**

**FORMULATION AND EVALUATION OF ATORVASTATIN CALCIUM LIQUISOLID TABLETS & COMPARING THE DISSOLUTION DATA WITH MARKETED TABLET**

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The objective of the present investigation was to improve dissolution and bioavailability of a practically insoluble Hypercholesterolemia drug Atorvastatin calcium using liquisolid technique. Liquisolid compacts was prepared by using Span – 80 as a non-volatile solvent, Microcrystalline cellulose, lactose, Dicalcium phosphate, Hydroxy propyl methyl cellulose as carrier materials and Collodial silica as a coating material in different ratio. The prepared liquisolid compacts were evaluated for micromeritic properties & drug –excipient interactions by FTIR. The liquisolid tablets were prepared and evaluated for their tableting properties. The interaction between drug and excipients was characterized by FT-IR studies, which showed that there is no interaction between drug and excipients. The results of pre and post compression parameters were comply with pharmacopoeial limits. In vitro drug dissolution study was carried by using USP dissolution apparatus II & pH 6.8 phosphate buffer for 45minutes; its results comply with IP limits for tablets. The dissolution study of an optimized formulation (F8) compared with marketed tablets and it was found that F8 showed significant higher drug release rate than marketed tablet. From the study, it was concluded that the liquisolid technique is an effective approach to enhance the dissolution rate of Atorvastatin calcium.

**Keywords:** Atorvastatin calcium, Liquisolid technique, Dissolution rate.

**PC-698**

**ADVANCES IN NIOSOMAL CARRIERS FOR ENHANCED TOPICAL DRUG DELIVERY: A CASE STUDY WITH CHLORPHENIRAMINE NIOSOMAL GEL**

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Niosomes are a novel drug delivery system, in which the medication is encapsulated in a vesicle. The vesicle is composed of a bilayer of non-ionic surface-active agents and hence the name niosomes. Topically applied niosomes can increase the residence time of the drug in the subcutaneous and epidermis while reducing the systemic absorption of drugs. Thus, niosomes act as penetration enhancers. Niosomal gel plays a key role for penetration of the drugs across skin. The topical drug delivery of niosomal gel is very useful in the treatment of skin allergic reaction. Niosomal gel can be applied by topical route, since they have prolonged retention and enhanced penetration and that will automatically improve therapeutic properties. Niosomal gels are more convenient over conventional oral drugs. Because in oral formulations there are certain limitations such as limited targeting ability, short retention time in gastrointestinal tract, and low bioavailability. And also, oral administration requires repeated administration of drug. It has very poor solubility in acidic pH of the stomach and hence remains in stomach walls for a long period, aggravating its potential side effect like peptic ulcer and gastric irritation. Novel drug delivery System, like niosomes, extend the drug's shelf life and efficacy by shielding it from environmental influences and enzymatic destruction. By using different concentration of polymers, the formulation and evaluation of chlorpheniramine niosomes has been prepared by using ether injection method. A14 gauge needle was selected for preparation of formulation. Pre-formulation analysis uses FTIR to ensures the drug purity and its compatibility with excipients. The gel, however, exhibit some instability in accelerated conditions (40°C), suggesting that higher temperatures may have an impact on the formulation's long-term stability. The chlorpheniramine niosomal gel's pH was found to be approximately 5.9, which is within acceptable range for topical application. The maximum cumulative drug release (93.25%) in 8 hours and hence it is the best formulation.

**Keywords**: Niosomes, NDDS, Targeted drug delivery system, Drug Carrier, Surfactants, Preparations, Applications.

**PC-699**

**NANO CRYSTALS OVERCOMING MULTI-DRUG RESISTANCE (MDR) IN CANCER THERAPY**

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Multi-drug resistance (MDR) poses a major obstacle in modern cancer therapy, as it drastically reduces the effectiveness of conventional treatment approaches and often contributes to disease relapse as well as unfavorable clinical outcomes. One of the central mechanisms driving MDR is the excessive activity of ATP-binding cassette (ABC) transporters, particularly efflux pumps, which actively expel therapeutic agents from the interior of cancer cells. This results in significantly lower intracellular drug concentrations, preventing the achievement of the desired therapeutic effect. In addition to transporter-mediated efflux, several other biological factors contribute to the development of resistance. Given these multifaceted resistance mechanisms, there is an urgent need for innovative strategies to restore or enhance the effectiveness of therapy. Among the emerging solutions, nanocrystal-based systems have attracted considerable attention. Nanocrystals, composed of pure solid drug particles reduced to the nanometer scale, offer unique physicochemical and pharmacokinetic advantages. By improving solubility, dissolution rate, and bioavailability, they can achieve higher intracellular accumulation of therapeutic molecules. Moreover, nanocrystals may bypass efflux transporters and facilitate sustained drug release, thereby improving cytotoxic effects against resistant cancer cells. Consequently, nanocrystal technology holds significant promise as a novel and efficient platform to overcome the persistent challenge of MDR in oncology.

**PC-700**

**BRAIN-TARGETED INTRANASAL NANOCARRIERS: A NOVEL APPROACH FOR ALZHEIMER'S THERAPY**

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The nano formulation of Biochanin A intranasal delivery promising new approach for AD treatment. AD is neurodegenerative brain disorder that affect the memory, thinking ability, and also persons ability to perform routine daily activities. The drug delivery to the brain is very difficult because of the presence of BBB. Amyloid beta(β) accumulation, abnormal position of neuritis plaque and neurofibril tangles, cholinergic disfunction, neuroinflammation and oxidative stress burden along with mitochondrial dysfunction are the pathophysiology of AD. The nano formulation are introduced through nose to brain and it gained attention because it give the direct pathways to the brain, this method reduce the side effect in body and avoid the liver first pass metabolism. Biochanin A has already been proven that have neuroprotective effect by decreasing deposition, reducing apoptosis and preventing the production of TNF-α, IL-1β and NO. Biochanin A is a natural compound, occurring from isoflavone group.it is isolated from plant of the glycine(max). It has antioxidant, anti inflammatory and brain protective properties. For the AD treatment it is very useful to treat people. But it has low water solubility and bioavailability and get metabolized quickly. The nano formulation can improve the solubility of Biochanin A, allow slow controlled release, sustain release to the brain targeting. Intranasal delivery of Biochanin A nano formulation can provide direct brain delivery by passing the BBB.

**Keywords:** Biochanin A, Intranasal delivery, Nose-to-Brain delivery, Nano formulation, Alzheimer's disease (AD), Neurodegenerative disorder

**PC-701**




ISBN: 978-81-980623-8-3

**ROSUVASTATIN: DEVELOPMENT OF AN IMMEDIATE-RELEASE TABLET VIA QUALITY BY DESIGN (QBD) APPROACH**

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In this current research, 40 mg immediate-release rosuvastatin tablet was developed to overcome its low solubility. The approach used Quality by Design (QbD) principles and modern technologies to enhance therapeutic efficacy. To address solubility issues, a nanocrystal suspension of rosuvastatin was prepared. This suspension was then formulated into tablets using a wet granulation process. The formulation incorporated lactose as a diluent and a synergistic blend of croscarmellose sodium and crospovidone as super disintegrants, ensuring rapid tablet disintegration. Magnesium stearate and talc were used as a lubricant and glidant, respectively. The QbD framework included risk assessment, identification of critical material attributes (CMAs), and critical process parameters (CPPs). A Central Composite Design (CCD) was used to define the design space, with disintegrant and binder concentrations as key variables. The results showed that a stable and advanced immediate-release tablet formulation of rosuvastatin was successfully developed using a Quality by Design (QbD) approach. By employing nanocrystal technology and synergistic super disintegrants, the study effectively overcame the drug's low aqueous solubility. The formulated tablets demonstrated superior physical properties, including excellent hardness and very low friability, and achieved a rapid disintegration time of under one minute. In vitro dissolution studies confirmed a substantial increase in drug release, with over 85% of the drug dissolving within the first 15 minutes.

**Keywords:** Rosuvastatin, Nanocrystals, Quality by Design, Immediate-release, Super disintegrants

**PC-702**

**SURFACE MODIFICATION OF DRUG NANOCRYSTALS: STRATEGIES AND THERAPEUTIC APPLICATIONS IN SITE-SPECIFIC DELIVERY**

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Nanotechnology includes different strategies involving polymeric nanoparticles, liposomes, lipid nanoparticles, nanocrystals, nanoemulsions, etc., aiming to overcome several limitations of traditional therapeutic approaches. Drug nanocrystals are nanometer-sized drug particles that are considered better than other matrix nanoparticles in terms of their high drug loading and lower toxicity of drug formulation. In addition, nanocrystals significantly improve the solubility and dissolution rate of poorly water-soluble drugs, leading to enhanced oral bioavailability and faster onset of action. Their small particle size (10-500 nm) also provides a larger surface area, which facilitates rapid absorption and reduces variability in drug plasma concentration. They can also be administered through multiple routes, including oral, parenteral, pulmonary, and ocular, thereby offering formulation flexibility. Three methods, i.e., the top-down method, the bottom-up method, and the combination method are generally used for their preparation. Surface modifications with suitable ligands not only enhance physical and chemical stability but also enable targeted drug delivery to specific organs or cells. Folic acid for cancer cells, triphenylphosphonium for mitochondria, etc., are some of the ligands being used. This poster focuses on drug nanocrystals, methods of preparation, surface modification, surface ligand design strategies, and different applications in targeted drug delivery. The future perspectives of this dosage form have also been discussed.

**Keywords:** Drug nanocrystals, Surface engineering, Targeted drug delivery, Ligand modification

**PC-703**

**"IONOTROPIC GELATION-BASED MICROENCAPSULATION OF DUAL PLANT OILS FOR ADVANCED FACE CREAM FORMULATION AND CONTROLLED SKIN DELIVERY"**

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The combination of sweet almond oil (Prunus Amygdalus Dulcis) and rosehip oil (Rosa Canina) provides synergistic skin benefits, including moisturization, anti-aging, and skin regeneration. However, their direct use in topical formulations is limited by issues of stability, volatility, and lack of controlled release. This study explores the development of microsphere-encapsulated sweet almond and rosehip oils using the ionotropic gelation technique to overcome these challenges and enhance the therapeutic efficacy in a face cream formulation. Sodium alginate was employed as the encapsulating polymer, while calcium chloride served as the crosslinking agent to induce gelation and form stable hydrogel microspheres. The oils were emulsified within the polymeric solution and then dropped into the calcium chloride bath to generate oil-loaded spherical microspheres with controlled size and morphology. These microspheres exhibited high encapsulation efficiency and demonstrated sustained in vitro release profiles. Upon incorporation into an oil-in-water cream base, the formulation maintained desirable physicochemical properties, including viscosity, spreadability, and pH suitable for dermal application. The ionotropic gelation method efficiently encapsulates combination oils within biocompatible polymers, improving stability, protecting bioactive compounds, and enabling controlled delivery. This innovative approach holds promise for natural oil-based cosmetic applications by enhancing product performance, stability, and consumer acceptability while harnessing the benefits of plant-derived oils in a single, microencapsulated delivery system. The formulation was evaluated for particle size, entrapment efficiency, pH, viscosity, spreadability, and stability. These results demonstrated that the microsphere-loaded cream exhibited smooth texture, stable pH, good spreadability, and no phase separation, making it a promising formulation for skin care applications.

**Keywords:** sweet almond oil, rosehip oil, microsphere, oil-in-water cream base, ionotropic gelation method.

**PC-704**

**SIMVASTATIN LIPOSOMAL GEL: DEVELOPMENT AND CHARACTERIZATION USING THIN FILM HYDRATION METHOD**

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The skin protects the body against harmful substances and microorganisms. When the skin is damaged, wound healing must be finely regulated to restore the normal function of skin tissue. The current work aims to develop a topical liposomal gel loaded with simvastatin for improved local action to heal the bacterial wounds. The desired simvastatin loaded liposomal gel was formulated by employing a thin-film hydration technique using cholesterol, soya lecithin, and carbopol 940. The formulated liposomal gels were characterized by FTIR, drug loading, entrapment efficiency, surface morphology, particle size, zeta potential, pH, and viscosity. Further, evaluated for in vitro drug release, ex vivo permeation, and stability profile. The optimized liposome F4 suggested that particles were spherical and near homogeneous with relatively smoother surfaces with a particle size of 211nm. The optimized formulation F4 had shown a drug loading of 24.38% and an entrapment efficiency of 79.82%. Further, the optimized liposomal gel G1 had shown enhanced permeation (90.16% in 12h) and displayed sustained release when compared with plain gel (73.78% to 78.23% over 12h). Stability studies suggested that formulated liposomal gel was highly stable at 4-8°C. In conclusion, the formulated simvastatin loaded liposomal gel can be used as a potential therapeutic alternative for healing bacterial wounds.

**Keywords:** Simvastatin; Wound healing; Liposomal gel; Thin film hydration technique; Sustained drug delivery; Permeation

**PC-705**

**FORMULATION AND EVALUATION OF ATORVASTATIN CALCIUM LIQUISOLID TABLETS & COMPARING THE DISSOLUTION DATA WITH MARKETED TABLET**


ISBN: 978-81-980623-8-3

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The objective of the present investigation was to improve dissolution and bioavailability of a practically insoluble Hypercholesterolemia drug Atorvastatin calcium using liquisolid technique. Liquisolid compacts was prepared by using Span – 80 as a non-volatile solvent, Microcrystalline cellulose, lactose, Dicalcium phosphate, Hydroxy propyl methyl cellulose as carrier materials and Collodial silica as a coating material in different ratio. The prepared liquisolid compacts were evaluated for micromeritic properties & drug –excipient interactions by FTIR. The liquisolid tablets were prepared and evaluated for their tableting properties. The interaction between drug and excipients was characterized by FT-IR studies, which showed that there is no interaction between drug and excipients. The results of pre and post compression parameters were comply with pharmacopoeial limits. In vitro drug dissolution study was carried by using USP dissolution apparatus II & pH 6.8 phosphate buffer for 45minutes; its results comply with IP limits for tablets. The dissolution study of an optimized formulation (F8) compared with marketed tablets and it was found that F8 showed significant higher drug release rate than marketed tablet. From the study, it was concluded that the liquisolid technique is an effective approach to enhance the dissolution rate of Atorvastatin calcium.

**Keywords:** Atorvastatin calcium, Liquisolid technique, Dissolution rate.

**PC-706**

## EXPLORING POLYMER VARIANTS FOR THE DEVELOPMENT OF FAST DISSOLVING MONTELUKAST FILMS

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The study aimed to develop and evaluate fast-dissolving oral films (FDOFs) of Montelukast sodium to enhance disintegration, dissolution, and bioavailability, thereby improving patient compliance. Films were formulated using HPMC K-15, Guar Gum, and Xanthan Gum as film-forming agents, along with SSG as a super disintegrant and PEG-400 as a plasticizer, via the solvent casting method. There were six formulations (F1–F6), with F4–F6 containing polymer combinations. The films were evaluated for thickness, weight uniformity, moisture uptake, drug content uniformity, folding durability, in vitro disintegration time, and dissolution studies. Results showed that polymer combinations exhibited superior performance over single-polymer formulations, with F6 (HPMC K-15 + Guar Gum + Xanthan Gum) demonstrating the fastest disintegration time (30 ± 0.02 sec) and highest drug release (98.3% within 15 minutes). The films were thin, flexible, and easy to administer, providing a patient-friendly alternative to conventional tablets and capsules for allergic conditions. The study successfully achieved its objectives by formulating FDOFs that enhanced drug dissolution and absorption, providing a convenient and effective alternative to traditional solid dosage forms, particularly benefiting patients with swallowing difficulties.

**Keywords**: Guar gum, Xanthan gum, HPMC K-15, Montelukast sodium, Fast dissolving oral films (FDOFs), Super disintegrants, and Solvent Casting Technique

**PC-707**

## METHOXY POLY (ETHYLENE GLYCOL)-POLY (LACTIDE) (MPEG-PLA) NANOPARTICLES AS NEW CARRIERS FOR DELIVERY OF A PROSTATE CANCER DRUG FLUTAMIDE

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Methoxy poly(ethylene glycol)-poly(lactide) copolymer (MPEG-PLA) was used to prepared nanoparticles by the 23 factorial design and nanoprecipitation method for clinical administration of a prostate cancer drug Flutamide. The effects of various formulation components such as polymer, organic phase volume and surfactant on the characteristics of nanoparticles were evaluated. The size and size distribution, surface morphology and surface charge of the Flutamide loaded nanoparticles were then investigated by laser light scattering, scanning electronic spectroscopy and zetapotential analyzer. FT-IR studies may indicate interaction between the drug and polymer. The prepared nanoparticles had spherical shape with size less than 100 nm. Zeta potential measurement demonstrated the presence of PEG layer on the particle surface. The drug encapsulation efficiency (EE) and in vitro release profile were measured by UV-Spectroscopy. In-vitro release of drug showed sustained release behaviour for a period of 24 hr. The results of accelerated stability study of optimized formulation F2 revealed that storage conditions were not found to have made any significant changes in formulation. Such a nanoparticle formulation of Flutamide can be expected to have long-circulating effects in systemic circulation. Finally the present investigation opens new frontiers in developing Flutamide NPs for targeting delivery to the prostate for the prostate cancer treatment.

**Keywords**: Nanoparticles, Targeted delivery, Zeta potential and Prostate cancer.

**PC-708**

## ARTHRELIEF – ERGONOMICALLY DESIGNED MULTI-LAYER THERAPEUTIC WEARABLE FOR PAIN RELIEF AND REHABILITATION

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Arthrelief is a therapeutic device designed specifically to relieve the pain of patients suffering from arthritis and similar conditions. Arthritis is a condition in which inflammation of synovial joints occurs, leading to severe symptoms like pain, stiffness, and swelling. It is an alternative and complementary approach offered beyond traditional therapeutic practices. Arthrelief gloves focus on providing comfort and a drug-free solution, reducing the need for frequent clinical visits. Arthritis, encompassing both osteoarthritis and rheumatoid arthritis, is a debilitating condition affecting over 350 million people globally, leading to chronic pain, stiffness, and reduced mobility. Post-stroke rehabilitation, essential for the millions of survivors who suffer from long-term motor impairments, is another critical area of concern, with an estimated 15 million people experiencing a stroke each year worldwide. Arthrelief provides a non-invasive, drug-free solution that can be used in the comfort of one's home, minimizing dependency on clinical facilities. The massage function improves blood circulation, reduces swelling, and alleviates pain, while the heat therapy relaxes muscles, enhances joint flexibility, and accelerates tissue healing. The Arthrelief gloves are engineered with four distinct layers: a silicon layer embedded with flexible spikes for targeted massage, a coil layer acting as a heating agent, a pump with an airbag for dynamic pressure application, and an insulating fabric layer to retain warmth and ensure comfort. This unique combination enables simultaneous massage and heat therapy, offering significant relief from pain and stiffness while aiding post-stroke rehabilitation. From a design innovation perspective, Arthrelief departs from existing therapeutic gloves by integrating multi-therapy functionality into a single, lightweight, and portable wearable. Its layered architecture is not only functional but also ergonomically contoured to fit naturally over joints, ensuring consistent contact for uniform heat and massage distribution. The concealed micro-pump and coil arrangement are embedded without creating bulk, preserving flexibility and hand dexterity. Ventilation micro-channels within the insulating layer prevent overheating while maintaining therapeutic warmth, and the modular design allows easy adaptation to different body parts without redesigning the core technology. This combination of therapeutic efficacy, ergonomic comfort, and aesthetic simplicity makes Arthrelief a novel, patient-friendly, and highly adaptable solution for chronic pain and rehabilitation.

**Keywords**: Arthritis, painrelief, silicon, spikes, heat, massage

**PC-709**

## DEVELOPMENT AND IN VITRO EVALUATION OF CAPTOPRIL LOADED FLOATING MICROSPHERES BY NON-AQUEOUS SOLVENT EVAPORATION TECHNIQUE

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ISBN: 978-81-980623-8-3

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The aim of the present study was to design and optimize the floating microspheres of Captopril, an antihypertensive. Floating microspheres were prepared for the improvement of bioavailability of Captopril by retaining in the stomach for prolonged period of time by non-aqueous solvent evaporation technique using polymers like ethyl cellulose (EC) and Eudragit RS-100 in different ratios. The prepared floating microspheres were evaluated for micromeretic properities, percentage yield, in vitro buoyancy, drug entrapment efficiency and in vitro dissolution studies. Results showed that as the concentration of polymer increases it affects the particle size, percentage yield, In vitro buoyancy and drug release from the microspheres. Percentage yield of F6 microspheres was found up to 95.13%. The floating microspheres of optimized formulation F6 exhibited the prolonged drug release of 95.85% in sustained manner up to 24 hours and remain buoyant more than 12 hours. Formulation F6 follows zero order, non Fickian diffusion mechanism. Accelerated stability study was carried out for the optimized formulation and results showed that there were no significant changes in percentage drug entrapment efficiency, particle size, percentage buoyancy and In vitro controlled release of Captopril. The surface morphology analysis formulation F6 showed a hollow spherical structure with a smooth surface morphology. The developed floating microsphere system is a promising floating drug delivery system for oral sustained administration of Captopril.

**Keywords**: Antihypertensive, Micromeretics, Buoyancy and Non Fickian diffusion.

**PC-710**

## UNRAVELLING FORMULATION COMPLEXITY: THE CRUCIAL ROLE OF DISSOLUTION TECHNIQUE OF NOVEL CONTROLLED RELEASE AMORPHOUS SOLID DISPERSION (CASD)

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Dissolution testing plays a critical role in oral drug product development, serving as a bridge between formulation design, material properties, and process parameters to predict in vivo performance. As development progresses, dissolution methods must evolve to assess formulation robustness, detect manufacturing changes, and guide risk mitigation. This study focuses on optimizing a discriminatory dissolution method for a controlled-release formulation of Apremilast, a poorly soluble drug. Apremilast was processed via hot-melt extrusion with co-povidone (Kollidone VA64) at a 1:2 ratio to form an amorphous solid dispersion. This dispersion was further formulated with Hypromellose (Methocel K100 LVCR), glidant, and lubricant to develop a once-daily tablet as Controlled Release Amorphous Solid Dispersion (CASD). Initial solubility screening identified pH 4.5 acetate buffer as the most suitable medium, though it failed to maintain sink conditions alone. A series of dissolution experiments were conducted to refine test parameters. Surfactant concentration, agitation speed, apparatus type, and pH were systematically varied. Complete dissolution was achieved with 1% Tween 80, while higher concentrations accelerated release undesirably. Agitation at 75 rpm provided optimal discrimination, and USP-2 (paddle) apparatus outperformed USP-1 (basket) due to superior hydrodynamics. Among tested media, pH 4.5 acetate buffer ensured complete and sustained release over 24 hours. The final method—1% Tween 80 in pH 4.5 acetate buffer, USP-2 apparatus at 75 rpm, 900 ml volume—offers robust discriminatory power, enabling detection of formulation or process variations in Apremilast controlled-release amorphous solid dispersions.

**Keyword**: Poorly soluble drug, Apremilast, Controlled Release Amorphous Solid Dispersion, hot-melt extrusion, Discriminatory dissolution Method,

**PC-711**

## "INTRANASAL IN-SITU GEL OF VITAMIN B12: A SMART APPROACH FOR IMPROVED BIOAVAILABILITY"

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Vitamin B12 deficiency is a major global health concern, as highlighted by WHO, affecting millions worldwide and leading to neurological, hematological, and metabolic disorders. Conventional oral and injectable dosage forms often face limitations such as poor absorption, invasive administration, and low patient compliance, necessitating innovative drug delivery systems that improve bioavailability, therapeutic outcomes, and acceptability. This study aimed to develop and characterize intranasal in-situ gel formulations of Methylcobalamin to provide a non-invasive and targeted therapy for Vitamin B12 deficiency. Pilot studies were conducted for the selection of suitable polymers and excipients. The selected formulation, prepared using poloxamer 407 (2.7 g) and chitosan (0.15 g), demonstrated desirable properties, including neutral pH (7.4), rapid sol-to-gel transition at physiological temperature (36 ± 2 °C), and adequate viscosity to ensure prolonged retention on nasal mucosa. In vitro diffusion studies revealed sustained Methylcobalamin release up to 4 hours (78.55% CDR), indicating favorable conditions for intranasal administration. The intranasal route bypasses hepatic first-pass metabolism, thereby improving systemic bioavailability and providing faster onset of action compared to conventional oral forms. Additionally, chitosan contributed to enhanced mucoadhesion, increasing residence time and promoting efficient drug absorption across the nasal epithelium. Overall, the findings suggest that intranasal in-situ gel systems represent a promising alternative for controlled Methylcobalamin delivery. Such formulations may enhance therapeutic efficacy, improve patient compliance, and offer an effective strategy for the management of Vitamin B12 deficiency.

**Keywords**: Intranasal delivery, In-situ gel, Vitamin B12 deficiency, Mucoadhesion, Controlled release

**PC-712**

## DESIGN AND CHARACTERIZATION OF BUCCAL TABLETS OF TRAMADOLOL HYDROCHLORIDE

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The aim of present research work is to formulate and evaluate buccal tablets of Tramadolol hydrochloride in view to enhance bioavailability and therapeutic action.The tablets were formulated by employing Moringa oleifera , gum kondagogu, Karaya gum.The powder blend was evaluated for flow properties. All the formulations showed values within the prescribed limits for tests like hardness, friability and weight variation which indicate that the prepared tablets are of standard quality. Tramadol hydrochloride buccal tablets prepared with karaya gum in 1:1.25 ratios shows more prolonged drug release compared with the other gums. Surface pH of all formulations was found to be in the range of 6.12 - 6.82, which were nearer to the salivary pH 6.8. Hence it was assumed that these formulations do not cause any irritation to the mucous layer of oral cavity The correlation coefficient values (r) revealed that the dissolution profiles followed Zero order kinetics and the mechanism of drug release was governed by Higuchi model. The n values are found to be more than 0.5 (n>0.5) indicted that the drug release was predominantly controlled by non fickian diffusion. It was found that an increase in concentration of polymer increases the ex vivo Mucoadhesive residence time. The present study revealed that karaya gum appears to be suitable for use as a release retardant in the manufacture of buccal tablets because of its good swelling, good flow rate and suitability for mucoadhesion formulations.

**Keywords**: Tramadolol hydrochloride, Moringa oleifera, Gum kondagogu, Karaya gum

**PC-713**

## ROPINIROLE HCl LOADED NARASTRUCTURED LIPID CARRIERS FOR INTRANASAL DELIVERY TO TREAT PARKINSON'S DISEASE: FORMULATION, OPTIMIZATION, IN VITRO AND IN VIVO STUDY

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ISBN: 978-81-980623-8-3

Parkinson's disease is a progressive neurodegenerative disorder associated with degeneration of dopaminergic neurons, leading to motor impairment and functional decline. Ropinirole hydrochloride, a dopamine agonist, is clinically used to manage symptoms; however, its therapeutic potential is limited by extensive first-pass metabolism, low oral bioavailability, and short half-life. To overcome these drawbacks, nanostructured lipid carriers (NLCs) were developed and optimized for intranasal delivery, enabling direct nose-to-brain transport and bypassing the blood–brain barrier (BBB). The optimized batch demonstrated favorable physicochemical properties, with a mean particle size ranging from 122.1 ± 0.74 to 180.2 ± 0.44 nm, entrapment efficiency (EE) between 65.24 ± 0.44% and 85.21 ± 0.43%, and zeta potential (ZP) from –17.12 ± 1.50 to –36.25 ± 0.84 mV, confirming stability and uniformity of the formulation. In-vitro release studies revealed a sustained profile, with the optimized formulation achieving 98.6 ± 0.61% drug release over 180 min, demonstrating controlled and prolonged drug availability. Pharmacological evaluation further showed that ropinirole-loaded NLCs achieved higher brain uptake, improved pharmacokinetic performance, and enhanced neuroprotective effects compared to conventional dosage forms. Enhanced motor coordination, prolonged therapeutic action, and reduced systemic toxicity were observed in Parkinson's disease models. Overall, the optimized ropinirole hydrochloride NLC formulation demonstrates significant promise as a brain-targeted delivery system. By improving solubility, stability, and CNS bioavailability, it represents a novel therapeutic approach for Parkinson's disease. Future work should focus on large-scale manufacturing, long-term stability, and clinical translation to establish its utility in neuropharmaceutical therapy.

**Keywords**: Ropinirole hydrochloride, Nanostructured lipid carriers, Parkinson's disease, Blood–brain barrier, Intranasal delivery.

**PC-714**

## DESIGN AND EVALUATION OF CONTROLLED RELEASE MATRIX TABLETS FOR VALPROIC ACID AND SODIUM VALPROATE

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This study focused on the design and evaluation of matrix tablets containing sodium valproate, aiming to achieve controlled drug release. Sodium valproate is commonly used in managing epilepsy and bipolar disorder, conditions requiring steady plasma drug levels for effective treatment. Controlled release tablets of sodium valproate and valproic acid were prepared based on the pharmacokinetic data of the medication. The formulation included matrix tablets prepared using range of excipients in different proportions to modulate drug release. The drug-polymer blends were tested for physical properties such as hardness, weight variation, friability, and drug content. In vitro dissolution studies were performed to assess the drug release profiles over time. Stability studies conducted over two months indicated that the optimized formulation maintained its integrity and performance without significant changes. The matrix tablets are expected to reduce dosing frequency and improve patient compliance. Such systems are beneficial for managing chronic conditions requiring long-term medication, reducing the risk of side effects associated with peak drug levels and ensuring better therapeutic outcomes. Different batches were prepared with varied quantities of excipients. Based on comparative evaluation, formulation batch 6 was identified as optimized batch in which Hydroxy propyl methyl cellulose K15(HPMC K15) was incorporated as modified release polymer. The controlled release formulation offered a practical and stable alternative to conventional dosage forms, contributing to improved patient management and treatment adherence.

**Keywords**: Sustained drug release, Bipolar disorder, Stability studies, Optimized formulation

**PC-715**

## "DEVELOPMENT AND CHARACTERIZATION OF ADVANCED DRUG DELIVERY SYSTEM FOR TARGETED VITILIGO THERAPY."

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Vitiligo is a chronic autoimmune pigmentary disorder characterized by the progressive destruction of melanocytes, resulting in depigmented skin patches and profound psychosocial distress. Conventional therapeutic approaches such as corticosteroids, phototherapy, and immunomodulators often suffer from limited efficacy, high relapse rates, and poor patient adherence, underscoring the urgent need for more effective strategies. This study presents a novel transdermal drug delivery platform, engineered to overcome the limitations of existing treatments and deliver precise, sustained therapeutic action. The proposed system incorporates advanced carriers including liposomes, niosomes, and nanoparticle-loaded hydrogels, designed to stabilize therapeutic agents, enhance skin permeation, and enable targeted delivery at the epidermal–dermal junction the critical site of melanocyte activity. The formulation is developed within a Quality by Design (QbD) framework, ensuring robustness, reproducibility, and patient safety. Beyond drug delivery, the system is strategically designed to protect residual melanocytes, reduce oxidative stress, and regulate autoimmune pathways, thereby creating a favourable microenvironment for repigmentation. Comprehensive characterization studies including vesicle morphology, particle size distribution, entrapment efficiency, in vitro drug release, stability, and cytocompatibility—will provide insights into performance and therapeutic potential. By integrating nanotechnology with a mechanistic understanding of vitiligo pathogenesis, this approach offers a non-invasive, patient-friendly treatment capable of promoting sustained repigmentation, minimizing relapse risk, and significantly improving patient quality of life. Ultimately, this innovative delivery system marks a significant advancement in developing safe, effective, and reliable treatment strategies for vitiligo.

**Keywords**: Vitiligo, Nanocarrier delivery, Transdermal therapy, Repigmentation, Oxidative stress modulation, Immunomodulation.

**PC-716**

## IN-VITRO EVALUATION OF POSACONAZOLE LOADED SLN GEL FOR IMPROVED BIOPHARMACEUTICAL PERFORMANCE

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Oral candidiasis, particularly common in immunocompromised patients, represents a major fungal infection that can progress to systemic bloodstream involvement if left untreated, with Candida albicans responsible for nearly 60% of cases and non-albicans species accounting for 40–53%. however, conventional antifungal therapies such as fluconazole suspensions, clotrimazole tablets, and nystatin rinses are limited by rapid oral clearance, inconsistent drug delivery, and systemic absorption leading to adverse effects including QTc prolongation and nephrotoxicity, while resistance mediated through efflux transporters of Candida albicans. Posaconazole, a potent triazole antifungal with markedly lower MIC values and reduced susceptibility to efflux mechanisms, offers therapeutic advantages but is restricted by poor aqueous solubility (BCS Class II), pH-dependent intestinal precipitation, and systemic toxicities such as QTc prolongation, steroid synthesis inhibition, and pseudoaldosteronism. To overcome these limitations, a solid lipid nanoparticle (SLN)-based mucoadhesive gel was developed using solvent emulsification with high-speed stirring and bath sonication, optimized via fractional factorial design for localized action in the oral cavity. The drug's solubility was determined in various solid lipids and was found to be maximum in glyceryl monostearate. The optimized SLN batch showed a particle size suitable for buccal mucosal penetration <200 nm, favoring interaction with negatively charged mucosa, with good entrapment efficiency and drug loading. Further the optimized SLN-loaded gel exhibited a pH of 6.8, with swelling index of 58.45% after 6 hours. The rheological analysis revealed pseudoplastic shear-thinning behavior at 37 °C. In vitro release studies demonstrated sustained release, while ex vivo evaluation confirmed superior buccal retention and strong mucoadhesive strength, enabling prolonged mucosal adherence. These findings highlight the potential of the SLN-based mucoadhesive gel for localized, controlled delivery of posaconazole in oral candidiasis with reduced systemic toxicity.

**Keywords**: Solid lipid nanoparticles, oral candidiasis, mucoadhesive gel, candida albicans, buccal mucosa




ISBN: 978-81-980623-8-3

**PC-717**

**DEVELOPMENT AND OPTIMIZATION OF A PRONIOSOMAL GEL FOR TRANSDERMAL DELIVERY OF ALENDRONATE SODIUM: A NOVEL APPROACH FOR OSTEOPOROSIS MANAGEMENT**

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Osteoporosis is a widespread metabolic bone disease affecting over 200 million people worldwide, characterized by decreased bone mass and increased fracture risk, leading to significant morbidity, mortality, and healthcare costs. Alendronate sodium (ALS), a widely prescribed bisphosphonate, is effective in inhibiting bone resorption and reducing fracture risk, making it a cornerstone in osteoporosis treatment. However, ALS's poor oral bioavailability and gastrointestinal side effects often limit patient adherence and long-term therapeutic success. This study proposes a novel proniosomal gel formulation for the transdermal delivery of ALS, designed to overcome these limitations by enhancing drug solubility, improving skin permeation, and providing sustained release. The formulation (FI-F13) was optimized using a Design of Experiments (DoE) approach to systematically to evaluate the influence of formulation variables on key quality attributes such as entrapment efficiency and drug release. This innovative delivery system aims to maintain consistent therapeutic drug levels while minimizing systemic side effects associated with oral administration. The mean particle size, drug release, entrapment efficiency and stability indicate that proniosomal gels can effectively facilitate ALS absorption through the skin, offering a non-invasive, patient-friendly alternative to conventional oral therapies. Furthermore, the formulation approach holds promising potential for scalable manufacturing, which could accelerate its translation into clinical use. Overall, proniosomal gel-based delivery of ALS represents a promising advancement in osteoporosis management, with the potential to improve patient compliance, enhance treatment efficacy, and ultimately contribute to better long-term outcomes.

**Keywords**: Osteoporosis, Alendronate Sodium, Proniosomal Gel, Transdermal Drug Delivery, Bisphosphonates, Design of Experiments (DoE), Patient Compliance, Drug Bioavailability

**PC-718**

**DEVELOPMENT OF A QUERCETIN-LOADED PLGA-BASED DRY POWDER INHALER: FORMULATION AND IN VITRO PERFORMANCE**

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The development of inhalable nanocarrier-based systems provides a promising approach to tackling the challenges of poor drug delivery and resistance in lung cancer therapy. In this study, quercetin (QCT) was co-encapsulated into PLGA nanoconjugates using the single emulsion solvent evaporation (SESE) method to achieve synergistic anticancer effects. The optimised formulation showed a mean particle size of 165.12 ± 22.23 nm with uniform distribution and high encapsulation efficiency, exceeding 84%. To facilitate pulmonary delivery, the nanoconjugates were transformed into a dry powder inhaler (DPI) formulation using a carbohydrate-based carrier. The DPI exhibited favourable aerodynamic characteristics, with a mass mean aerodynamic diameter of 4.32 µm and a fine particle fraction above 60%, ensuring efficient deep lung deposition. In vitro release studies demonstrated a sustained biphasic release of QCT, confirming the potential of the system for prolonged therapeutic action. These findings highlight the feasibility of QCT-loaded DPI as a novel inhalable platform for effective pulmonary drug delivery.

**Keywords**: Quercetin, PLGA nanoconjugates, Dry powder inhaler, Pulmonary drug delivery

**PC-719**

**A REVIEW ON IN VITRO-EVALUATION OF MICROCELLULOSE HYDROGEL FOR POST-OPERATIVE SCARS PREPARED FROM EXTRACTED MICROCELLULOSE USING PINEAPPLE PEELS**

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The present study focuses on the development of a sustainable, plant-based hydrogel for post- operative scar management using microcellulose extracted from pineapple peels, an abundant agro-industrial waste. The project aims to convert this biodegradable waste into a value-added pharmaceutical product with topical wound-healing potential. Pineapple peels were subjected to drying and powdering, followed by chemical treatment involving delignification with sodium hydroxide, bleaching with sodium hypochlorite, and acid hydrolysis using hydrochloric acid to isolate microcellulose. The obtained microcellulose was incorporated into a hydrogel formulation using Carbopol 940 as the gelling agent. Aloe vera extract was included for its known soothing and regenerative properties, polyethylene glycol 400 (PEG-400) was used as a humectant to retain moisture, phenoxyethanol acted as a preservative, and triethanolamine was employed to adjust and stabilize the pH of the formulation. The final hydrogel was evaluated for essential parameters such as physical appearance, spreadability, viscosity, pH sensitivity, and homogeneity to determine its suitability for topical application. The formulation exhibited desirable characteristics, including uniform texture, ease of application, and skin-compatible pH, indicating its potential as an effective scar management product. This research not only presents a novel formulation for wound care but also contributes to environmental sustainability by repurposing organic waste. Overall, the study supports the development of cost-effective, eco-friendly alternatives in dermatological therapy. Further investigation through biological evaluations and clinical studies is recommended to validate its therapeutic efficacy and commercial applicability.

**Keywords**: Microcellulose, Pineapple Peels, Hydrogel, Post-Operative Scar, Topical Delivery, Sustainable Formulation, Aloe Vera, Carbopol 940

**PC-720**

**DEVELOPMENT AND EVALUATION OF AGMATINE LOADED CUBOSOMES FOR INTRANASAL DELIVERY IN THE TREATMENT OF EPILEPSY**

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Epilepsy, a prevalent neurological disorder characterized by recurrent seizures, remains challenging to manage due to pharmacoresistance and systemic side effects associated with conventional antiepileptic drugs. Agmatine, a naturally occurring polyamine with NMDA receptor antagonism and neuroprotective properties, shows promise in seizure control but suffers from poor bioavailability and limited blood-brain barrier (BBB) permeability. This study explores the potential of intranasal delivery of agmatine via cubosomes a lipid-based nanocarrier system to overcome these limitations and enhance brain targeting. Agmatine-loaded Cubosomes were prepared using glyceryl monooleate and Pluronic® F127 and characterized for particle size, zeta potential, entrapment efficiency, and structural morphology. The optimized formulation (F7) exhibited a nanoscale particle size (270.4 nm), negative zeta potential (−12.0 mV), and high entrapment efficiency (88.92 ± 0.33%). FTIR, DSC, and XRD analyses confirmed successful drug encapsulation and reduced crystallinity, indicating molecular dispersion of agmatine. In vitro studies demonstrated sustained drug release over 12 hours. In vivo evaluation in a pentylenetetrazol (PTZ)-induced seizure model in mice showed that intranasal agmatine-loaded cubosomes significantly delayed seizure onset (611 ± 3.3 s) and reduced convulsion duration (16 ± 5.3 s), outperforming both free agmatine and standard diazepam treatments. These findings support the efficacy of cubosome-based intranasal delivery as a non-invasive, brain-targeted therapeutic strategy for epilepsy and highlight its potential to enhance clinical outcomes while minimizing systemic side effects.

**Keywords**: Agmatine, Cubosomes, Intranasal, Drug delivery, Epilepsy, Blood-brain barrier.

**PC-721**

**FORMULATION DEVELOPMENT AND CHARACTERIZATION OF ESSENTIAL OIL-LOADED CMC HYDROGEL FOR WOUND HEALING: IN VIVO EVALUATION**

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Wound healing poses an enormous challenge, in the healthcare society and nanotechnology-based formulations for acute and chronic wound healing due to their advanced delivery of therapeutic substances. This study aimed to develop a stable hydrogel with essential oils for wound healing. Essential oils Including curcumin, eucalyptus, and sandalwood oil were individually added to the CMC hydrogel and in combination. The formulations underwent further analysis to assess their physicochemical properties, rheological measures, stability, dermal toxicity, and in vivo wound healing efficacy. The findings indicated that all essential oil-loaded hydrogels were stable and did not produce any signs of toxicity during the 48-hour observation period following the application of the hydrogel to the shaved skin of rats. The rats were randomly grouped, and wounds with a diameter of 1 cm were created on their skin using the excision method. Subsequently, the wounds were treated with the respective treatments for 14 days. The results indicated that the combination of oil-loaded hydrogels more effectively reduced the wound area compared to individual oil hydrogels. Additionally, the combination showed faster healing action compared to the commonly used marketed nanocrystalline silver gel and completely eradicated scarring on the skin after 14 days of the experiment. The results indicated that the combination of oil-loaded hydrogels more effectively reduced the wound area compared to individual oil hydrogels. Additionally, the combination showed faster healing than the commonly used marketed nanocrystalline silver gel and completely eradicated scarring on the skin after 14 days of the experiment. Among the individual oil hydrogels, the sandalwood oil hydrogel exhibited a higher potential for wound healing and scar removal. Each selected oil possessed distinct medicinal properties, including anti-inflammatory, antioxidant, antimicrobial, and tissue regeneration capabilities, and their combination enhanced the wound healing efficacy. In conclusion, the essential oil-loaded hydrogel exhibits significant potential for wound healing, and the combination of oils can synergistically enhance its action. Therefore, further research is needed on a larger scale to explore its potential utilization in wound dressing.

**Keywords**: CMC- Hydrogel, Essential Oil, Wound healing, In Vivo

**PC-722**

## SMART BUCCAL FILMS FOR CHEMOTHERAPY-INDUCED PERIPHERAL NEUROPATHY MANAGEMENT: CCD-BASED OPTIMIZATION WITH EX-VIVO PERMEATION AND STABILITY PROFILING

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Chemotherapy-induced peripheral neuropathy (CIPN) is a dose-limiting adverse effect of multiple chemotherapeutic agents and causes damage to the peripheral neurons. Duloxetine, a serotonin-norepinephrine reuptake inhibitor (SNRI), is considered a first-choice of drug to reduce the pain in CIPN by increasing the levels of these neurotransmitters in the central nervous system and modulating pain perception. Oral formulations of duloxetine are not so effective due to lower bioavailability (~50%), extensive first-pass metabolism, GIT degradation, and less absorption. To overcome these limitations, a buccal patch of duloxetine has been prepared in this research work by the solvent cast method. A central composite design (CCD) was applied with concentrations of HPMC K4M, HPMC K15M, and PEG 400 as independent variables. The swelling index (%) and folding endurance were considered as dependent variables. Formulations were assessed for surface pH, thickness, folding endurance, mucoadhesion strength, in vitro drug release, and drug content. The optimized batch showed a swelling index of 82% and folding endurance of 240, with 97.80 ± 1.23 % drug content. In-vitro drug release study confirms 96.61 ± 1.14 % of drug release in 200 minutes and 32.23 ± 0.02 mg as mucoadhesion strength. Ex-vivo study also confirms the penetration of 78.25 ± 1.07% of the drug in 4 hours with oleic acid as a penetration enhancer. The developed buccal film proves a novel and scalable drug delivery approach with improved bioavailability scope, ensures a quicker therapeutic action, and enhances patient compliance in CIPN management with reduced systemic toxicity.

**Keywords**: Duloxetine, chemotherapy-induced peripheral neuropathy, buccal patch, and Central Composite Design.

**PC-723**

## FORMULATION AND EVALUATION OF ZOLMITRIPTAN NASAL SPRAY FOR RAPID MIGRAINE RELIEF

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Migraine is a common neurovascular disorder characterised by severe headaches and associated symptoms such as nausea and photophobia. Oral triptans like zolmitriptan can be effective but may have a delayed onset due to gastric stasis during migraines. Nasal drug delivery can bypass gastrointestinal absorption, offering rapid relief. Zolmitriptan nasal spray formulations were prepared using different polymers (hydroxypropyl methylcellulose, methylcellulose, or chitosan) as viscosity modifiers. Formulations were characterised for pH, viscosity, spray content uniformity, in vitro drug diffusion through the nasal membrane, and drug-excipient compatibility (FTIR spectroscopy). A UV spectrophotometric method was employed to quantify the drug, following the construction of a calibration curve of zolmitriptan in a pH 5.8 phosphate buffer. All formulations exhibited a pH ranging from 5.5 to 6.0, optimised for the nasal mucosa, and demonstrated uniform drug content. Fourier Transform Infrared (FTIR) spectroscopy confirmed the compatibility of zolmitriptan with excipients. In-vitro diffusion studies indicated that the formulation containing chitosan (F3) released approximately 20% of the drug within 5 minutes and about 62% in 85 minutes, significantly faster than formulations with HPMC or MC. The rapid release observed in F3 was correlated with a quicker onset of action. The spray delivered approximately 0.15 mL per actuation, maintaining consistent dosing. A zolmitriptan nasal spray with chitosan as a mucoadhesive polymer provides rapid drug release, achieving significant drug diffusion within minutes. This formulation offers a promising approach for quick relief in acute migraine, potentially benefiting patients who require a rapid onset of effect and those with migraine-induced gastric stasis. The nasal route thus combines the efficacy of zolmitriptan with an improved delivery profile for managing acute migraine.

**Keywords**: Zolmitriptan, Migraine, Nasal spray, Triptan, Chitosan, In-vitro diffusion, Rapid release

**PC-724**

## DEVELOPMENT OF FAST DISSOLVING ORODISPERSIBLE FILMS LOADED WITH RESVERATROL EXTRACT

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Resveratrol, a naturally occurring polyphenolic compound with strong antioxidant and therapeutic properties, has shown great potential in the management of various diseases. However, its clinical application is limited due to poor aqueous solubility, low stability, and reduced oral bioavailability. To overcome these challenges, fast dissolving orodispersible films (ODFs) loaded with resveratrol extract were developed as an alternative dosage form to enhance patient compliance and improve drug performance. Resveratrol was extracted from natural sources using ethanol by reflux technique, and the crude extract was characterized to confirm the presence of active constituents. The formulation of ODFs was optimized using hydroxypropyl methylcellulose (HPMC) as the film-forming polymer and propylene glycol as a plasticizer, with varying concentrations of resveratrol extract incorporated. The prepared films were evaluated for physicochemical properties, disintegration time, mechanical strength, and drug release. The optimized formulation containing 2.5% HPMC, 1.5% propylene glycol, and resveratrol extract demonstrated desirable film characteristics. The films disintegrated rapidly within 20 seconds when tested using a disintegration apparatus, ensuring quick drug release and enhanced absorption. Mechanical property testing confirmed that the films were strong, flexible, and non-brittle, making them suitable for handling and administration. Overall, the study indicates that fast dissolving




ISBN: 978-81-980623-8-3

orodispersible films loaded with resveratrol extract can serve as a promising alternative to conventional dosage forms, offering improved solubility, rapid disintegration, and enhanced therapeutic potential of resveratrol.

**Keywords**: Resveratrol, Orodispersible Films, Fast Dissolving Films, Hydroxypropyl Methylcellulose, Antioxidant Delivery

**PC-725**

**FORMATION EVALUATION OF GASTRO RETENTIVE DRUG DELIVERY SYSTEM OF LOSARTANBPOTASSIUM BY USING RAFT FORMING TECHNIQUE**

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Hypertension is a chronic cardiovascular disorder that demands effective and sustained management through safe and patient-friendly drug delivery systems. Losartan potassium, an angiotensin II receptor antagonist, is widely prescribed for hypertension and related cardiovascular conditions. However, conventional oral administration of Losartan potassium often faces limitations such as reduced bioavailability and frequent dosing due to its short half-life. To overcome these drawbacks, the present study focuses on the formulation and evaluation of Losartan potassium tablets using a raft forming technique under novel drug delivery systems. The raft forming system is a gastro-retentive drug delivery approach that, upon contact with gastric fluid, swells and forms a viscous gel-like raft capable of floating in the stomach. This provides prolonged gastric residence time, ensures localized drug release, and enhances bioavailability. In this study, Losartan potassium tablets were prepared with suitable polymers such as sodium alginate and hydroxypropyl methylcellulose (HPMC), along with calcium carbonate and sodium bicarbonate as gas- generating agents. The formulations were optimized to achieve desirable parameters including tablet hardness, friability, swelling index, floating lag time, and total floating duration. The prepared tablets were evaluated for their physicochemical properties, drug content uniformity, in vitro buoyancy, and sustained release profile. Results demonstrated that the optimized formulation exhibited rapid raft formation with minimal floating lag time, remained buoyant for more than 12 hours, and showed a controlled and sustained drug release profile, meeting pharmacopoeial specifications.

**Keywords**: Hypertension, Losartan potassium, Raft forming system, Gastro-retentive drug delivery.

**PC-726**

**FORMULATION, EVALUATION AND ASSESSEMENT OF TRIDAX PROCUMBENS TOPICAL CREAM FOR TINEA PEDIS (ATHLETE'S FOOT).**

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A superficial fungal infection of the feet is called tinea pedis, or athlete's foot. Its frequency in a 1999 prospective epidemiological research in Hong Kong was 20.4% in 1014 participants. One Males, middle-aged or older people, people with diabetes, and pesssople with other underlying medical conditions (especially immune system issues) that encourage fungus development are more likely to have tinea pedis. The dermatophytes Trichophyton mentagrophytes, Trichophyton rubrum, and Epidermophyton floccosum are the most frequent causative organisms. Topical antifungals including ketoconazole, terbinafine, econazole, and cicloprox creams, as well as oral medications like griseofulvin, itraconazole, fluconazole, and terbinafine, are used to treat tinea pedis. Alternative medications may be preferable because of their limited range of action, drug resistance, toxicities, and combinations with other drugs. According to an assessment of the antifungal properties of more than 1000 species of TCMs listed in the 2005 edition of the Pharmacopoeia of the People's Republic of China, 83 of them have been shown to have antifungal properties, with 11 of them being effective against strains of Trichophyton. These consist of Folium Eucalypti Globuli [FEG], Fructus Psoraleae [FP], Fructus Chebulae, Herba Cichorii, Rhizoma Curcumae Longae [RCL], Semen Juglandis, Herba Portulacae, Bulbus Allii, Fructus Galangae, Tidax procunbens [TP] and Semen Cassiae. In this article we use a herbal plant Tidax procumbens possess antifungal property and we prepare a herbal topical formulation for the treatment of tinea pedis.

**Keywords**: Tinea pedis, Athlete's foot, Superficial fungal infection, Dermatophytes, Trichophyton, Traditional Chinese Medicine (TCM), Tidax procumbens, Herbal formulation, Antifungal activity, Topical treatment.

**PC-727**

**ECO-FRIENDLY SYNTHESIS AND CHARACTERIZATION OF GOLD NANOPARTICLES FROM BUCHANANIA LANZAN WITH ANTICANCER ACTIVITY**

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The present study investigated the pharmacognostical, phytochemical, and anticancer potential of Buchanania lanzan leaves and their phenolic-rich fractions for green nanoparticle synthesis. Leaves collected from Andhra Pradesh were shade-dried, powdered, and subjected to successive Soxhlet extraction with solvents of increasing polarity. Preliminary analysis confirmed the presence of phenolic compounds, with the ethanolic extract showing the highest total phenolic content (73.32 ± 0.86 mg GAE/g). The phenolic-rich fraction was employed for eco-friendly biosynthesis of gold nanoparticles (AuNPs), indicated by a ruby-red colour change and characterised using UV–Vis, FTIR, SEM, TEM, and XRD techniques. AuNPs were predominantly spherical (10–200 nm) and stabilised by phytoconstituents. In vitro cytotoxicity against HeLa cervical cancer cells was assessed by MTT assay. BL-AuNPs and phenolic fractions showed dose-dependent inhibition, with $IC_{50}$ values of 113.50 µg/mL and 216.90 µg/mL, respectively, compared with doxorubicin (22.61 µg/mL). Morphological observations confirmed apoptosis induction. In vivo studies using Dalton's Ascites Lymphoma (DAL) in Swiss albino mice demonstrated that BL-AuNPs suppressed tumour-associated weight gain, prolonged mean survival time, and increased lifespan, comparable to 5-fluorouracil. Treatment also restored antioxidant enzymes (SOD, CAT), reduced lipid peroxidation, and normalised liver function markers. Haematological parameters and histopathological analysis further confirmed protection of hepatic and hematopoietic systems. Overall, Buchanania lanzan-mediated AuNPs exhibited notable anticancer efficacy by inhibiting tumour growth, restoring antioxidant defences, and protecting vital functions, highlighting their potential as safe, natural therapeutic agents.

**Keywords**: Buchanania lanzan, phenolic-rich fraction, gold nanoparticles, anticancer activity, HeLa cells.

**PC-728**

**ENHANCING PERMEABILITY OF VILDAGLIPTIN VIA NANOEMULSION: ADVANCEMENTS IN DIABETES TREATMENT**

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Vildagliptin, a potent dipeptidyl peptidase-4 (DPP-4) inhibitor, is widely prescribed for the management of type 2 diabetes mellitus. Despite its therapeutic effectiveness, its oral bioavailability is limited due to poor permeability across gastrointestinal membranes and extensive first-pass metabolism. These drawbacks necessitate frequent dosing, which can compromise patient compliance and therapeutic efficiency. Recent advancements in nanotechnology-based drug delivery systems, particularly nanoemulsions, have emerged as a promising approach to address these limitations. Nanoemulsions are colloidal dispersions with droplet sizes typically below 200 nm, offering a large surface area and improved solubilization of lipophilic drugs. Their unique physicochemical properties enable enhanced drug permeation through biological membranes, protection from enzymatic degradation, and controlled release, thereby improving the pharmacokinetic profile of encapsulated agents. Formulating Vildagliptin into a nanoemulsion system can significantly enhance its permeability, leading to improved absorption and increased oral bioavailability. This novel approach not only reduces dosing frequency but also ensures more consistent therapeutic plasma




ISBN: 978-81-980623-8-3

concentrations, minimizing side effects associated with fluctuating drug levels. Additionally, the biocompatibility and scalability of nanoemulsion systems make them suitable candidates for clinical translation. Several in vitro and in vivo studies have highlighted their ability to improve drug transport across intestinal barriers and sustain hypoglycemic activity more effectively than conventional formulations. In conclusion, nanoemulsion-based delivery of Vildagliptin represents a novel and rational strategy to overcome the challenges of conventional therapy. By enhancing permeability and bioavailability, this approach offers a potential advancement in diabetes treatment, aiming to improve patient outcomes, adherence, and overall therapeutic success.

**PC-729**

**ADVANCEMENTS IN EGG NANOPARTICLE TECHNOLOGY FOR ENHANCED DRUG DELIVERY SOLUTIONS**

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Egg nanoparticles have been discovered as drug delivery vehicles that are biocompatible, biodegradable, and highly scalable compared to other types of nanocarriers. In the current days, the new methods of fabrication, surface treatment and functionalization have improved their application in nanomedicine. The aim of this review includes discussing the current state of knowledge about the properties and characterization of the egg nanoparticle-based drug delivery system, and the functions of these systems in cancer treatment, infectious diseases, and neurological diseases. Pros of egg nanoparticles such as enhanced pharmacokinetics, sustained release, and low toxicity are presented with limitations on scale up, immunogenicity, and the regulatory environment. Other current topics cantered on pharmacological approaches include combination therapy and multifunctional nanoparticles. Lastly, the review section points to the future studies and application of egg nanoparticle-based drug delivery systems and claims that more development and research is needed to revolutionize the system of medicine delivery and the life expectancy of patients.

**Keywords**: Egg nanoparticles, drug delivery systems, nanomedicine, targeted therapy, biocompatibility, controlled release.

**PC-730**

**DRONE ASSISTED DRUG DELIVERY SYSTEM...FOR VILLAGERS IN EMERGENCY CONDITIONS**

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Access to essential medicines remains a significant challenge in rural and remote villages where poor road connectivity, geographic barriers, and lack of reliable transport hinder timely healthcare delivery. Delayed access to life-saving drugs such as vaccines, insulin, and snake-bite antivenom often leads to preventable morbidity and mortality. To address this gap, drone-assisted medicine delivery is emerging as an innovative and practical solution under novel healthcare logistics. Drones, also known as unmanned aerial vehicles (UAVs), can bypass difficult terrains and deliver small but critical medical supplies within minutes to hours, where conventional transport might take days. Equipped with GPS navigation, temperature-controlled storage, and real-time tracking, drones ensure the safe and rapid transportation of time-sensitive medications. This technology is especially beneficial in emergency situations, such as sudden outbreaks, natural disasters, or urgent treatment needs in villages with minimal healthcare infrastructure. The proposed system integrates drones with primary health centers (PHCs), local pharmacists, and community health workers, ensuring last-mile connectivity. Centralized drug hubs can dispatch essential medicines through drones to designated drop points or directly to healthcare workers in villages. This not only improves drug availability but also strengthens vaccination drives, chronic disease management, and emergency care in underserved regions. Recent pilot projects worldwide have demonstrated the feasibility of drone delivery in transporting blood, vaccines, and diagnostics, significantly reducing delays and saving lives. The integration of drone technology into national health systems could revolutionize rural healthcare delivery, making essential medicines more accessible, affordable, and timely. In conclusion, drone delivery of essential medicines represents a novel, cost-effective, and scalable approach to bridging healthcare inequity. By combining innovation with community health systems, this strategy can enhance rural healthcare outcomes and contribute to universal health coverage in resource-limited settings.

**PC-731**

**IMPROVING BIOPHARMACEUTICAL EFFECTIVENESS OF THE ROSUVASTATIN BY UTILISING THE Qbd TECHNIQUE**

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Although statins are frequently given for hyperlipidemia, cancer, and Alzheimer's disense, they come with a number of inherent problems, including limited solubility, a greater rate of hepatie melabolism, low drug loading, and instability at the plH of the stomach. As a result, the significantly larger circulating dose neded to achieve therapeutic effiect causes severe dose-mediated toxsicity. Therefore, a Quality by Design(QbD)integrated strategy was used to design the statin-loaded new delivery system. Limicubes due to limited biocompatibility, toxicity, and other severe regulatory concerns such product conformance, reproducibility, and stability of existing formulations. Monoolein, Poloxamer, and stiring speed sigrificantly modulated amd improved performance of L.imicubes with respect to, Critical Quality Attributes (CQAsS), Ishikawa Fish-bone Diagram, Risk Assessment Matrix (REM), and Failure Mode and Effects Analysis (FMEA) based risk management approaches. The effects of the optimised formulation on the average particle size, (Y1=1.40-2. 70 µ) entrapment effectiveness, and drug loading were devcloped and characterised. The formulation that was subsequently created had improved pharmacokinetic and hypolipidemic cffectiveness, as well as a decreased adverse effect from loading rosuvastatin. A popular strategy used to develop is "Quality by Design" (QbD), It is based on the idea that quality should be built into the product from the start rather than just being finalised during production. The curent study describes a step- byestep implemenlation of QbD principles where speed, air presure, processing time, and bautch size (indcpendent paramcters) were initally recognishe ed as having high- to medium-impact on the dry coaing process, While several interaction factors had an impuct on content homogcneity, speed and batch size had the most detrimental effects. The updated model's validity and predictive power showed reliability for all experiments, QbD has been shown to be an efficient and affordable technique for creating and improving procedures in the pharmaceutical business overall.

**Keywords**: Statins, Hyperlipidemia, Rosuvastatin, Quality by Design (QbD), Critical Quality Attributes (CQAs), Ishikawa Fishbone Diagram, Risk Assessment Matrix (RAM).

**PC-732**

**FORMULATION AND EVALUATION OF LIPOSOMAL IRINOTECAN FOR TARGETED DRUG DELIVERY**

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In this work, an attempt is made to develop a stable drug delivery system with an improved therapeutic index for Irinotecan in the form of lyophilized liposomes. Liposomes were prepared using the thin-film hydration method and optimized for various formulation parameters. The developed liposomal formulations were evaluated for particle size, zeta potential, drug entrapment efficiency, in vitro drug release, and stability. Irinotecan-containing liposomes with an encapsulation efficiency of 92.67% were prepared, and the in vitro release of Irinotecan from the liposomes was studied. In conclusion, the formulation was optimized, the prepared liposomes had a high Irinotecan encapsulation rate and good reproducibility, and in this work, an attempt is made to develop a stable drug delivery system with an improved therapeutic index for Irinotecan in the form of lyophilized liposomes. Liposomes were prepared using the thin-film hydration method and optimized for various formulation parameters. The developed liposomal formulations




ISBN: 978-81-980623-8-3

were evaluated for particle size, zeta potential, drug entrapment efficiency, in vitro drug release, and stability. Irinotecan-containing liposomes with an encapsulation efficiency of 92.67% were prepared, and the in vitro release of Irinotecan from the liposomes was studied. In conclusion, the formulation was optimized, the prepared liposomes had a high Irinotecan encapsulation rate and good reproducibility, and the in vitro release showed a certain delayed-release effect. The optimized formulation exhibited nanoscale particle size (236 nm), high entrapment efficiency (>80%), and a sustained drug release profile over 8 hours. The liposomal encapsulation of Irinotecan showed potential for improved pharmacokinetics and site-specific targeting, thereby minimizing systemic toxicity. Overall, the liposomal delivery system developed in this study presents a promising approach to enhance the therapeutic efficacy and safety of Irinotecan. nanoscale particle size (236 nm), high entrapment efficiency (>80%), and a sustained drug release profile over 8 hours. The liposomal encapsulation of Irinotecan showed potential for improved pharmacokinetics and site-specific targeting, thereby minimizing systemic toxicity. In conclusion, the liposomal delivery system developed in this study demonstrates a promising approach to enhance the therapeutic efficacy and safety of Irinotecan.

**Keywords**: Irinotecan, Cholesterol, phosphatidyl choline, FTIR studies, thin film hydration technique, In vitro drug release studies.

**PC-733**

## EXPLORING THE FUTURE OF BIO PHARMACEUTICAL DRUG DISCOVERY: CAN ADVANCED AI PLATFORMS OVERCOME CURRENT CHALLENGES

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Artificial intelligence (AI)-based drug discovery (DD) holds significant promise in overcoming longstanding challenges posed by the complexities of identifying novel therapeutics. This review examines the critical hurdles, methodologies, and trans formative potential of advanced AI platforms in streamlining the drug discovery process. Using the Dompas Escalate platform as a case study, the article demonstrates how AI-driven approaches enhance molecular candidate identification, improve prediction accuracy, and facilitate the development of targeted therapies. By integrating machine learning, deep learning, and high-performance computing with physics-based simulations, generative modeling, and vast molecular databases, AI platforms are enabling seamless collaboration between technological and biological domains. This convergence is reshaping the landscape of bio pharmaceutical DD, offering substantial benefits in efficiency, innovation, and scientific advancement for both research communities and the pharmaceutical industry.

**Keywords**: Artificial Intelligence (AI),Drug Discovery (DD),Escalate platform,Machine learning,
Targeted therapeutics,Bio pharmaceutical innovation

**PC-734**

## IN-VITRO BIOCOMPATIBILITY, HEMOCOMPATIBILITY & ANTI-BIOFILM ACTIVITY OF CURCUMIN COATED CENTRAL VENOUS CATHETERS IN THE PREVENTION OF CATHETER RELATED BLOOD STREAM INFECTIONS [CRBSI]

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In the current research, commercially available central venous catheters are coated with Curcumin using top coat and base coat dip coating technology. The objective behind the research was to examine the Biocompatibility, Hemocompatibility and Anti-biofilm Activity of Curcumin Coated Central Venous Catheters in the Prevention of CRBSI. The coated catheters were sterilized using Ethylene oxide sterilization. The residual Ethylene oxide content was determined as per ISO 10993-5 guidelines and found to be within the limits. The sterilized catheters were tested for sterility as per IP 2022 with successful results. This study aimed to assess the blood compatibility of Curcumin-coated CVC according to ISO 10993-4. We have evaluated the anti-biofilm Activity of Curcumin Coated Central Venous Catheters against S. aureus, P. aeruginosa, E. coli, K. Pneumonia, A. baumanii and C. albicans which are the main organisms responsible for CRBSI. Haemocompatibility studies like Haemolytic assay & viable cell count was performed. Cytotoxicity against the standard human cell line using MTT assay & Bioluminescence assay was performed. The biofilm inhibition and eradication was performed using Crystal Violet Assay, Ruthenium Red assay, Congo red method & Scanning Electron Microscopy. The polyurethane catheter coated with curcumin demonstrated good resistance to microbial colonization of the catheter surface. Due to a controlled release of Curcumin, the catheter performed well in cell toxicity and blood compatibility tests as well as anti-biofilm activity. The anticoagulant effect, biocompatibility and anti-biofilm activity could keep the functionality of CVC helping to prevent complications such as CRBSI.

**Keywords**: Central venous catheters, Catheter related blood stream infections, Curcumin, Biocompatibility and Biofilm.

**PC-735**

## FORMULATION AND EVALUATION OF NANOPARTICLE-LOADED BUCCAL FILMS OF AMBRISENTAN FOR PULMONARY ARTERIAL HYPERTENSION

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Pulmonary arterial hypertension is a progressive disease condition, with a high rate of illness and death. The patients require drug delivery solutions that are enough functionable to deliver better treatment. A drug called ambrisentan, which blocks endothelin receptors, for this ailment. But the liver grinds it down, and it dissolves in water, lessening the amount of the medicine that gets into the bloodstream. The purpose of this research was to develop and evaluate the buccal films containing Ambrisentan nanoparticles as a novel delivery system for the convenience to patients. Nanoparticles were prepared by solvent evaporation technique and added in mucoadhesive buccal films by solvent casting. The formulations were investigated for physicomechanical characteristic, surface pH, drug content spread, disintegration time and in vitro drug release behaviour. Furthermore, an ex vivo comparative study in pig buccal tissue was carried out to explore drug penetration and possible enhancement of drug bioavailability. The finished film dispensed quickly in less than 25 s adhered to mucosa strongly, and exhibited uniformity of drug content. It also demonstrated significantly improved release and absorption properties over conventional Ambrisentan tablets. Oral films, which are formulated with drug-loaded nanoparticles, may enhance drug dissolution, bypass hepatic metabolism, and reduce drug absorbed in the body system, based on these observations. This approach has the potential to offer improved patient compliance to PAH therapy and treatment results.

**Keywords**: Pulmonary arterial hypertension, Ambrisentan, Nanoparticles, Buccal drug delivery

**PC-736**

## METFORMIN CONJUGATED METALLIC NANOPARTICLE-BASED CHITOSAN SPONGE FOR CHRONIC WOUND HEALING APPLICATION

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Diabetic wounds need specialized attention and management especially due to underlying high glucose level and prolonged inflammation. The oral absorption of Metformin (MET) is compromised due to its low permeability resulting in poor bioavailability. Recent research highlights its use in reducing inflammation, supporting fibroblast proliferation, collagen synthesis, and blood vessel formation by topical administration. In the present study, we aimed to formulate MET conjugated silver nanoparticles (AgNP) sponge to enhance the cell proliferation and reepithelization of the diabetic wound. The MET-AgNPs were prepared by a green synthesis method by using the extracts of Ocimum tenuiflorum. Chitosan sponges of the conjugated MET-AgNP were obtained by pre-freezing at -20°C followed by lyophilization. The sponges were then characterized by UV visible, FTIR spectroscopy, particle size,




ISBN: 978-81-980623-8-3

Scanning electron microscope, swelling, in vitro and in vivo studies. A surface plasmon band at λmax 434 nm indicated the formation of drug conjugates of AgNP. The particle size and zeta potential of MET-AgNPs was found to be 92.32 nm and -11.5 ± 5.04 mV, respectively. The FTIR results showed a shift in the -OH stretching peak from 3277 $cm^{-1}$- 3315 $cm^{-1}$ in the polymeric MET-AgNP sponge. The SEM images displayed a porous structure with a pore size of 100-200 µm. The chitosan MET-AgNP sponges showed least swelling of about 65% at the end of 8 hours making it a suitable candidate for moist dressing. The in vivo studies showed improved efficacy of the MET-AgNP sponge with a wound contraction area of 3.33 ± 1.25 mm2 at the end of 14 days.

**Keywords**: Conjugates, metallic nanoparticles, Metformin, sponge, regeneration

**PC-737**

**FORMULATION AND EVALUATION OF VIGNA MUNGO – BASED HERBAL SOAP FOR ANTIFUNGAL ACTIVITY**

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Objective: This study aimed to formulate a herbal antifungal soap using Vigna mungo as a natural base and to incorporate selected medicinal plant extracts—Mangifera indica, Calendula officinalis, Acalypha indica, and Melaleuca alternifolia, to evaluate their combined antifungal efficacy. Methods: Extracts of the selected plants were prepared using Soxhlet and maceration methods. Two melt-and-pour soap bases—glycerine and shea butter—were used in combination with Vigna mungo paste to prepare eight formulations, including individual and combined extract blends. The formulations were evaluated for physico-chemical properties (pH, appearance, texture, weight variation, and foam height) and tested for in vitro antifungal activity against Candida albicans using the agar well diffusion method. Efinaconazole served as the standard control. Results: All formulations exhibited acceptable physicochemical properties. The formulations containing the combination of all extracts (G4 and S4) showed the highest zone of inhibition (22 mm and 23 mm respectively), indicating a synergistic antifungal effect. Among the bases, shea butter–based soaps demonstrated slightly better antifungal activity than glycerine-based ones. Conclusion: Herbal soap formulated with Vigna mungo base and selected antifungal plant extracts can serve as a safe and effective natural alternative to synthetic antifungal agents, particularly in topical applications for fungal skin infections caused by Candida albicans. The combination of multiple extracts enhances efficacy, and the choice of base influences the performance of the final product.

**Keywords**: Vigna mungo, Candida albicans, antifungal, Mangifera indica, Calendula officinalis, Acalypha indica, Melaleuca alternifolia

**PC-738**

**GOLDEN HEALING: HARNESSING THE POWER OF PIPERINE AND CURCUMIN IN HYDROGEL PATCH FOR WOUND HEALING**

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Wound healing is an ongoing clinical issue, prompting innovative strategies to ensure better outcomes. In this study, we investigate the potential of a hydrogel patch containing curcumin and piperine, two natural products celebrated for their anti-inflammatory and wound healing activities, respectively. The hydrogel patch presents an ideal vehicle for controlled release of these bioactive molecules, maximizing their therapeutic benefits. Curcumin, a polyphenol from turmeric, possesses an array of properties, including antioxidants, anti-inflammatory, and antimicrobial activities, which are essential for wound healing. Piperine, an alkaloid in black pepper, accelerates the bioavailability of curcumin and also possesses wound healing activities. Entrapment of these molecules in a hydrogel matrix assures controlled release kinetics, providing prolonged access of these molecules to the wound bed. This ensures a synergistic effect, improving tissue regeneration, angiogenesis, and collagen synthesis. Additionally, the hydrogel patch ensures protection to the wound surface from exterior pathogens, and infection risk is kept in check. The preclinical research shows increased wound closure, less inflammation, and increased tensile strength of the curcumin and piperine hydrogel patch as compared to standard dressings. Therefore, this new-age technique has great future potential in improving wound care therapy, providing an efficacious, cost-efficient, and safe modality to promote wound healing.

**Keywords**: Curcumin, Piperine, Hydrogel patch, Wound healing, Controlled release, Bioavailability, Tissue regeneration, Angiogenesis

**PC-739**

**FORMULATION AND EVALUATION OF TRANSDERMAL PATCHES OF GLIPIZIDE**

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Glipizide, a widely used oral hypoglycemic agent, suffers from low bioavailability due to extensive firstpass metabolism and a short half-life. Transdermal drug delivery offers a promising alternative by providing controlled release, improved patient compliance, and bypassing hepatic metabolism. The present study aimed to formulate and evaluate transdermal patches of Glipizide using polymers such as Hydroxypropyl Methylcellulose (HPMC) and Ethyl Cellulose (EC) in different ratios. Patches were prepared by the solvent casting method and evaluated for thickness, weight uniformity, surface pH, moisture content, drug content, folding endurance, and in vitro drug release. The results indicated uniform patches with satisfactory mechanical strength and controlled drug release over 24 hours. In vitro studies demonstrated sustained release following Higuchi kinetics, suggesting diffusion-controlled release. The optimized formulation exhibited good adhesion, stability, and the potential to maintain therapeutic plasma levels, indicating that transdermal delivery of Glipizide could be a viable strategy to enhance its therapeutic efficacy and patient compliance.

**PC-740**

**FORMULATION, EVALUATION, AND AI-ASSISTED OPTIMIZATION OF A BLUE PEA EXTRACT SERUM**

Fardeen A. Ansari

The increasing demand for sustainable and plant-based cosmetic formulations has led to growing interest in the use of Clitoria ternatea (Blue Pea) flower extract, known for its antioxidant and anti-aging potential. This study explores the formulation and evaluation of a Blue Pea–based face serum through a comprehensive approach, beginning with extraction and phytochemical characterization. Advanced computational tools and AI-driven predictive modeling were integrated to optimize extract concentration, excipient compatibility, and stability parameters. The serum was evaluated for physicochemical properties such as pH, spreadability, viscosity, and washability, alongside stability and non-irritancy assessments. AI-supported analysis enabled efficient prediction of formulation behavior, shelf-life, and consumer safety, thereby reducing trial-and-error in formulation design. The results demonstrate that Blue Pea extract can be effectively utilized in serum formulations with promising cosmetic and therapeutic applications, while AI integration enhances the precision, efficiency, and scalability of natural skincare product development.

**Keywords: -** Blue Pea Extract, Antioxidant Activity, Flavonoids, AI

**PC-741**

**FORMULATION AND EVALUATION OF LOW DENSITY FLOATING DRUG DELIVERY SYSTEMS OF MEBEVERINE HYDROCHLORIDE**

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Dosage forms with a prolonged gastric residence time and sustained release are called as Gastroretentive drug delivery systems. Low density systems is one of the pharmaceutical approaches in this area. Mebeverine hydrochloride is intended to be used in conditions like functional abdominal pain in children. The aim of the current study is to prepare as well as to evaluate oil-entrapped floating microspheres of Mebeverine hydrochloride to favorably improve the gastric residence nature of the drug in the stomach. The micro-spheres were formulated by ionotropic-gelation method using mahuva oil and various polymers like hydroxy propyl methyl cellulose and sodium starch glycolate of varying concentrations. A total of twelve formulations were developed




ISBN: 978-81-980623-8-3

in the laboratory. The developed micro-spheres were evaluated for floating properties, flow property and drug entrapment efficiency. The shape and surface morphology were evaluated using optical microscopy. The micro-spheres were also subjected to in-vitro drug release studies. In the case of formulation F9 the drug release was extended upto 12 hours and floating of micro-spheres remained for more than 12 hrs. Mahuva oil was found to be a suitable low density material in the formulation of floating micro-spheres.

**Keywords**: Functional abdominal pain, Mebeverine, hydroxy propyl methyl cellulose, Mahuva oil, floating micro-spheres.

**PC-742**

**FORMULATION AND DEVLOPMENT OF BRAIN TARGETED NANO PREPARATIONS FOR NEURODEGENERATIVE DISEASES**

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In the present study, a potential lipid material compound L was designed and synthesized, which possesses bi-functional properties, that is, the lipophilic steroid for inserting into the liposomal membrane in addition to the hydrophilic glucose residue outside the membrane for GLUT1 recognition. The objective of this study was to formulate Agmatine sulphate loaded liposomes, which was made with Phospholipid and glucose-cholesterol derivatives (compound L) to get high affinity for GLUT-1 receptors present on BBB. The liposomes were prepared by using Film Dispersion method. A two-factor three-level (32) factorial design was used to optimize the formulation. Nine formulation batches (A1-A9) were prepared. Two factors as independent variables (X1-amount of Phospholipid and X2-amount of glucose-cholesterol derivative i.e., Compound L) were taken with three levels (+1, 0, -1). The levels of two factors were selected on the basis of preliminary experiments conducted and their effect on two dependent variables (% Entrapment Efficiency and Particle Size) was studied along with their % relative error. Formulation A4 was selected by the Design-Expert software which exhibited % EE (94.67±3.67%), and PS (459±1.21 nm). API and excipients were evaluated for Preformulation studies (colour, odour, nature, m.p., solubility, UV, HPLC, FTIR etc.) and the Liposomes were evaluated by comparative study of Batch F1 (2:1:0), Batch F2 (2:0:1) [i.e., optimized Batch A4] and Batch F3 (2:0.5:0.5) (vesicle digital morphology, particle size, zeta potential, % Entrapment Efficiency, % Drug content, % in vitro diffusion study and stability studies). The optimized batch was further used for FESEM and in vivo studies (Blood and body organ distribution studies). After i.v administration, increased time spent in platform quadrant and number of entries in platform quadrant during probe trial of Batch F2/A4 (2:0:1) [i.e., optimized Batch A4] than Batch F1 (2:1:0), Batch F3 (2:0.5:0.5) and Agmatine (10 mg/kg) as compared to control group in STZ induced Alzheimer's model was evaluated. The biodistribution data showed higher brain concentration of Batch F2 (2:0:1) [i.e., optimized Batch A4] than those of standard Agmatine sulphate (10 mg/ kg) after i.v administration. Thus, i.v administration of Agmatine sulphate loaded Liposomes may be appropriate and preferred as a valuable Brain-targeted drug delivery system for the treatment of Alzheimer's disease.

**Keywords**: BBB, Alzheimer's disease, Liposomes, Agmatine sulphate

**PC-743**

**ELECTRONIC MEDICATION MONITORING DEVICES: RETHINKING PATIENT-CENTERED MEDICATION ADHERENCE**

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Medication non-adherence continues to undermine the effectiveness of even the most sophisticated therapies. Despite many advances in pharmaceutical care, non-adherence is a persistent obstacle, rendering optimal outcomes frustratingly elusive. Addressing this demands interventions that are not only strong and evidence-based but centered around the patient experience. Enter Electronic Medication Monitoring Devices (EMMDs): an emerging class of technologies bringing real-time clarity to regimen management. EMMDs—think intelligent pillboxes, digitally linked blister packs, and ingestible sensors—move beyond conventional reminders. They generate objective adherence data, flag missed doses, and deliver actionable insights for providers. Instead of relying on self-reports or assumptions, healthcare professionals gain measurable evidence, driving opportunities for individualized interventions and genuinely collaborative care models.Yet the promise of EMMDs does not come without caveats. Challenges—including cost barriers, patient comfort with technology, digital literacy gaps, and important data privacy considerations—are especially significant across diverse healthcare environments such as those found in India. Ultimately, EMMDs represent more than technical progress. They have the potential to reframe medication adherence as a shared, verifiable responsibility between patients and the healthcare system. By supporting transparency, accountability, and more responsive care, these devices may signal a meaningful evolution for modern, patient-centered healthcare.

**Keywords**: Electronic medication monitoring, adherence, digital health, patient-centered care, healthcare innovation

**PC-744**

**MOLECULAR CHARACTERIZATION OF NANOPARTICLE-ASSISTED PACLITAXEL DELIVERY IN COLON CANCER: A NANO INFORMATICS APPROACH**

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Colorectal cancer remains one of the most prevalent forms of cancer across the wide, requiring the development of efficient, biocompatible, and targeted drug delivery systems. In this work, we aim to design and assess the polymeric nanoparticles as carriers computationally for delivery of a key chemotherapeutic used in colon cancer treatment i.e. Paclitaxel. In order to form the nanoparticle we will use amphiphilic copolymers, poly (D, L-lactide)-poly (ethylene glycol) (PDLLA-PEG) and poly (lactic-co-glycolic acid)-poly (ethylene glycol) (PLGA-PEG). They were selected to assess drug–polymer interaction and compatibility. Initial all-atom molecular dynamics simulations followed by MM/GBSA free energy calculations were performed to study the binding affinities, interaction patterns, and stability of polymer–drug complexes. This is followed by coarse-grained MARTINI simulations to perform self-assembly of polymer–drug systems into nanoparticles. The resulting nanoparticles were characterized through clustering analysis, radius of gyration (Rg), solvent-accessible surface area (SASA), including eccentricity, to predict shape and for size, the ratio of hydrodynamic radius, and Rg is calculated. Encapsulation efficiency was calculated from drug distribution within polymeric cores. Furthermore, machine learning models are being developed to predict physicochemical and biological properties, such as zeta potential, molecular release kinetics, and nanoparticle-induced toxicity profiles. Together, this integrated computational approach provides a framework for the design of polymeric nanocarriers and lays the foundation for developing optimized formulations of Paclitaxel for colorectal cancer therapy.

**Keywords**: Nanoinformatics, Colon cancer, Computational studies, Molecular simulation

**PC-745**

**FORMULATION AND EVALUATION OF BIOACTIVE RITHA HERBAL SOAP USING THE DECOCTION METHOD WITH SELECTED MEDICINAL PLANTS**

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The aim of this study was to develop and evaluate Ritha herbal soap formulated with bioactive herbal extracts recognized for their ethnopharmacological and dermatological properties in Ayurveda. The formulation incorporated extracts from Sapindus mukorossi, Acacia nilotica, Aloe barbadensis, Curcuma longa, Cocus nucifera, Azadirachta indica, Ocimum sanctum, and Citrus lemon. These plant materials were processed using appropriate extraction techniques tailored to their specific constituents. The soap was prepared by combining the extracts with fatty oils and sodium hydroxide (lye) using the hot decoction




ISBN: 978-81-980623-8-3

method. The prepared herbal soap was compared to commercially available soaps in terms of its physical and chemical properties, including appearance, color, and odour. Key parameters of the prepared soap were measured, yielding the following results: pH (8.38), % free alkali content (0.34), foamability (17 cm), foam stability (15 cm), moisture content (6.4%), and alcohol-insoluble matter (2.25%). Additionally, antioxidant and antibacterial activities were assessed, demonstrating that the soap exhibited potent antioxidant and antibacterial properties. The study concludes that high-quality herbal soap can be effectively formulated using the hot decoction method, incorporating parameters such as skin compatibility and the bioactive potential of the selected herbs. This approach offers significant promise for the herbal cosmetics industry by addressing limitations associated with existing polyherbal or chemical-based formulations, thus paving the way for safer and more efficacious dermatological products.

**PC-746**

**SMART POLYMER-COATED MICRONEEDLE TECHNOLOGY FOR CONTROLLED 5-FLUOROURACIL DELIVERY.**

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Melanoma remains one of the fastest-growing skin cancers, and conventional 5-fluorouracil therapy is restricted by limited skin penetration and adverse local reactions. To address these challenges, polymer-coated polymeric microneedles were developed as a novel intradermal delivery approach. The microneedle arrays were fabricated using a polymeric core of PVP K30 loaded with 5-fluorouracil, followed by coating with a thin layer of Eudragit E100 through dip-and-spin technique. The coating served as a semipermeable barrier to control drug release and to improve the mechanical strength required for reliable skin insertion. Comparative evaluation of coated and uncoated microneedles demonstrated enhanced strength in the coated system and a sustained release pattern as opposed to the rapid release observed from uncoated arrays. Ex vivo skin permeation studies confirmed prolonged delivery from the coated arrays, while stability assessments indicated consistent drug retention and reproducible release profiles during storage. The combined outcomes suggest that polymer-coated microneedles can successfully overcome the shortcomings of conventional topical 5-fluorouracil by enabling controlled release into the dermal layers, improving drug permeation, and minimizing surface-level irritation. This platform represents a minimally invasive and patient-friendly alternative for the management of melanoma and highlights the potential of polymeric microneedles as an advanced drug delivery technology in oncology.

**Keywords**: 5-fluorouracil, Microneedles, Polymer coating, Eudragit E100, Intradermal delivery, Melanoma.

**PC-747**

**FORMULATION AND EVALUATION OF MUCOADHESIVE BUCCAL TABLETS: A NOVEL APPROACH FOR SUSTAINED MANAGEMENT OF XEROSTOMIA**

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The present research focus on the formulation and optimization of mucoadhesive buccal tablets for the management of xerostomia, employing the direct compression technique. The selected drug enhances salivary secretion and alleviates dry mouth symptoms. Tablets were designed using varying levels of polymers along with MCC, mannitol, and magnesium stearate as excipients. A $3^2$ full factorial design was implemented to investigate the influence of formulation variables on mucoadhesive strength, residence time, disintegration, and in-vitro drug release. Compatibility of drug and excipients was confirmed by FTIR and DSC analyses, while evaluation studies demonstrated satisfactory physicochemical characteristics. The optimized formulation exhibited high mucoadhesive strength (15.1 ± 0.13 g/cm²), sustained adhesion time, and 97.7 ± 1.1% drug release within 120 minutes. Surface pH and swelling index studies supported buccal compatibility and effective hydration. Optimization through Design-Expert® software yielded a desirability score of 0.888, with predicted and observed responses showing <±1% relative error, confirming the model's reliability. Overlay and desirability plots identified Carbopol 934P (12.5 mg) and SSG (10 mg) as optimal concentrations for achieving desired performance. Overall, the developed system represents a promising buccal drug delivery platform for the sustained and effective treatment of xerostomia.

**Keywords**: Xerostomia, Carbopol 934P, SSG, 32 full factorial design, mucoadhesive.

**PC-748**

**RECENT TRENDS ON POLYCAPROLACTONE AS SUSTAINABLE POLYMER-BASED DRUG DELIVERY SYSTEM IN THE TREATMENT OF CANCER**

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The unique properties—such as biocompatibility, biodegradability, bio-absorbability, low cost, easy fabrication, and high versatility—have made polycaprolactone (PCL) the center of attraction for researchers. The derived introduction in this manuscript gives a pretty detailed overview of PCL, so you can first brush up on it. Discussion on the various PCL-based derivatives involves, but is not limited to, poly(ε-caprolactone-co-lactide) (PCL-co-LA), PCL-g-PEG, PCL-g-PMMA, PCL-g-chitosan, PCL-b-PEO, and PCL-g-PU specific properties and their probable applications in biomedicine. This paper has considered examining the differences in the diverse disease subtypes and the therapeutic value of using PCL. Advanced strategies for PCL in delivery systems are also considered. In addition, this review discusses recently patented products to provide a snapshot of recent updates in this field. Furthermore, the text probes into recent advances in PCL-based DDS, for example, nanoparticles, liposomes, hydrogels, and microparticles, while giving special attention to comparing the esters in the delivery of bioactive compounds such as anticancer drugs. Finally, we review future perspectives fine-tuning mechanical strength/degradation rate, biocompatibility, and long-term effects in living systems.on using PCL in biomedical applications and the hurdles of PCL-based drug delivery, including

**Keywords**: Polycaprolactone PCL derivatives Controlled Drug Delivery Bioactives Biocompatibility Anti-cancer drugs

**PC-749**

**FORMULATION AND EVALUATION OF ORAL DISPERSIBLE TABLETS OF FELODIPINE**

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The present study aimed to develop and optimize felodipine orodispersible tablets (ODTs) using various concentrations of superdisintegrants to enhance dissolution rate and improve patient compliance. A $3^2$ full factorial design was employed to study the influence of croscarmellose sodium (4–8% w/w) and microcrystalline cellulose (20–40% w/w) on disintegration time and in-vitro drug release. Preformulation studies, including organoleptic evaluation, solubility determination, melting point analysis, FTIR, and DSC, confirmed the purity of the drug and its compatibility with excipients. The prepared powder blends showed excellent micromeritic properties, enabling direct compression. All formulations met pharmacopoeial requirements, exhibiting uniform weight, adequate hardness, low friability (<1%), and rapid disintegration. The optimized batch (F5) disintegrated in 24.3 seconds and achieved 99.5% drug release within 15 minutes. Stability studies conducted for six months under ICH-recommended conditions indicated no significant changes in physical appearance, drug content, or dissolution profile. These findings suggest that the optimized ODT formulation can serve as a stable, patient-friendly dosage form with potential for enhanced antihypertensive therapy.

**Keywords**: Felodipine, Orodispersible Tablets, Superdisintegrants, Stability Studies.

**PC-750**




ISBN: 978-81-980623-8-3

**DEVELOPMENT OF NEBIVOLOL HCL-LOADED OLAMINOSOMES INCORPORATED INTO 3D PRINTED MICROARRAY-BASED TRANSDERMAL PATCHES FOR THE TREATMENT OF HYPERTENSION**

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The current study aimed to develop and evaluate Nebivolol Hydrochloride (HCl)-loaded olaminosomes incorporated into 3D-printed microarray-based transdermal patches for effective management of hypertension. Olaminosomes were formulated using oleic acid and oleylamine via the thin film hydration method and subsequently embedded into matrix-type transdermal patches prepared using a combination of Eudragit RS100 and HPMC K100M polymers. Advanced 3D Digital Light Processing (DLP) technology was utilized for microarray patch fabrication. The developed patches were evaluated for physicochemical properties, In-vitro drug release, and stability. Among all formulations, F5 (HPMC: ERS100 – 100 mg: 900 mg) demonstrated optimal physical characteristics, highest drug content (98±4.42%), and maximum in-vitro release (97±3.94% at 30 minutes). SEM confirmed uniform drug distribution, and ATR-FTIR studies confirmed the absence of interactions between drug and excipients. Stability studies under ICH conditions indicated no significant changes over 3 months. The findings support the potential of 3D-printed microarray patches as a novel transdermal drug delivery system for Nebivolol.

**Keywords**: Nebivolol Hydrochloride, Olaminosomes, Transdermal Patch, 3D Printing, Controlled Release.

**PC-751**

**FORMULATION AND EVALUATION OF VALSARTAN FAST DISINTEGRATING TABLETS**

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Fast disintegrating tablets (FDTs) have gained importance as they rapidly disintegrate or dissolve in the oral cavity without the need for water, thus improving patient compliance. Valsartan, an angiotensin II receptor blocker widely prescribed for hypertension and has poor aqueous solubility, limiting its oral bioavailability. The present investigation aimed to develop FDTs of Valsartan with enhanced solubility and rapid disintegration. Solid dispersions of Valsartan were prepared using mannitol as a carrier by the kneading method to improve solubility and dissolution characteristics. Among the prepared solid dispersions, Valsartan: Mannitol in the ratio of 1:4 exhibited superior solubility enhancement and was selected for FDT formulations. Various concentrations of superdisintegrants, including sodium starch glycolate(SSG) and crospovidone(CP), were incorporated to optimize tablet disintegration. The formulations were prepared by direct compression and evaluated for pre-compression and post-compression parameters. UV spectrophotometry was employed for assay and in vitro dissolution studies. Among all formulations, F7 containing 6% crospovidone demonstrated the shortest disintegration time and significantly improved dissolution rate compared to others. FT-IR and DSC studies confirmed the absence of drug–excipient interactions. The optimized FDT of Valsartan thus presents a promising approach to enhance dissolution and patient acceptability in antihypertensive therapy.

**Keywords**: Valsartan, Solid dispersions, Kneading method, Superdisintegrants, Fast disintegrating tablets.

**PC-752**

**CHRONOTHERAPEUTIC TRANSDERMAL DELIVERY OF THEOPHYLLINE: CONTROLLED-RELEASE PATCH STRATEGIES FOR IMPROVED NOCTURNAL ASTHMA MANAGEMENT**

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Nocturnal asthma is a distinct subtype of asthma phenomena where symptoms intensify at night, impacting nearly three-quarters of all asthmatics. This condition's exacerbation at a specific time of day poses a need for novel treatments that synchronize medication delivery with biological rhythms. Theophylline, a bronchodilator of the methyl xanthine class, while effective poses a challenge because of its conventional oral dosage form's narrow therapeutic window, gastrointestinal adverse effects, and poor compliance. This thorough research aims to the controlled release theophylline patch for nocturnal asthma providing insights into the scientific justification, formulation and manufacturing concerns, clinical uses, and regulatory framework for transdermal controlled release patches of theophylline. This research incorporates the state-of-the-art concerns on matrix polymers, permeation enhancement polymers, safety, Chrono table medication, and future avenues of digital health integration and patent landscape post expiration.

**Keywords**: transdermal patch, theophylline, nocturnal asthma, controlled release, chronotherapy.

**PC-753**

**DESIGN & DEVELOPMENT OF FLOATING BILAYERED ANTI-DIABETIC TABLETS USING TRIGONELLA FOENUM AS KEY EXCIPIENT**

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The primary objective of this study is to design and formulate a bilayered floating tablet comprising Glipizide and Metformin hydrochloride, employing fenugreek mucilage to serve dual roles as a super disintegrant and release retardant. This innovative approach aims to enhance the effectiveness of diabetes mellitus treatment. The compatibility of Glipizide, Metformin hydrochloride, and Fenugreek mucilage was confirmed through IR spectral studies. Various bilayered floating tablets were developed, with Glipizide incorporated into the immediate release layer utilizing modified Trigonella as a super disintegrant. The sustained release layer contained Metformin hydrochloride, with Trigonella gum acting as a release rate retardant, using the direct compression method. The physical evaluation of the bilayered floating tablets, encompassing parameters such as weight variation, friability, hardness, swelling index, and drug content, yielded satisfactory results. The release pattern of all formulations adhered to zero-order kinetics, corroborating the Peppas mechanism. Notably, the release profile from fenugreek as a release rate retardant exhibited predominant non-Fickian diffusion ($p>0.5$). Among the formulations, F5 contains an optimized concentration of natural excipient emerged & showed 93.04% Glipizide drug release after 25 minutes and 97.44% Metformin hydrochloride release over 12 hours. Importantly, individual layer assessment in the floating bilayered tablet revealed no significant adverse impact of Metformin hydrochloride on Glipizide, ensuring therapeutic levels to combat elevated blood sugar without inducing toxic effects. In vivo radiographic imaging of rabbit abdomens administered with the selected formulation exhibited a floating lag time of 10 minutes, and a total floating time greater than 10 hours. In conclusion, the development of floating bilayered anti-diabetic tablets incorporating Trigonella Foenum as a key excipient exhibit promising potential for controlled drug release. The bi-layered structure ensures sustained therapeutic effects, while Trigonella Foenum contributes to enhanced drug stability and anti-diabetic properties.

**Keywords**: Floating Bilayered Tablet, Trigonella Foenum, Anti-diabetic, Glipizide, Metformin.

**PC-754**

**THEME: PHARMACEUTICAL TECHNOLOGY**

**DESIGN AND DEVELOPMENT OF BIFONAZOLE-LOADED NANOSPONGES FOR TOPICAL DRUG DELIVERY**

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This research endeavor focuses on the development of sustained-release Bifonazole-loaded nanosponges incorporated topical gel with improved permeability and stability of Bifonazole. Nanosponges were crafted by cross-linking with β-Cyclodextrin to develop porous nanosized structures. The drug was integrated using a solvent evaporation method, employing solvents such as ethanol, acetone, and chloroform. The choice of solvent during the drug loading process significantly influenced the encapsulation efficiency of the nanosponges. The encapsulation


ISBN: 978-81-980623-8-3

efficiency of the drug-loaded nanosponge was increased with crosslinking ratios. The formulation with a 1:1 ratio of β-Cyclodextrin: crosslinking agent, chloroform as the solvent, and Carbopol as the gelling agent showed better results based on drug encapsulation efficiency, drug content, and sustained release characteristics. The drug release from all the formulations exhibited zero-order release kinetics, and the mechanism of drug release followed the Peppas model. The diffusion exponential coefficient (n) values, ranging from 0.9402 to 1.1864, indicated a non-fickian diffusion mechanism. The optimized Bifonazole-loaded nanosponge gel offered sustained topical delivery with improved solubility, permeability, and stability. In conclusion, the design and development of bifonazole-loaded nanosponges present a promising approach for enhancing topical drug delivery. The nanosponge formulation offers advantages such as improved stability, controlled release, and enhanced skin penetration. These characteristics contribute to the potential efficacy and safety of bifonazole in treating various dermatological conditions.

**Keywords**: Bifonazole, Nanosponge, Topical Drug Delivery, β-Cyclodextrin.

**PC-755**

## FORMULATION AND EVALUATION OF COLON TARGETED DRUG DELIVERY SYSTEMS.

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The present study ained to develop and evaluate colon-targeted drug delivery systems of Nitrofurantoin using guar gum as a natural polysaccharide carrier. Matrix tablets were formulated by wet granulation method with starch paste as a binder, incorporating varying proportions of guar gum. In-vitro drug release studies were conducted at 37 ± 0.5 'C under sequential conditions simulating gastrointestinal transit:0.1 N HCl (2 h), phosphate buffer pH 7.4 (3 h), and simulated colonic fluid pH 6.8 containing 4% w/v rat caecal content (10 h). Results revealed that the formulation containing 20% guar gum (F4) released only 10.04% of Nitrofurantoin in the upper gastrointestinal conditions, compared to 20-30% drug release from other formulations. In simulated colonic fluid, F4 exhibitednearly complete drug release (~100%). These findings indicate that guar gum- based matrix tablets, particularly with 20%concentration, are cffective in minimizing premature release and achieving site-specific delivery of Nitrofurantoin to the colon, offering potential therapeutic benefits in colonic infections.

**Keywords**: Colon targeted drug delivery, Nitrofurantoin, Guar gum, Matrix tablets, Wet granulation, Rat caecal content, In-vitro release.

**PC-756**

## NANO-EMULSION APPROACH TO ENHANCE SKIN HYDRATION FORMULATION AND EVALUATION OF A HYALURONIC ACID MOISTURIZING CREAM

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The present study focuses on the formulation and evaluation of a nanoemulsion-based moisturizing cream containing hyaluronic acid, a naturally occurring biopolymer known for its excellent water retention and skin hydration properties. Nanoemulsion systems offer enhanced stability, improved drug penetration, and a non-greasy aesthetic compared to conventional emulsions, making them highly suitable for topical cosmetic applications. The nanoemulsion was prepared using an oil-in-water (O/W) system, employing suitable oils, surfactants (such as Tween 80), and co-surfactants to achieve droplet sizes in the nanometer range. Hyaluronic acid was incorporated as the active moisturizing agent due to its biocompatibility and hygroscopic nature. The formulation was converted into a cream base by adding a suitable thickener to improve viscosity and application properties. The prepared nanoemulsion cream was evaluated for various parameters, including physical appearance, pH, viscosity, spreadability, droplet size, zeta potential, drug content, and in vitro drug release. The formulation showed desirable pH (5.1 to 6.7), smooth texture, and nano-sized droplets (103–110 nm), with sustained drug release up to 8 hours. No signs of phase separation or degradation were observed during stability studies. The results indicate that the nanoemulsion-based cream is a stable, effective, and cosmetically acceptable formulation for prolonged skin hydration. It holds significant potential for commercial cosmetic and dermatological applications in moisturizing and anti-aging products.

**Keywords**: Hyaluronic acid, oil, surfactants, Co-surfactants, Nanoemulsion, Moisturizing
cream, In vitro drug release studies

**PC-757**

## "DEVELOPMENT AND EVALUATION OF ANTIHYPERTENSIVE MOUTH-DISSOLVING TABLETS USING NOVEL CO-PROCESSED EXCIPIENTS"

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Hypertension requires immediate attention and therapy. The drug should get immediately disintegrated, dissolved and absorbed. Therefore, it is necessary to provide dosage regime which will anticipate effect.[1] Co-processing involves combining two or more excipients to create a single entity that exhibits superior functionality compared to the individual components. For preparation of co-processed excipients starches like barley starch, maize starch, Xylitol starch etc. can be used. Incorporating this natural starch into co-processed excipients blends can enhance critical tablet properties such as flowability, compressibility, and disintegration time. This is particularly beneficial in the formulation of MDTs, where rapid disintegration is essential for quick onset of action and improved bioavailability. This research aims to develop a co-processed excipients blend using barley starch to formulate MDTs for antihypertensive drugs, addressing the challenges of rapid disintegration, taste masking, mechanical strength, moisture sensitivity, and poor API solubility. The outcome of this study could provide a novel approach to enhance patient compliance and therapeutic efficacy in the management of hypertension. [4] This research is significant as it explores the potential of barley starch, a natural and biocompatible excipient, in enhancing the formulation of MDTs for antihypertensive drugs. The findings could lead to the development of more patient-friendly dosage forms, ultimately improving therapeutic outcomes and patient adherence to treatment regimens.

**Keywords**: Mouth dissolving tablet, Hypertension, Antihypertensive activity, Co-processing process.

**PC-758**

## DEVELOPMENT AND EVALUATION OF A DNA-APTAMER-BASED NANOPARTICLE TARGETING HER2 BIOMARKERS IN BREAST CANCER: FORMULATION, CHARACTERIZATION, AND IN VITRO EVALUATION

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Particularly breast cancer, poses significant therapeutic challenges due to tumor challenges in targeted drug delivery contributing to treatment inefficacy and systemic toxicity. This study introduces a novel biomarker-targeted polymeric nanoparticle (NP)formulation for doxorubicin (DOX) delivery, specifically designed to exploit HER2 overexpression in breast cancer cells. The NPs were prepared using a modified nanoprecipitation method, incorporating poly (lactic-co-glycolic acid) (PLGA) as the polymer matrix and anti-HER2 antibodies for surface functionalization to enable active targeting. In vitro evaluation included physicochemical characterization, drug release kinetics, cellular uptake studies, and cytotoxicity assays on HER2-positive (SK-BR-3) and HER2-negative (MDA-MB-231) cell lines. In vivo assessments were conducted in xenograft mouse models to evaluate biodistribution, antitumor efficacy, and toxicity. Results demonstrated that the targeted NPs exhibited a mean particle size of 150 nm, encapsulation efficiency of 85%, and sustained DOX release over 72 hours. Enhanced cellular uptake and cytotoxicity were observed in HER2-positive cells, with a 2.5-fold reduction in IC50 compared to free DOX. In vivo, the formulation achieved 60% tumor volume reduction with minimal cardiotoxicity. These findings suggest that biomarker-targeted NPs offer a promising platform for precision oncology, improving therapeutic outcomes while mitigating off-target effects. This interdisciplinary approach from pharmaceutics and oncology highlights the potential for clinical translation in targeted cancer therapy.




ISBN: 978-81-980623-8-3

**Keywords**: Polymeric nanoparticles, HER2 biomarker, Doxorubicin, Targeted drug delivery, Breast cancer.

**PC-759**

**NATURAL MACROMOLECULES POLYSACCHARIDE-BASED DRUG DELIVERY SYSTEMS TARGETING TUMOR NECROSIS FACTOR ALPHA RECEPTOR FOR THE TREATMENT OF CANCER**

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Cancer is one of the most significant abnormalities in medical sciences for which a new and efficient therapeutic intervention is desired. Targeting the tumor necrosis factor-alpha receptor appears to have a critical role in both cancer development and immune modality. In this review, an attempt is made to review the potential and av enues of natural macromolecules that have augmented drug delivery systems for specific targeting of the tumor necrosis factor-alpha receptor in cancer therapy. Biological macromolecules, derived from biocompatible and biodegradable sources such as lipids, polysaccharides of natural origin, such as chitosan, hyaluronic acid, algi nate, pectin, dextran, starch, cellulose, agar, carrageenan, guar gum, chondroitin sulfate, pullulan, and konjac glucomannan, have been immensely utilized in drug delivery systems for its negligible toxicity mucoadhesive properties, ability to enhance drug stability, and controlled release capabilities. Various novel drug delivery approaches are discussed in detail, including those using polysaccharides, lipids, chitosan, proteins, polymers, dendrimers, exosomes, hydrogels, albumin nanoparticles, silk nanoparticles, and cyclodextrin nanoparticles, incorporating cutting-edge engineering techniques for encapsulation of chemotherapeutic, immunomodulatory, and gene-silencing drugs for site-specific delivery at a site of a tumor. Such macromolecules can mitigate toxicity and even bypass multidrug resistance through their intrinsic property, ligand functionalization for targetability towards receptors. In the present review, an attempt is made to present an outlook for the role of natural macromolecules is being a breakthrough intervention in interfering with tumor necrosis factor-alpha receptor- dependent processes in cancer and a new direction in developing efficient, non-toxic, and personalized therapies for anti-cancer activities.

**Keywords**: TNF-alpha Natural nanocarriers Drug delivery Polysaccharides Cancer immunotherapy

**PC-760**

**"STATIN AND CYP3A4 INHIBITOR INTERACTION LEADING TO RHABDOMYOLYSIS IN HYPERLIPIDEMIC PATIENTS"- A CASE STUDY**

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Statins, widely prescribed for hyperlipidemia and cardiovascular disease, are generally well-tolerated but can cause severe adverse effects when combined with CYP3A4 inhibitors (Clarithromycin / Ketoconazole) such as clarithromycin or ketoconazole. This case study investigated the effects of co-administration of statins (atorvastatin or simvastatin) with CYP3A4 inhibitors in 25 patients aged 40–65 years over a 3-month period. Serum creatine kinase (CK) levels, liver function, and renal parameters, as well as clinical signs of muscle toxicity, were closely monitored in each patient. During the study period, several patients developed symptoms including muscle pain, weakness, and dark urine. Laboratory assessments revealed significantly elevated CK levels, consistent with rhabdomyolysis, in a subset of patients. The interaction is primarily due to inhibition of CYP3A4, which reduces statin metabolism and causes accumulation and an increased risk of myotoxicity. Management included immediate discontinuation of the offending CYP3A4 inhibitor, temporary suspension or dose reduction of the statin, aggressive hydration, and supportive care to prevent renal complications. Up until normalization, CK and renal function were closely monitored. This case series highlights the critical importance of vigilant monitoring when prescribing statins alongside CYP3A4 inhibitors, particularly in middle-aged and older adults. Preventing serious outcomes, such as acute renal failure, requires prompt intervention, prompt recognition of myopathy symptoms, and awareness of potential drug–drug interactions.

**Keywords**: Statins, CYP3A4 inhibitors, Rhabdomyolysis, Hyperlipidemia, Drug–Drug Interaction, Creatine Kinase

**PC-761**

**ENHANCED DISSOLUTION AND CONTROLLED RELEASE OF MEFANAMIC ACID THROUGH β-CYCLODEXTRIN NANOSPONGES: A QBD BASED STUDY**

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Mefenamic acid (MFA), a nonsteroidal anti-inflammatory drug (NSAID), exhibits potent analgesic and anti-inflammatory effects but is limited by poor aqueous solubility and low oral bioavailability, resulting in variable therapeutic efficacy and gastrointestinal adverse effects. To overcome these challenges, β-cyclodextrin (β-CD)–based nanosponges were developed as a novel carrier system for MFA. Blank nanosponges were synthesized via the melt method using diphenyl carbonate as a crosslinker and optimized employing a Central Composite Design (CCD). MFA was subsequently loaded into the optimized nanosponges through a freeze-drying technique. The formulations were characterized for physicochemical and structural properties using Fourier-transform infrared spectroscopy (FTIR), differential scanning calorimetry (DSC), powder X-ray diffraction (PXRD), transmission electron microscopy (TEM), particle size analysis, and zeta potential measurement. The optimized MFA-loaded nanosponges exhibited spherical morphology, nanoscale particle size, high entrapment efficiency, and enhanced amorphous dispersion of the drug. In vitro dissolution studies demonstrated markedly improved solubility and a sustained drug release profile extending up to 12 hours, with release kinetics following a first-order model. The optimized formulation was successfully encapsulated into hard gelatin capsules, which complied with all pharmacopoeial quality standards. Accelerated stability studies confirmed the formulation's robustness with no significant changes in drug content, particle size, or release characteristics. These findings highlight β-CD nanosponges as a promising strategy to enhance the solubility, stability, and controlled release of poorly water-soluble drugs such as MFA.

**Keywords**: Mefenamic acid, β-cyclodextrin, nanosponges, solubility enhancement, sustained release, Central Composite Design, freeze-drying, oral drug delivery.

**PC-762**

**TAILORING MULTIFUNCTIONAL NANOCUBOSOME TOPICAL SPRAYS FOR INTEGRATED SUNSCREEN, ANTI-AGING, AND MOISTURIZING EFFECTS**

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Modern cosmeceutical development emphasizes multifunctional systems capable of simultaneously providing photoprotection, anti-aging, and hydration. Conventional topical products often suffer from poor stability, limited penetration, and lack of sustained effects. Nanocubosomes, owing to their bicontinuous lipid–water architecture and high encapsulation capacity, offer a promising platform to overcome these challenges. The present study focused on tailoring multifunctional nanocubosome sprays designed to integrate sunscreen, anti-aging, and moisturizing effects within a single formulation. Nanocubosomes were prepared using glycerol monooleate and Poloxamer F127 via high-shear homogenization and loaded with UV filters (avobenzone, titanium dioxide nanoparticles), antioxidants (α-tocopheryl acetate, resveratrol), and moisturizers (hyaluronic acid, ceramides). The formulations were evaluated for particle size, polydispersity index, zeta potential, entrapment efficiency, spray characteristics, and stability. Functional assessments included in vitro UV absorption, antioxidant potential (DPPH assay), skin hydration (TEWL and corneometry), and ex vivo dermal permeation. Optimized sprays displayed a particle size below 200 nm with narrow distribution (PDI <0.25) and high entrapment of both hydrophilic and lipophilic actives. The multifunctional nanocubosomes exhibited broad-spectrum UVA/UVB absorption (SPF ~40), 2.5-fold




ISBN: 978-81-980623-8-3

higher antioxidant activity compared with free actives, and a 45% reduction in transepidermal water loss indicating improved hydration. Ex vivo permeation studies confirmed enhanced dermal deposition of antioxidants and moisturizers relative to conventional emulsions. Tailored nanocubosome sprays successfully combined photoprotection, anti-aging, and moisturization in one platform. These multifunctional formulations highlight the potential of nanocubosomes as next-generation cosmeceuticals for advanced skin protection and rejuvenation.

**Keywords**: Nanocubosomes, Multifunctional spray, Sunscreen, Anti-aging, Moisturizing.

**PC-763**

## DESIGN AND CHARACTERIZATION OF SPANLASTIC NANOCARRIERS FOR STABILITY ENHANCEMENT AND DERMAL PENETRATION OF VITAMIN E DERIVATIVES

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α-Tocopheryl acetate (TA), a stable esterified derivative of Vitamin E, is widely recognized for its antioxidant and photoprotective properties. However, its clinical efficacy is limited by poor penetration through the stratum corneum. The present study aimed to formulate and evaluate α-Tocopheryl acetate–loaded spanlastics as a novel nanocarrier system to improve stability, dermal penetration, and topical delivery. TA-loaded spanlastics were prepared by the ethanol injection method using Span 60 and Tween 80 in varying ratios. The formulations were characterized for entrapment efficiency (EE%), particle size (PS), polydispersity index (PDI), zeta potential, deformability index (DI), and in vitro release profile. The optimized formulation was further assessed for ex vivo skin permeation and deposition using excised rat skin compared with a plain TA solution. The optimized TA-spanlastic formulation demonstrated high EE% (~85% w/w), nanoscale particle size (<200 nm, PDI < 0.3), and excellent deformability (DI ~10). A sustained release profile was observed, with significant enhancement in skin permeation and dermal deposition compared to the plain drug solution. Stability testing confirmed good physical and chemical stability of the formulation for up to 6 months. α-Tocopheryl acetate–loaded spanlastics enhanced topical stability, controlled release, and dermal penetration of Vitamin E acetate. This nanocarrier system shows strong potential as a cosmeceutical formulation for protecting skin against oxidative stress and UV-induced photodamage.

**Keywords**: α-Tocopheryl acetate, Vitamin E derivative, spanlastics, topical delivery, skin permeation, photoprotection, stability.

**PC-764**

## OPTIMIZATION OF OPHTHALMIC NANOFORMULATION OF PIROXICAM USING QBD APPROACH

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In the current research, ophthalmic nanoformulation of Piroxicam was prepared and optimized by Quality by Design (QbD). The objective behind the research was to formulate nanoparticles based eye drop and to evaluate them for various parameters like particle size, zeta potential, entrapment efficiency, assay, percentage yield and drug release and sterility testing. The nanoparticles were prepared by emulsion solvent diffusion method using 32 factorial design. Speed of rotation (RPM) and ethyl cellulose concentration are having impact on particle size of nanoparticles and entrapment efficiency. It was found that as the speed of rotation increases, the particle size of nanoparticles gets decreased and as the concentration of ethyl cellulose increased particle size of nanoparticles was found to be decreased. As the speed of rotation increases the entrapment efficiency of nanoparticles get increased and as the concentration of ethyl cellulose increases entrapment efficiency of nanoparticles also get increases.On the basis of data obtained from evaluation of batches as well as factorial design model study, batch B3 was selected as optimized batch which was having low particle size and good entrapment efficiency.

**Keywords**: Piroxicam, ophthalmic nanoformulation, quality by design, eye drop, ethyl cellulose.

**PC-765**

## DESIGN AND EVALUATION OF IRBESARTAN FAST DISSOLVING TABLETS BY USING JACK FRUIT SEED STARCH AS NATURAL SUPERDISINTEGRANT

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In the present investigation an attempt was made to isolate starch from jack fruit seed powder and utilizing the same as excipient to design of fast dissolving tablets Irbesartan. Starch was isolated from jack fruit seeds by aqueous and alkali extraction process. The physicochemical and phytochemical tests confirmed the presence of only carbohydrates and polysaccharides in the extracts. Acute toxicity studies for the extract indicated that all the rats were healthy with no physiological changes in their behavior. The fast-dissolving tablets were prepared by wet granulation technique by using isopropyl alcohol as granulating fluid. All the tablet formulations were found to be stable and meeting I.P specified limits for post compression parameters. In vitro dissolution studies were carried out in 0.1N HCl by using USP apparatus II (paddle method). The dissolution rate of formulations F5 and F8 containing 5%w/w of alkali extracted starch and 5 % w/w of croscaramellose sodium showed faster disintegration and improved dissolution rate than compared to marketed and other formulations. Majority of the formulations displayed first order release kinetics and were found to be linear with R2 values in the range of 0.946-0.993. FTIR and DSC analysis revealed that there were no major interactions between the drug and the excipients used in the tablets. SEM analysis was done to study the surface morphological characteristics of starch extract and drug which indicated that there were no physical and chemical interactions during tabletting process. Accelerated stability studies indicated that the formulations were stable.

**Keywords**: Irbesartan, fast dissolving tablets, Jack fruit seed starch, Croscarmellose sodium.

**PC-766**

## FORMULATION AND EVALUATION OF ANTI-ULCER HERBAL GEL FROM CLUSTER FIG (FICUS RACEMOSA)

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Cluster fig (Ficus racemosa), a plant known for its wide array of medicinal benefits, has shown promising potential in the treatment of mouth ulcers. The bioactive compounds found in its fruits, leaves, and bark, including flavonoids, tannins, and phenolic compounds, contribute to its therapeutic properties. Research suggests that Ficus racemosa possesses anti-inflammatory, antimicrobial, and antioxidant effects, which play a significant role in alleviating mouth ulcers. The plant's ability to reduce inflammation and promote tissue healing helps in accelerating the recovery of the mucosal lining in the oral cavity. Additionally, its antimicrobial properties help combat secondary infections that may exacerbate ulcer conditions. These findings support the potential use of Ficus racemosa as a natural remedy for preventing and managing mouth ulcers, although further clinical trials are needed to confirm its effectiveness and determine optimal usage. This study concludes that the Cluster fig anti-ulcer gel presents a promising natural alternative for ulcer management, offering enhanced bioavailability, patient compliance, and reduced adverse effects compared to conventional therapies.

**Keywords**: Cluster fig (Ficus racemosa), Mouth ulcers, Tannins, Phenolic compounds, Anti-inflammatory.

**PC-767**

## FORMULATION DEVELOPMENT AND EVOLUTION OF SOAP BY USING GOAT MILK.

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In the current situation, growing health consciousness has increased demand for nutraceutical Foods, which offer health advantages over just




ISBN: 978-81-980623-8-3

meeting basic nutritional needs. Goat milk has been increasingly popular recently due to its beneficial nutritional and Medicinal properties. values that help the host's physiology and general health. Numerous Useful components, including fat, protein, lactose, vitamins, enzymes, and mineral salts, are Present in goat milk. Goat milk's unique lipid and protein molecule structures improve its absorption, digestibility, And bioavailability in the human stomach. Furthermore, because of a number of bioactive Ingredients, including medium chain fatty acids, polyamines, free amino acids, Oligosaccharides, and trace minerals, which affect how the body processes and reacts to Absorbed nutrients, it also displays a variety of biological activities.. Goat milk is currently Advised as the best alternative to cow and human milk for human infants because of its Compositional similarity to human milk and lower frequency of allergic reactions. Moreover It is regarded as an essential component of premium dairy products and baby formulas.

**Keywords**: therapeutic value, nutritional benefits, goat milk, and bioactive compounds.

**PC-768**

**DESIGN AND DEVELOPMENT OF DUAL EUDRAGIT BASED POLYMERIC MICROSPHERES FOR CONTROLLED DRUG DELIVERY OF MEBEVERINE HCL**

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In the current study, formulation and evaluation of Mebeverine Hydrochloride microspheres are done through a mixture of Eudragit L100 and Eudragit RS100 polymers, by the solvent evaporation technique. The microspheres were prepared by giving different ratios of the drug to polymer; 1:1 to 1:5, to determine the influence of the concentration of the polymer on the drug entrapment, release characteristics and the physical characteristics of the microspheres. Eudragit L100 is pH-sensitive, which facilitates release in intestinal environments, whereas RS100 remains released by its pH-independent permeable shell. The commendation of 1:1 (L100:RS100) ratio of the 1: 3 (drug:polymer) proportion seemed to exhibit the finest results in terms of entrapment efficiency, controlled drug release, and stability of microsphere. An example of a long term pharmacological intervention is the Irritable Bowel Syndrome (IBS) which is a chronic gastrointestinal disorder characterized by abdominal pain, changes of bowel habits, and a visceral hypersensitivity. FTIR of the optimized formulation showed that there was no interaction between the polymers and the drug and thus it was stable. Differential Scanning Calorimetry (DSC) showed encapsulation of the drug by change in melting endotherm. In-vitro release experiments showed that the 1:1 drug to polymer ratio emitted the 97% of drug which increases to persistent but incomplete release by higher ratios (1:4 and 1:5) owing to increased matrix density. In this way, the dual Eudragit system offers a pH-responsive, synergistic delivery of Mebeverine HCl, with high opportunities in the IBS management.

**Keywords**: Mebeverine HCl, Eudragit L100, Eudragit RS100, Microspheres.

**PC-769**

**DEVELOPMENT OF TICAGRELOR SOLID DISPERSIONS USING ENTADA SCANDENS SEED STARCH BY MODIFIED SOLVENT EVAPORATION METHOD**

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The current research aims to enhance the bioavailability of Ticagrelor, a BCS class 4 drug, by using Entada scandens seed starch as a superdisintegrant. Ticagrelor is an agent that is indicated for prevention of stroke and heart attack. Starches from plants are used as binders, diluents, disintegrants, and lubricants. Starches were extracted from Entada scandens seed powder using the alkali method (sodium hydroxide at 0.1%, 0.25%, and 0.5% concentrations) and distilled water. The starch prepared from 0.5% sodium hydroxide (ESS4) showed the best physicochemical properties. Solid dispersions were prepared using ticagrelor, Croscarmellose sodium, and starch in various concentrations using solvent evaporation and modified solvent evaporation techniques. In vitro dissolution studies showed that the solid dispersion formulation TF10 containing ticagrelor and Entada scandens seed starch in a 1:5 ratio along with 15% w/w of alkali extracted starch showed faster disintegration and an enhanced dissolution rate than the solid dispersions prepared alone with Croscarmellose sodium. FTIR and DSC studies revealed no major interactions between the drug and excipients. X-Ray Diffraction and SEM studies revealed the crystalline and amorphous nature of the formulations. The study concluded that Entada scandens seed starch possesses superdisintegrant properties, indicating its usage in preparation of novel fast disintegrating formulations.

**Keywords**: Entada scandens, Solid dispersions, Ticagrelor, Croscarmellose sodium, modified solvent evaporation method.

**PC-770**

**MCC ADSORBED SOLID SOLUTIONS OF EZETIMIBE FOR ENHANCED BIOAVAILABILITY**

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The objective of this study is to prepare solid solutions of ezetimibe (EZT) followed by developing into orodispersible tablets (ODTs) to enhance the oral bioavailability. Solid solutions were prepared by fusion technique. Influences of three different formulation parameters viz. type of carrier, amount of carrier and amount of adsorbent on the solubility and dissolution rate of EZT from the solid solutions was investigated through design of experiments. Optimization of these formulation factors was done by desirability functions approach using Design Expert software. The ODTs from the optimized solid solutions were prepared by direct compression. Compatibility of EZT with the selected excipients was established by infrared spectroscopy. Solid solutions were characterized by differential scanning calorimetry, micromeritic analysis, solubility analysis & dissolution studies. The solubility and dissolution rate of solid solutions were found to be significantly ($p < 0.05$) influenced by selected formulation factors. Optimized solid solutions exhibited a solubility of 1.53 mg/mL against the solubility of pure EZT of 0.1 mg/mL. The best formulation of the ODTs exhibited a disintegration time of 18 sec. and 98% of drug dissolved within 10 min. These results demonstrated that solubility and dissolution of EZT can be enhanced by formulating it in the form of amorphous solid solutions followed by ODTs. These improved characteristics could help in enhancing oral bioavailability of EZT.

**Keywords**: Ezetimibe, Solid solutions, Fusion technique, Orodispersible tablets, Bioavailability

**PC-771**

**FORMULATION AND EVALUATION OF HERBAL SHAMPOO FOR ANTI-DANDRUFF TREATMENT**

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Shampoos are among the most widely used cosmetic preparations for cleaning and maintaining scalp and hair health. While synthetic shampoos are effective, their chemical ingredients and preservatives may cause irritation and long-term side effects. To address these concerns, the present study focused on the formulation and evaluation of a polyherbal shampoo using extracts of Psidium guajava, Phyllanthus emblica, Hibiscus rosa-sinensis, Sapindus mukorossi, and Aloe barbadensis. These herbs were selected for their well-established cleansing, conditioning, antioxidant, and antifungal properties. The extracts were combined with natural additives including gum tragacanth, tea tree oil, lemon juice, glycerin, and lavender oil to produce herbal shampoo. The prepared shampoos were evaluated through a series of physicochemical and performance parameters. Tests included pH determination, percentage of solid content, viscosity measurements, foam stability, cleansing action, dirt dispersion, and antifungal activity. The results confirmed that the formulations maintained an acidic pH within the optimal range for scalp health, possessed acceptable solid content, and stable foaming ability. The cleansing action was satisfactory, with the shampoos effectively




ISBN: 978-81-980623-8-3

removing grease and dirt without leaving residues. Dirt dispersion tests indicated that impurities remained in the water than in the foam, ensuring better rinsing properties. The antifungal studies by agar well diffusion method demonstrated inhibition of fungal growth, confirming the potential of the formulation to manage dandruff and related scalp conditions. Overall, the study highlights that polyherbal shampoos can provide an effective, safe, and eco-friendly alternative to synthetic products by combining cleansing and therapeutic benefits, promise hair and scalp hygiene, nourishment and protection.

**Keywords**: Polyherbal shampoo, Psidium guajava, Phyllanthus emblica, Antifungal activity, scalp health.

**PC-772**

**FORMULATION AND IN VITRO CHARACTERIZATION OF FLEXOSOMES FOR OCULAR DRUG DELIVERY SYSTEMS**

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Flexosomes, a novel class of flexible, edge-activated liposomes, have emerged as promising nanocarriers for ocular drug delivery due to their enhanced deformability and ability to penetrate the corneal barrier. This study presents the formulation and comprehensive in vitro characterization of drug-free flexosomes intended for ocular applications. Flexosomes were prepared using the ethanol injection method by optimizing key formulation variables, including phospholipid concentration, type and amount of edge activators, and hydration volume. The resulting vesicles exhibited a nanosized particle distribution (approximately 150–250 nm) with a narrow polydispersity index, indicating uniform size. Zeta potential measurements revealed sufficient surface charge (±30 mV) for colloidal stability. Transmission electron microscopy confirmed spherical morphology with intact vesicular structure. The deformability of the vesicles was demonstrated through extrusion assays, highlighting their enhanced flexibility compared to conventional liposomes. Stability studies over 30 days showed minimal changes in size and zeta potential, indicating good physical stability. These findings suggest that drug-free flexosomes possess desirable physicochemical properties, making them suitable candidates as ocular drug delivery vehicles for subsequent drug loading and therapeutic applications.

**Keywords**: Flexosomes, drug loading, Zeta potential, Ocular DDS

**PC-773**

**DESIGN AND DEVELOPMENT OF NOVEL BILAYERED MUCOADHESIVE PATCH OF ENALAPRIL MALEATE**

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Hypertension, being a recurring medical condition, needs convenient and effective treatment. In the present study, we focused on designing a new bilayered mucoadhesive patch of enalapril maleate for the management of hypertension. The bilayered film consist of one drug loaded mucoadhesive layer of hydroxypropyl methylcellulose K100 and other backing membrane layer of ethyl cellulose to facilitate sustained drug release pattern. Three different formulations (F1-F3) designed by solvent casting technique were evaluated for their mucoadhesive properties, drug release characteristics, and mechanical strength. The patches were also characterized physicochemical in terms of their thickness, weight, and surface morphology. The mucoadhesion time for drug delivery patch F1 containing hydroxypropyl methylcellulose K100 achieved about 150 minutes with a maximum value, thus securing prolonged residence at the site of application for the drug. The drug exhibited sustained release from patch F1 over 7 hours with the release rate depending upon the polymer employed. The optimized patch possessed suitable mechanical strength, flexibility, and adhesive characteristics. In summary, it is concluded that the developed novel bilayered mucoadhesive patch of Enalapril maleate illustrates a viable strategy and promising approach for the management of hypertension.

**Keywords**: Enalapril maleate, bilayered patch, mucoadhesion, hypertension

**PC-774**

**BUCCAL MUCOADHESIVE TABLETS OF DOMPERIDONE MALEATE: A FORMULATION APPROACH**

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The present study aimed to develop and evaluate a mucoadhesive dosage form of Domperidone maleate, a synthetic benzimidazole compound that acts as a dopamine D2 receptor antagonist with antiemetic activity. Mucoadhesive tablets were prepared using the direct compression method. Among all formulation batches, F3 (containing Carbopol 940 and sodium alginate) demonstrated the best performance, exhibiting a consistent drug release over 7 hours with an extent of 94.44%. Graphical analysis of F3 using Higuchi's model indicated that drug release was diffusion-mediated. In vitro permeability studies of F3 over 7 hours showed 76.69% drug release. FTIR analysis confirmed the absence of any interaction between the drug and polymers.

**Keywords**: Domperidone maleate, Mucoadhesive tablet, antiemetic

**PC-775**

**DEVELOPMENT AND CHARACTERIZATION OF NOVEL PRASUGREL-LOADED NANOSPONGE FORMULATIONS**

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The present study aimed to develop and characterize Prasugrel-loaded nanosponges to enhance solubility, encapsulation efficiency, and stability of the drug, thereby improving its potential bioavailability. Four different formulations (F1–F4) of nanosponges were prepared using varying proportions of β-cyclodextrin and ethyl cellulose, with dichloromethane serving as the cross-linking agent. The formulations were evaluated for drug loading efficiency, particle size distribution, polydispersity index (PDI), surface morphology (SEM), drug-polymer interaction (FTIR), and physical state (DSC and XRD analyses). Formulation F4 exhibited the highest drug loading efficiency (39.74%) due to an optimal polymer-to-drug ratio and controlled cross-linking, whereas F2 showed the lowest efficiency (16.87%) due to excessive cross-linking hindering drug entrapment. Particle size analysis revealed F4 had the smallest and most uniform particles (267.9 nm; PDI 0.263), indicating superior nanosponge formation. SEM analysis confirmed smooth, spherical nanosponges with evenly distributed pores in F3. FTIR spectra validated successful drug encapsulation through evident molecular interactions. DSC and XRD analyses showed a complete transition of Prasugrel from crystalline to amorphous form in F4, suggesting improved solubility and encapsulation efficiency compared to other batches. The optimized formulation F4 demonstrated effective encapsulation, enhanced solubility, and stable nanosponge characteristics, making it a promising nanocarrier system for the delivery of poorly water-soluble drugs like Prasugrel. This study underscores the potential of nanosponges in enabling sustained and controlled release of hydrophobic drugs.

**Keywords**: Prasugrel, Nanosponges, Formulation, Characterization, Development, β-cyclodextrin.

**PC-776**

**FORMULATION AND EVALUATION OF HERBAL MOUTH DISSOLVING FILM OF TULSI EXTRACT**

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Mouth dissolving films (MDFs) have emerged as an advanced dosage form that provides rapid disintegration, improved patient compliance, and convenience of administration without the need for water. In the present work, an attempt has been made to formulate and evaluate a




ISBN: 978-81-980623-8-3

herbal mouth dissolving film of Tulsi (Ocimum sanctum) extract, a well-known medicinal plant possessing antimicrobial, antioxidant, and immunomodulatory properties. The films were prepared by solvent casting method using polyvinyl alcohol (PVA) as a film-forming polymer and glycerol as a plasticizer. Different concentrations of Tulsi extract were incorporated into the polymeric solution to optimize drug loading. The prepared films were evaluated for various physicochemical parameters such as thickness, folding endurance, surface pH, drug content uniformity, disintegration time, and in vitro dissolution profile. Preliminary results indicated that the films were uniform, flexible, and transparent with satisfactory mechanical strength. The disintegration time was found to be within 30–45 seconds, ensuring quick release of the active phytoconstituents. In vitro dissolution studies revealed more than 85% release of active constituents within 10 minutes, confirming the suitability of the formulation for rapid therapeutic action.

The study concludes that herbal mouth dissolving films of Tulsi extract can serve as a promising alternative dosage form for rapid relief in oral infections and as a natural immunomodulatory supplement.

**Keywords**: Mouth dissolving film, Tulsi extract, Ocimum sanctum, herbal formulation, solvent casting method.

**PC-777**

## FORMULATION AND IN-VITRO CHARACTERIZATION OF ABACAVIR SULPHATE EFFERVESCENT FLOATING TABLETS

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After oral administration of Abacavir, rapid absorption occurs from upper part of gastro intestinal tract with peak concentrations occurring at 0.63 - 1 hr after dosing.Conventional drug therapy with tablets produce relatively rapid and high peak blood levels that requires frequent administration to maintain effective range of plasma drug levels. Thisconventional therapy leads to reduced effectiveness with poor therapeutic management. To overcome the inadequacy of conventional therapy with tablets, floating sustained release.Abacavir tablets were developed. Floating sustained release Abacavir Sulphate tablets were prepared by using direct compression method. Tablet were formulated using Ethyl Cellulose with hydrocolloids like Hydroxypropyl Methylcellulose (HPMC K4M) and Carbopol 974P as release retarding polymers, Sodium bicarbonate (NaHCO3) and Citric acid as effervescent agents. Tablets were then evaluated for various physical parameters including hardness, thickness, weight variation, friability, drug content, in-vitro buoyancy, Swelling index and In-vitro gastro retentive drug release were conducted. Drug and excipient compatibility studies show that they are compatible with each other. The optimized formulation (F9) shows the hardness of 5.7kg/cm2, tablet thickness of 2.74mm, 0.45% of friability, in-vitro buoyancy was up to 6 hours and % drug release was 90.56% in 6 hours. Drug release kinetics was found to follow non-fickian diffusion.Hence, F9 is considered as optimizedformulation based on in-vitro buoyancy and % drug release.

**Keywords**: Abacavir sulphate; Carbopol 974P; HPMC K4M; Ethyl cellulose; Effervescent floating tablets.

**PC-778**

## DEVELOPMENT OF NANOEMULGEL OF 5-FLUOROURACIL FOR SKIN MELANOMA USING GLYCYRRHIZIN AS A PENETRATION ENHANCER

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The purpose of this study was to enhance the topical delivery of 5-Fluorouracil (5-FU), a cancer treatment, by developing a nanoemulgel formulation. Glycyrrhizin (GLY), a natural penetration enhancer has been investigated to exhibit synergistic effects with 5-FU in inhibiting melanoma cell proliferation and inducing apoptosis, Hence, GLY, along with suitable lipids was utilized to create an optimized nanoemulsion (NE) based gel. Solubility studies and ternary phase diagram revealed isopropyl myristate (IPM), Span 80, Tween 80 as S and Transcutol P as co-surfactant. IPM demonstrates excellent solubilizing properties facilitates higher drug loading, ensuring efficient delivery to the target site.,The optimized formulation consisting of 40 % IPM, 30 % of mixture of Tween80: Span80 (S mix mix ) and 15 % Transcutol P provides with a nanometric size of 64.1 ± 5.13 nm and drug loading of 97.3 ± 5.83 %. The optimized formulation observed with no creaming and breakeing of NE and found thermodynamically stable during different stress conditions (temperatures of 4.0 ◦ thawing ( 21.0 ± 0.50 ◦ C to 20.0 ± 0.50 ◦ C and 45.0 ◦ C) and physical C). The NE was then transformed into a nanoemulgel (NEG) using 1.5 % w/w Carbopol base and 0.1 % w/w glycyrrhizin. The ex vivo permeability studies showed significant en hancements in drug permeability with the GLY-based 5-FU-NEG formulation compared to pure 5-FU gel in excised pig skin upto1440 min in PBS 7.4 as receptor media. The IC 50 values for Plain 5-FU gel, 5-FU-NEG, and GLY-based 5-FU-NEG were found to be 20 µg/mL, 1.1 µg/mL, and 0.1 µg/mL, respectively in B16F10 cell lines. The percentage intracellular uptake of GLY-5-FU-NEG and 5-FU-NEG was found to be 44.3 % and 53.6 %, respectively. GLY-based 5-FU-NEG formulation showed alterations in cell cycle distribution, in compared to 5- FU-NE gel. The overall findings suggest that the GLY-based 5-FU-NEG holds promise for improving anti- melanoma activity.

**Keywords**: 5-FU, Nanoemulsion, Nanoemulsion-based gel, Cytotoxicity, Permeation Solubility, Melanoma, Targeting

**PC-779**

## ULTRASONICALLY ASSISTED ANTISOLVENT PRECIPITATION OF FELBAMATE NANOSUSPENSIONS: A FORMULATION & EVALUATION STUDY

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The Felbamate nanosuspension formulation was prepared by using the anti-solvent precipitation and ultrasonic method. In this work the polymers like HPMC K4M, Poloxamer 188.Polyvinyl alcohol, Polyethylene Glycol 400, as anti-solvent acetone was used. Total eight formulations were prepared by using different composition of the polymers based on the prepared formulations (F1 – F8) were evaluated for Drug content, Solubility determination, In vitro drug release study, ATR-FTIR spectroscopy, Particle size determination and poly dispersity index, and Morphology characterization by scanning electron microscopy. All the formulations were evaluated for drug content which was in the range 90.15 & to 98.95 %. The solubility determination of all formulations in phosphate buffer pH 6.8 was found to be in the range of 0.0156 mg/ml to 0.0375 mg/ml. The results showed that the solubility of formulation was found to be higher in F1 (0.031 mg/ml) compared with other formulations. The solubility of all formulations improved (from insoluble to slightly soluble) compared to pure drug of Felbamate. The in vitro release was carried out for all formulations. The results showed that as the concentration of polymer was increased, the percentage drug release was decreased. Optimized formulations showed 98.69% and 96.49% drug release within 120 minutes, but pure drug released upto 22.46% only. The release rate kinetic data for the best as a F1 formulation showed that the formulation provided good linearity was observed with the zero order (R2 = 0.9), the zero-order kinetics explains the good release of the prepared nanosuspension over the period of 120 minutes. The data were fitted into the Korsmeyer-Peppas equation which showed good linearity and the slope of the Korsmeyer-Peppas plot (n= 0.969) were found to be more than 0.45 indicating the diffusion mechanism is Case II transport.

**Keywords**: Felbamate, dispersity index, solubility, Kinetic studies

**PC-780**

## GASTRO-RETENTIVE FLOATING BILAYER TABLETS: A NOVEL APPROACH FOR CO-DELIVERY OF METFORMIN HYDROCHLORIDE AND OLMESARTAN USING DESIGN OF EXPERIMENTS

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The study aimed to develop gastro-retentive floating bilayer tablets for the co-delivery of Metformin Hydrochloride and Olmesartan using a Design of Experiments (DoE) approach. Metformin was formulated as an extended-release (ER) layer, while Olmesartan constituted the immediate-release (IR) layer. The ER layer contained Hydroxypropyl




ISBN: 978-81-980623-8-3

Methylcellulose (HPMC K100) as the polymer and sodium bicarbonate ($NaHCO_3$) as the gas-generating agent, prepared via wet granulation. The IR layer used crospovidone as a superdisintegrant and $NaHCO_3$ for gas generation, also formulated by wet granulation. The tablets were evaluated for physical and chemical parameters, floating characteristics, drug release, and stability. All formulated tablets passed standard quality control tests. Upon incorporation of the gas-generating agent, the floating lag time was reduced to 3-5 minutes, with a floating duration of over 10 hours. Drug release from the ER layer sustained beyond 8 hours, with Metformin exhibiting zero-order release kinetics, following the Korsmeyer-Peppas model with a super case II transport mechanism. Stability studies over the designated period indicated no significant changes in physical appearance, physicochemical properties, or drug release profiles. The developed bilayer floating tablets demonstrated effective co-delivery of Metformin and Olmesartan with desirable floating and sustained release characteristics, making them a promising strategy for improving therapeutic outcomes in managing conditions like hypertension and diabetes. This study also highlights the importance of a systematic approach to formulation optimization and the evaluation of the dissolution profile.

**Keywords**: Gastro-retentive floating bilayer tablets, Metformin Hydrochloride, Olmesartan, Extended-release (ER), Immediate-release (IR), Design of Experiments (DoE).

**PC-781**

## NANOCRYSTALLIZATION OF LANSOPRAZOLE FOR SOLUBILITY ENHANCEMENT USING A DUAL POLYMER STRATEGY

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This study aims to improve the aqueous solubility and acid stability of lansoprazole, a proton pump inhibitor with poor oral bioavailability due to low solubility and acid sensitivity. Lansoprazole nanocrystals were prepared using the antisolvent precipitation method. The drug was dissolved in ethanol and injected into an aqueous phase containing a stabilizer under high-speed homogenization. Two hydrophilic polymers—polyvinyl pyrrolidone (PVP) and polyvinyl alcohol (PVA)—were tested as stabilizers at drug-to-polymer ratios of 1:1, 1:2, and 1:3. The resulting nanocrystals were characterized for particle size, dissolution behavior, and physicochemical properties using FTIR and DSC analyses. Among all formulations, the PVP-based nanocrystals at a 1:3 ratio showed the best performance, demonstrating smaller and more uniform particles, enhanced dissolution within one hour, and superior physical stability with minimal agglomeration. FTIR results confirmed no chemical interaction between drug and polymer, while DSC analysis indicated partial amorphization, supporting successful nanocrystal formation. Compared to PVA, PVP proved more effective in stabilizing the formulation and improving drug solubility. These results indicate that PVP at a 1:3 ratio is the optimal stabilizer for preparing lansoprazole nanocrystals by the antisolvent method, with potential to significantly enhance the drug's oral bioavailability.

**Keywords**: Lansoprazole, Nanocrystals, Polyvinylpyrrolidone, Polyvinyl alcohol, Antisolvent precipitation.

**PC-782**

## DESIGN AND DEVELOPMENT OF BIFONAZOLE-LOADED NANOSPONGES FOR TOPICAL DRUG DELIVERY

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This research endeavor focuses on the development of sustained-release Bifonazole-loaded nanosponges incorporated topical gel with improved permeability and stability of Bifonazole. Nanosponges were crafted by cross-linking with β-Cyclodextrin to develop porous nanosized structures. The drug was integrated using a solvent evaporation method, employing solvents such as ethanol, acetone, and chloroform. The choice of solvent during the drug loading process significantly influenced the encapsulation efficiency of the nanosponges. The encapsulation efficiency of the drug-loaded nanosponge was increased with crosslinking ratios. The formulation with a 1:1 ratio of β-Cyclodextrin: crosslinking agent, chloroform as the solvent, and Carbopol as the gelling agent showed better results based on drug encapsulation efficiency, drug content, and sustained release characteristics. The drug release from all the formulations exhibited zero-order release kinetics, and the mechanism of drug release followed the Peppas model. The diffusion exponential coefficient (n) values, ranging from 0.9402 to 1.1864, indicated a non-fickian diffusion mechanism. The optimized Bifonazole-loaded nanosponge gel offered sustained topical delivery with improved solubility, permeability, and stability. In conclusion, the design and development of bifonazole-loaded nanosponges present a promising approach for enhancing topical drug delivery. The nanosponge formulation offers advantages such as improved stability, controlled release, and enhanced skin penetration. These characteristics contribute to the potential efficacy and safety of bifonazole in treating various dermatological conditions.

**Keywords**: Bifonazole, Nanosponge, Topical Drug Delivery, β-Cyclodextrin.

**PC-783**

## TAMOXIFEN CITRATE-LOADED LIQUID CRYSTALLINE NANOCARRIERS FOR BREAST CANCER TREATMENT: EXPERIMENTAL AND COMPUTATIONAL APPROACH

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Tamoxifen citrate (TMX), a key therapy for estrogen-receptor-positive breast cancer, suffers from poor solubility, rapid clearance, and systemic toxicity. Advanced drug delivery systems can overcome these issues by enabling targeted delivery, sustained release, and reduced side effects. Loading TMX onto nanocarriers allows safer, more effective treatment of solid tumors, maximizing therapeutic benefit while minimizing toxicity. In the present study, a TMX-encapsulated liquid crystalline nanoparticle was prepared, exhibiting a particle size of 162.3 ± 8.78 nm, a polydispersity index of 0.23 ± 0.03, and a drug encapsulation efficiency of 98.5%. The presence of glycerol monooleate and poloxamer 407 enhanced the drug entrapment by creating a lipid bilayer matrix that holds lipophilic drugs like TMX. Robust intermolecular interactions between TMX and excipients were captured by molecular dynamics simulations using Schrodinger's materials science suite. FTIR, DSC, FE-SEM, and HR-TEM provided detailed insight into the nanoscale morphology and internal ordering of the mesophases. In vitro drug release (at pH 5.5 and 7.4) studies demonstrated a sustained release profile. An in vivo toxicity study was carried out using the genetic model Drosophila melanogaster, confirming that nanoformulation was non-toxic, without influencing survival and motor defects in flies. This study combines computational simulations, nanostructure engineering, and biosafety profiling, demonstrating the quantitative framework for improved delivery of poorly soluble therapeutics.

**Keywords**: Tamoxifen, drug delivery system, liquid crystals, molecular dynamics.

**PC-784**

## QUALITY BY DESIGN (QBD) BASED FORMULATION AND CHARACTERIZATION OF ACARBOSE'S OSMOTIC CONTROLLED RELEASE TABLETS

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The purpose of the study was to develop and optimize controlled porosity osmotic tablets of acarbose using a Quality by Design (QbD) approach. The aim was to overcome limitations of conventional acarbose formulations, such as short half-life, poor bioavailability, and multiple dosing, by designing a sustained release system that could improve therapeutic efficacy, patient compliance, and clinical outcomes in type II diabetes management. Acarbose was identified and characterized by melting point determination, FTIR, and HPLC assay. Granules were prepared by wet granulation and evaluated for pre-compression parameters, including angle of repose, bulk density, tapped density, Carr's index, and Hausner's ratio. A $3^2$ full factorial design was employed using concentration of mannitol and microcrystalline cellulose




ISBN: 978-81-980623-8-3

as independent variables, while hardness and drug release were chosen as responses. Tablets were coated with a semipermeable membrane and evaluated for hardness, friability, weight variation, drug content, swelling index, and in vitro dissolution studies. The optimized formulation was further subjected to stability studies as per ICH guidelines. Pre-formulation results confirmed the purity and compatibility of acarbose with excipients. Granules showed good flow properties, and tablets exhibited acceptable hardness, friability, and content uniformity. The factorial design analysis revealed that both mannitol and microcrystalline cellulose positively influenced hardness and cumulative drug release. The optimized formulation (F3) achieved 70.55% release at 8 h and 97.36% release at 24 h, demonstrating a controlled release profile. Stability studies confirmed reproducibility and robustness of the optimized batch. The study successfully demonstrated the development of acarbose osmotic tablets using a QbD-based factorial design approach. The optimized formulation provided sustained and predictable drug release over 24 hours, which can potentially reduce dosing frequency, enhance glycemic control, and improve patient adherence. Further in vivo and clinical studies are needed to confirm bioavailability and therapeutic benefits.

**Keywords**: Acarbose, controlled porosity osmotic tablets, factorial design, sustained release, Quality by Design, optimization, diabetes mellitus.

**PC-785**

## OPTIMIZATION AND EVALUATION OF TOPICAL GEL CONTAINING SOLID LIPID NANOPARTICLES LOADED WITH CICLOPIRON OLAMINE

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Topical drug delivery has emerged as a promising strategy for the management of superficial fungal infections and various skin diseases. Ciclopirox olamine, a broad-spectrum antifungal agent, is widely used but faces challenges such as limited permeability and inconsistent retention when delivered through conventional dosage forms. To address these drawbacks, solid lipid nanoparticles (SLNs) were formulated and incorporated into a gel base with the objective of enhancing skin penetration, sustaining drug release, and improving therapeutic performance. The nanoparticles were systematically optimized by selecting appropriate lipids, surfactants, and preparation techniques. Characterization parameters including particle size, zeta potential, entrapment efficiency, and morphology confirmed the formation of stable nanosized carriers. The SLN-based gel was further evaluated for its pH, viscosity, spreadability, drug content, and in-vitro release profile. Comparative analysis with a marketed gel demonstrated superior release kinetics and prolonged retention from the developed formulation. Antifungal testing indicated improved activity against fungal strains, highlighting the potential Clinical relevance of the system. Overall, the study suggests that an SLN-incorporated gel of Ciclopirox olamine represents an effective novel topical delivery platform with advantages of Controlled release, enhanced antifungal efficacy, and improved patient compliance.

**Keywords**: Solid lipid nanoparticles, Ciclopirox olamine, Topical gel, Antifungal activity.

**PC-786**

## DEVELOPMENT & CHARACTERIZATION OF NOVEL FILM FORMING SPRAY FOR TOPICAL PSORIASIS THERAPY

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Psoriasis is a chronic autoimmune skin disorder marked by red, scaly, and inflamed lesions that greatly affect a patient's quality of life. Conventional topical treatments, including creams and ointments, often face limitations such as poor spreadability, greasy texture, and inadequate skin adherence, leading to reduced patient compliance. In this research work, an attempt was made to develop a film-forming spray as an alternative topical delivery system for psoriasis management. The formulation was designed using suitable film-forming polymers, plasticizers, and penetration enhancers to ensure ease of application, rapid drying, and the formation of a uniform, flexible film over the affected area. The prepared sprays were systematically evaluated for key parameters including pH, viscosity, spray pattern, drying time, film thickness, folding endurance, drug content, and in-vitro release profile. Skin permeation and retention studies further confirmed the ability of the formulation to deliver the drug locally with sustained action. Stability testing under ICH conditions established the robustness of the optimized spray. Optimization of the formulation was carried out using Design Expert (DoE) 13 software based on preliminary experimental findings. The pH of the optimized formulation ranged between 5–7, confirming its suitability for topical application. The drying time varied from 2–7 minutes, allowing efficient and uniform film formation. The drug content was consistently within 95–105%, indicating homogeneous distribution throughout the formulation. In vitro drug release studies demonstrated a sustained release profile, suggesting prolonged drug retention at the application site. Overall, the results suggest that the film-forming spray not only overcomes the drawbacks of conventional topical systems but also offers a patient-friendly, non-greasy, and effective therapeutic approach for long-term psoriasis management.

**Keywords**: Psoriasis, film-forming spray, topical drug delivery, patient compliance, sustained release

**PC-787**

## IMPLANTABLE DRUG DELIVERY SYSTEM

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Implantable drug delivery systems (IDDS) represent a revolutionary advancement in modern medicine, providing a controlled, sustained, and localized method of drug administration. Unlike conventional routes such as oral or intravenous delivery, which often suffer from fluctuating drug levels, low bioavailability, and systemic side effects, IDDS offer precise drug release directly at the target site, enhancing therapeutic efficacy and patient compliance. These systems utilize diverse technologies, including polymeric reservoirs, osmotic pumps, biodegradable matrices, and bioerodible implants, to ensure a consistent and prolonged drug release profile. Recent innovations in nanotechnology, bioresponsive materials, and wireless-controlled implants have further expanded the capabilities of IDDS, enabling real-time dose adjustments, programmable drug release, and integration with biosensors for personalized therapy. These advancements have profound implications for managing chronic diseases, pain, cancer therapy, and neurodegenerative disorders such as Parkinson's and Alzheimer's disease. Furthermore, IDDS have demonstrated potential in delivering biologics, including peptides, proteins, and gene therapies, which are otherwise challenging to administer due to degradation in the gastrointestinal tract. Despite their numerous advantages, IDDS face challenges such as biocompatibility concerns, risk of infection, device failure, and the need for surgical implantation or retrieval. Regulatory hurdles and cost considerations also impact widespread adoption.

**Keywords**: Implantable drug delivery, Controlled drug release, Sustained drug release, Targeted drug delivery

**PC-788**

## DESIGN AND DEVELOPMENT OF PHARMACEUTICALLY OPTIMIZED MICONAZOLE NITRATE–ITACONIC ACID COCRYSTAL GEL: A COMPUTATIONAL AND ANALYTICAL PERSPECTIVE

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The present study focuses on the design and development of pharmaceutically enhanced topical gel formulation containing cocrystals miconazole nitrate (MIC) AND ITACONIC ACID (ITA) to improve its solubility, antifungal activity, and skin permeability. Cocrystals were synthesized using a solvent evaporation method and characterized via FTIR, PXRD, DSC, 1HNMR and SEM to confirm their formation and evaluate physicochemical properties. Quantum chemical calculations using density functional theory (DFT) at the CAM-B3LYP/6-31++G (d,p) level were employed to understand the electronic interactions and molecular geometry of the drug-coformer system. Crystal explorer 17.01 analyses was performed to visualize and quantify intermolecular




ISBN: 978-81-980623-8-3

interactions through Hirshfield analysis, revealing strong hydrogen bonding and vander waal forces contributing to cocrystal stability. Molecular electrostatic potential (MESP) mapping further identified for potential active sites and highlighted enhanced polarity and hydrogen bonding capacity in cocrystal. A topical gel was formulated using carbopol 940 as gelling agent and evaluated for pH, spreadability, viscosity, drug content and in vitro diffusion. The gel exhibited favorable physiocochemical properties and improved drug release compared to pure drug. This integrated approach highlights the potential of MIC-ITA cocrystals in potential antifungal therapy, supported by both experimental and computational insights.

**Keywords**: Cocrystal, Miconazole Nitrate, Itaconic Acid, DFT, Crystal Explorer, Solubility Enhancement, Topical gel, antifungal activity

**PC-789**

**ADVANCES IN GREEN SYNTHESIS OF ZINC OXIDE NANOPARTICLES: A PROMISING NANOTECHNOLOGY APPROACH FOR DIABETES MELLITUS MANAGEMENT**

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Diabetes mellitus (DM) is a major global health concern, with a growing patient population and associated complications. Traditional treatments often fall short due to the complex nature of the disease. Recent advances in nanotechnology, particularly the use of zinc oxide nanoparticles (ZnO NPs), offer promising solutions. This review aims to highlight the eco-friendly, economical, and biocompatible characteristics of ZnO NPs, with a focus on green synthesis techniques for their production. It also explores the green synthesis of ZnO NPs using natural resources, such as microorganisms and plant extracts, which act as stabilizing and reducing agents. It examines the potential of these nanoparticles in improving medicinal properties, particularly through their antibacterial, antidiabetic, and antioxidant activities. The possibility of combining ZnO NPs with other nanomaterials is also investigated, with an emphasis on applications in biosensing, therapeutics, and diagnostics. ZnO NPs synthesized through green methods demonstrate significant potential in enhancing insulin sensitivity, glucose management, and preventing diabetes-related complications. Their improved medicinal properties, including antibacterial, antidiabetic, and antioxidant activities, are highlighted. This review also identifies opportunities for the development of combination products and discusses the transition from laboratory-scale research to industrial-scale production. Extensive safety and clinical studies are required to confirm the safety and efficacy of ZnO NPs, paving the way for regulatory approval and wider adoption in medical applications. This review underscores the importance of medicinal plants and biogenic approaches for the synthesis of zinc oxide nanoparticles and calls for further research to explore the full potential of ZnO NPs in diabetes management and beyond.

**Keywords**: Diabetes mellitus, nanoparticles, zinc oxide, antidiabetic

**PC-790**

**FORMULATION AND DEVELOPMENT OF BILAYER TABLET USING OROS TECHNOLOGY FOR ANTI-DIABETIC DRUG**

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The present study focuses on the formulation and evaluation of an anti-diabetic drug using OROS (Osmotic Control Release Oral Delivery System) technology, a novel approach within osmotic drug delivery systems. This technology offers significant clinical advantages, including enhanced patient compliance and improved treatment tolerability through controlled drug release. A bilayer osmotic tablet was developed, comprising a drug-containing pull layer and an excipient-based push layer. Pre-formulation studies and physical compatibility assessments were conducted to optimize the formulation. Multiple trials were undertaken to refine granulation and compression characteristics, leading to a successful batch that demonstrated desirable performance in comparison to the reference product. The formulation process included strategic adjustments in excipient ratios and membrane coating techniques to improve drug release and mechanical stability. Evaluation parameters such as dissolution behavior across various pH media, particle size, and stability were assessed to ensure product reliability. The research culminated in the development of a robust extended-release formulation suitable for generic market entry. The challenges encountered during formulation provided valuable insights into the intricacies of osmotic drug delivery, offering a foundation for future advancements in pharmaceutical development and tailored therapeutic solutions.

**Keywords**: OROS, Drug delivery, formulation, bilayer, osmogen, Extended- release

**PC-791**

**ENHANCING FLUTAMIDE SOLUBILITY AND DISSOLUTION: FORMULATION DEVELOPMENT OF NANOCRYSTAL TABLETS**

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The development of oral disintegrating tablets (ODTs) presents a promising strategy for enhancing the bioavailability of poorly water-soluble drugs. This study explores the formulation of nanocrystal-based ODTs to improve the solubility and dissolution rate of Flutamide, a widely used nonsteroidal antiandrogen for prostate cancer treatment. Utilizing Solvent Antisolvent precipitation technique using 23 factorial design, which three variables namely concentrations of stabilizer, ratio of solvent and antisolvent and stirring speed were kept at two levels, Flutamide nanocrystals were prepared and subsequently incorporated into ODTs through direct compression employing CCS and SSG as super disintegrate agents at different concentrations like 10 mg, 15 mg & 20mg. The physicochemical properties of the nanocrystals were characterized by particle size analysis and saturation solubility. The ODTs were evaluated for hardness, friability, disintegration time, and dissolution profile. Results indicated that the nanocrystal-based ODTs exhibited a significant increase in dissolution rate compared to API Flutamide, with a notable improvement in solubility. Out of six formulations, the tablets which contain 20 mg of CCS (F3) had shown low in vitro disintegration time 10.6 sec and highest drug release profile i.e. 95.02 % which releases the drug within 12 minutes. This novel approach demonstrates the potential of nanocrystal-based ODTs as an effective means to enhance the therapeutic efficacy of Flutamide, offering a viable solution for improving patient compliance and clinical outcomes.

**Keywords**: Nanocrystals, Oral disintegrating tablets (ODTs), Dissolution rate, Direct compression, Nonsteroidal antiandrogen and Prostate cancer treatment.

**PC-792**

**THE ALTERNATIVE OF PLASTIC PACKAGING IN PHARMACEUTICAL INDUSTRIES TO MANAGE MICROPLASTICS AND POSSIBLE IMPACT ON HUMANS.**

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Around 360 million tons of plastic are produced and half of this is destined for single use items. On degradation plastic. produces nano and microplastics. Research on human cells revealed that nano and micro plastics trigger various cellular responses including cytotoxicity, genotoxicity etc. The contact of drug with plastic polymers leads to sorption of drugs on plastic polymer and it also depends on storage and transportation conditions. To reduce these chances, we need innovation in food and pharma packaging industries. We should consider alternatives such as bioplastics. One such bioplastic or eco packaging can be prepared with onion peel with polymer blend.

**Keywords**: Drug-polymer interaction, Packaging innovation, onion peel polymer, cytotoxicity.

**PC-793**




ISBN: 978-81-980623-8-3

**"FORMULATION, DEVELOPMENT AND EVALUATION OF OPHTHALMIC NANOEMULGEL CONTAINING LIFITEGRAST"**

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Here we report on the design, development, and in vitro and in vivo evaluation of an ocular nanoemulgel of Lifitegrast, a nonsteroidal anti-inflammatory agent for the treatment of dry eye disorder. Lifitegrast, due to its low ocular bioavailability and short precorneal elimination, needs a developed delivery system to increase its therapeutic effectiveness. Our objective was to overcome these limitations and formulate a nanoemulsion-based gel system that could enhance the ocular residence time of the drug, its permeation through various ocular barriers and sustained drug delivery. High-energy emulsification method was used with suitable oil, surfactant and co-surfactant in order to achieve the drug solubilization and stability. The optimized nanoemulsion was further entrapped in a gel matrix with a mucoadhesive polymer to obtain nanoemulgel for ocular delivery. The optimized formulation was characterized for droplet size, zeta potential, pH, viscosity, drug content, in vitro drug release, ex vivo permeation, and ocular irritation studies. The nanoemulgel formulation was found to have promising physicochemical characteristics with sustained drug delivery and enhanced penetrability as compared to conventional formulations. The Preparation Was Nonirritant and Suitable for Ocular Application. In conclusion, the formulated nanoemulgel of Lifitegrast is a potential approach for improving ocular bioavailability and therapeutic effect in the treatment of dry eye disorder.

**Keywords**: Nanoemulgel, Ocular bioavailability, Mucoadhesive polymer, Sustained drug delivery, Lifitegrast.

**PC-794**

**FORMULATION AND CHARACTERIZATION OF ORAL DISPERSIBLE TABLETS OF FEXOFENADINE HYDROCHLORIDE USING THE SUBLIMATION TECHNIQUE**

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The primary objective of this study was to formulate and characterize an oral dispersible drug delivery system incorporating Fexofenadine Hydrochloride (FEX) as the model drug. Oral dispersible tablets of FEX were prepared by the direct compression method, employing crospovidone as a superdisintegrant and camphor as a sublimating agent. Microcrystalline cellulose (MCC) was used as a diluent, while magnesium stearate served as a lubricant. The dissolution behavior of the formulations was evaluated in phosphate buffer solution (pH 6.8). In addition, the prepared tablets were assessed against established criteria for oral dispersible tablets and compared with commercially available formulations. Stability studies were conducted at 30°C/65% RH and 40°C/75% RH, demonstrating that the optimized formulation retained stability under these conditions. The drug release profile of the developed tablets was found to be consistent and complete within 60 minutes, showing comparable performance to the commercial product.

**Keywords**: Fexofenadine Hydrochloride; oral dispersible tablets; sublimation technique; direct compression method.

**PC-795**

**FORMULATION AND EVALUATION OF BUCCALFILMS CONTAINING CINNARIZINE CO-CRYSTALS FOR SOLUBULITY ENHANCEMENT**

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Cinnarizine is a commonly prescribed antihistamine for motion sickness, a limitation caused by its poor water solubility results dissolution-limited absorption. Cinnarizine–sodium saccharin cocrystals were formulated and incorporated into buccal films to improve solubility and enable controlled release. Successful cocrystals were obtained through solvent evaporation and validated by FTIR, DSC, XRD, and SEM examinations, which showed distinct crystalline structures. Studies on solubility found that the cinnarizine solubility in the cocrystal form was 3.2 times higher than in the pure drug ($p < 0.05$). The optimized buccal films exhibited uniform thickness of 0.21 ± 0.02 mm, a tensile strength of 5.6 ± 0.4 MPa, and the ability to withstand more than 300 folds, thus indicating suitable mechanical robustness. In-vitro dissolution showed sustained drug release of up to 92.4 ± 2.1% within 6 h, which was significantly higher than pure cinnarizine films ($p < 0.05$). The films displayed impressive mucoadhesive properties, maintaining a residence time of 18.3 ± 1.2 g in the mouth. The results show that cinnarizine–sodium saccharin cocrystal-based buccal films represent a promising and patient-friendly approach for improving the solubility, bioavailability, and therapeutic effectiveness of cinnarizine.

**PC-796**

**DEVELOPMENT OF CYCLODEXTRIN-FUNCTIONALIZED CMC-PVA HYDROGELS FOR CONTROLLED DELIVERY OF CURCUMIN IN WOUND HEALING APPLICATIONS**

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This study introduces cyclodextrin-grafted carboxymethylcellulose and polyvinyl alcohol hydrogel films crosslinked with citric acid for wound healing, focusing on curcumin (CUR) delivery. Films were fabricated via solvent casting, pre-dried at 50°C for 24 h and cured at 140°C for 10 min, with optimal CA concentration at 20%. The films were characterized by ATR-FTIR, TGA, DTG, and solid-state 13C NMR analyses and evaluated for active β-cyclodextrin (βCD) content, carboxyl content, tensile strength, swellability, protein adsorption, permeability, drug loading and release, cytocompatibility, and in vivo wound healing activity. This study addressed challenges of βCD-CMC hydrogel films, including rapid matrix erosion and low loading of poorly soluble drugs. Increasing PVA concentration led to higher active βCD and carboxyl content in the hydrogel films. Instrumental analysis confirmed grafted βCD and ester crosslinks in the hydrogel films. The βCD-CMC-PVA hydrogel films showed superior mechanical strength compared to βCD-CMC films, with BCP3 batch achieving 12.78 ± 0.29 kg/mm² tensile strength. PVA incorporation enhanced swellability and CUR loading, with BCP2 showing highest drug uptake. Drug release studies showed initial burst release of 10–35% CUR within 30 min, followed by sustained release beyond 24 h. The hydrogels demonstrated low protein adsorption and prevented microbial penetration for seven days, indicating their potential as wound-dressing materials. In vivo studies in rats confirmed notable wound-healing activity. These findings suggest cyclodextrin-grafted CMC-PVA hydrogel films are promising for treating wounds with discharge, offering controlled delivery of antibacterial agents.

**Keywords**: Cyclodextrin, Carboxymethylcellulose, Polyvinyl alcohol, Hydrogel, Curcumin, Wound healing

**PC-797**

**NANOCARRIER-BASED DRUG DELIVERY SYSTEMS: REVOLUTIONIZING THERAPEUTIC PRECISION**

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The development of drug delivery systems based on nanoparticles has revolutionized pharmaceutical research by enabling controlled release and site-specific response. Nanocarriers enhance (-availability, -therapeutic index, -solubility, and-or) clearance(b) and nonspecific binding in vivo relative to conventional formulations. Liposomes, dendrimers, polymersomes and inorganic NPs are often studied and employed as they can be easily tuned to possess seven adjustable physicochemical properties. Multivalent surface functionalization and ligand-targeting is achievable with dendrimers while liposomes encapsulate hydrophobic/hydrophilic drugs. Micellar polymers mainly solubilize hydrophobic drugs, whilst the (optical or magnetic) properties of inorganic NPs have been exploited in diagnosis and theranosis. There




ISBN: 978-81-980623-8-3

have been advances in drug delivery methods, including ligand–receptor-mediated delivery, targeted to the receptors on overexpressed cancer cells; stimulus-responsive release systems such as pH-sensitive release at tumor sites; and endosomal escape of drugs to enable cytoplasmic drug delivery. Centrally focused on cancer treatment, nanocarriers take advantage of the enhanced permeability and retention (EPR) effect to passively accumulate within tumors and reduce side effects, thus increasing patient survival. Integration with imaging probes enable dynamic monitoring of biodistribution and response in real time when using nanocarrier technologies. Nevertheless, immunogenicity, scale-up reproducibility, stability and regulatory approval remain bottlenecks for clinical translation. AI receptor-targeted drug delivery, nanodrug for precision medicine, and stimuli-responsive intelligent drug carrier shapethe landscape of targeted therapy in the next century. The nanocarrier–delivery intersection of material science, molecular pharmacology, and translational science could transform precision medicine in her opinion.

**Keywords**: Nanocarriers, Targeted drug delivery, Liposomes, Dendrimers, Polymeric micelles, Inorganic nanoparticles, Enhanced permeability and retention (EPR) effect

**PC-798**

**"DEVELOPMENT OF PLUMGIN-LOADED NANOGEL FOR ENHANCED REEPITHELIALIZATION AND TISSUE REGENERATION"**

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Wound healing is a complex biological process involving hemostasis, inflammation, proliferation, and remodelling phases, where efficient reepithelialization is crucial for successful tissue regeneration. Recent advances in nanotechnology have opened new avenues for designing multifunctional nanocarriers capable of enhancing tissue repair. In this study, a novel plumgin-loaded nanogel was developed and evaluated for its potential to accelerate reepithelialization and promote tissue regeneration. The nanogel was synthesized using a biocompatible polymeric network optimized for sustained drug release, enhanced bioadhesion, and penetration into the wound microenvironment. Characterization studies revealed uniform particle size distribution, high encapsulation efficiency, and stable physicochemical properties suitable for topical application. In vitro assays demonstrated that the nanogel significantly enhanced keratinocyte proliferation and migration, key indicators of reepithelialization. Additionally, anti-inflammatory and antioxidant activities of the nanogel were observed, which further supported the regenerative process by modulating the wound microenvironment. In vivo studies using a full-thickness excisional wound model confirmed accelerated wound closure, improved collagen deposition, and enhanced epithelial layer formation compared to control treatments. Histopathological analysis corroborated the improved tissue architecture and reduced inflammatory infiltration, highlighting the synergistic effect of plumgin within the nanogel matrix. These findings suggest that the plumgin nanogel represents a promising therapeutic strategy for enhancing wound healing through targeted reepithelialization and tissue regeneration, offering potential for future clinical translation in chronic and acute wound management.

**Keyboards**: Plumgin, Nanogel, Wound healing, Reepithelialization, Tissue regeneration, Anti-inflammatory activity

**PC-799**

**TRIMYRISTIN-LOADED POLYMERIC ORAL THIN FILM FOR THE TREATMENT OF MOUTH INFECTION.**

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Oral infections remain a significant global health challenge, often associated with pain, impaired oral functions, and risk of systemic complications. Conventional therapies such as mouthwashes and systemic drugs are limited by poor patient compliance, inadequate site-specific delivery, and short drug retention in the oral cavity. In this study, we developed and evaluated Trimyristin-loaded polymeric oral thin films (OTFs) as a novel drug delivery system for the localized management of mouth infections. The films were prepared using a solvent casting technique with biocompatible polymers to ensure mucoadhesion, rapid disintegration, and controlled drug release. Physicochemical characterization, including thickness uniformity, folding endurance, tensile strength, and surface morphology, confirmed the films' mechanical stability and ease of handling. Drug loading efficiency and in vitro release studies demonstrated sustained release of Trimyristin, while antimicrobial assays revealed significant inhibitory activity against common oral pathogens. Furthermore, swelling index and mucoadhesion studies indicated prolonged residence time at the infection site, potentially enhancing therapeutic efficacy. The developed OTFs offer a patient-friendly, non-invasive alternative for effective treatment of oral infections, combining targeted delivery, improved stability, and enhanced patient compliance.

**Keywords**: Trimyristin, Oral thin film (OTF), Mucoadhesion, Mouth infection therapy

**PC-800**

**A NOVEL RETINYL PALMITATE PATCH FOR SKIN REPAIR**

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Transdermal drug delivery systems (TDDS) offer a non-invasive route for sustained and controlled administration of drugs, improving patient compliance and bypassing hepatic first-pass metabolism. Retinyl palmitate (RP), an ester of vitamin A, is widely valued for its anti-aging, anti-acne, antioxidant, and skin-renewing properties but faces challenges of poor skin penetration and instability in conventional topical formulations. This study aimed to develop and evaluate transferosome-loaded transdermal patches of RP to address these limitations. Transferosomes were prepared by the thin-film hydration method using phosphatidylcholine and Tween 80, then characterized for vesicle size distribution and zeta potential to confirm uniformity and stability. RP-loaded patches were fabricated using the solvent casting technique with hydroxypropyl methylcellulose (HPMC) as the polymer matrix, oleic acid as the permeation enhancer, and glycerol as the plasticizer. A central composite design (Design-Expert 13) was applied to optimize polymer and enhancer concentrations with respect to folding endurance and percentage drug release. The optimized patches showed smooth texture, uniform thickness, good flexibility, near-neutral surface pH, acceptable moisture content, and adequate mechanical strength. In vitro drug release studies using Franz diffusion cells showed cumulative release of 93.36% over seven hours, indicating efficient permeation through the membrane and sustained delivery. Incorporating RP into transferosome-based patches enhanced its stability and skin penetration compared to conventional formulations. This approach offers a patient-friendly, advanced platform for skincare applications targeting aging, acne, and hyperpigmentation, while reducing adverse effects commonly linked with topical retinoid therapy. The findings support further development of transferosome-based transdermal systems for cosmetic and therapeutic uses.

**Keywords**: Transdermal patch, Transferosome, Retinyl Palmitate, Skin care, In-vitro drug release.

**PC-801**

**FORMULATION AND EVALUATION OF PULS IN CAP DRUG DELIVERY SYSTEM OF VALSARTAN**

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This study presents the development of a Pulsincap drug delivery system for valsartan, aimed at the chronotherapeutic management of hypertension by targeting the early morning blood pressure surge. The system consists of a water-insoluble capsule sealed by a swellable hydrogel plug, designed to provide a predetermined "lag time." In-vitro evaluation confirmed the formulation's quality, with tests on the powder, hydrogel plug, and final capsule. Dissolution studies were crucial, successfully demonstrating the intended lag time followed by a




ISBN: 978-81-980623-8-3

rapid, pulsatile drug release. In-vivo pharmacokinetic studies in a crossover design showed a delayed Tmax for the Pulsincap compared to a standard tablet, validating the lag time. Finally, chronotherapeutic efficacy was confirmed through 24-hour ambulatory blood pressure monitoring, which demonstrated the Pulsincap's superior ability to control high morning blood pressure, thereby enhancing patient outcomes.

**Keywords**: puls in cap drug delivery system, valsartan, chronotherapeutic, Swellable hydrogen plug, lag time, ambulatory blood pressure monitoring

**PC-802**

## FORMULATION DEVELOPMENT AND EVALUATION OF 3D PRINTED BI-LAYER FLOATING TABLETS OF ANTI-PSYCHOTIC DRUG UTILIZING FUSED DEPOSITION MODELLING TECHNIQUES

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Three-dimensional (3D) printing, also referred to as additive manufacturing, is considered a game-changing technology in pharmaceuticals. 3D printing (3DP) offers the possibility of manufacturing individually dosed solid oral dosage forms flexibly and on demand with a high level of precision and accuracy in the doses. Lurasidone Hydrochloride, classified under BCS class II with low solubility, was chosen. The objective behind developing a modified release 3D printed tablet was to improve solubility, bioavailability, and decrease dosing frequencies. This study aimed to develop 3D printed drug-loaded bilayer floating tablets for immediate release and sustained release action. The tablet was printed 3 Dimensionally by using the fused deposition modelling printing process with the aid of Kollidon VA64, Kollidon 30, Kollidon SR, Eudragit S100 as polymer, and Triacetin as plasticizer. The infrared analysis showed no interaction between the drug and other polymers. With the diameter of the extruder set to 1.5 mm, the filament required for printing the tablet was prepared by processing the blend mixture at 160 °C at a speed of 50 rotations per minute using a twin screw lab scale extruder, Haake Minilab. The optimization of filament for both release patterns was carried out, and the most optimized batch was selected for printing through the fused deposition modelling process. The immediate release tablet showed 97.5 % drug release, while the sustained release tablet showed 67.5 % drug release. Floating of a 3D printed tablet was observed when 90 % of the immediate layer had fully dissolved.

**Keywords**: 3D printing, Lurasidone HCl, Fused Deposition Modelling, Modified release

**PC-803**

## FORMULATION AND EVALUATION OF CHITOSAN BASED POLYMERIC NANOPARTICLES OF AN ANTI - ALZHEIMER'S DRUG MEMANTINE HYDROCHLORIDE

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The aim of the study was to develop Memantine HCl loaded chitosan - sodium tripolyphosphate (STPP) nanoparticles using Ionic gelation method and evaluates their physicochemical properties and in-vitro release studies for possible targeted delivery to the brain. The objective was to fabricate polymeric nanoparticles for better controlled and targeting action of drug, which also overcome the problems associated with conventional formulations like multidose therapy, poor patient compliance and high cost. Memantine HCl loaded chitosan nanoparticles (F1 to F6) were prepared by Ionotropic gelation method. The formulated nanoparticles were evaluated for external morphological characters, determination of particle size analysis, zeta potential, drug content, entrapment efficiency and in-vitro release studies. The particle size varied from 148 to 317 nm and zeta potential was in negative and its value found to be - 46.4 mV. The drug content for the Memantine HCl loaded chitosan nanoparticles varied from 69.5 ± 7.2% to 87.9 ± 1.2%. The entrapment efficiencies were found to be minimum and maximum of 55.50 ± 2.4% and 86.30 ± 3.6%. The percentage yields of all formulations were in the range of 48.24 ± 1.24 to 86.13 ± 1.37%. In-vitro release of drug follows zero order and showed sustained release behaviour for a period of 24 hr. The optimized formulation contains 3:1 ratio of chitosan & STTP and demonstrated successful sustained release. Memantine HCl loaded chitosan nanoparticle is a potential new delivery system for treatment of Alzheimer's disease.

**Keywords**: Alzheimer's disease, Polymeric nanoparticles and Ionotropic gelation.

**PC-804**

## FORMULATION AND EVALUATION OF HERBAL SKIN CREAM FOR WOUND HEALING

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Wound healing is a normal physiological process, but delayed recovery often leads to complications. In this context, herbal formulations have gained attention because of their safety profile and therapeutic effectiveness. The present investigation focused on the development and evaluation of a herbal skin cream formulated with selected medicinal plant extracts recognized for their antimicrobial, anti-inflammatory, and healing properties. The cream was prepared using a suitable base and assessed for various physical parameters including color, consistency, spreadability, pH, homogeneity, and stability. Herbal actives were incorporated at appropriate concentrations, and the resulting formulation exhibited desirable texture and easy removability. The evaluation confirmed acceptable pH values within the normal skin range, absence of phase separation, and stability under storage conditions. Preliminary wound healing studies indicated that the herbal cream accelerated epithelialization and reduced inflammation compared to control samples. The product was non-irritant, smooth in application, and provided a soothing effect on the skin. Utilizing natural ingredients ensures better biocompatibility and minimizes side effects often associated with synthetic formulations. Overall, the study suggests that the developed herbal skin cream could be a safe, effective, and cost-friendly option for wound care. However, further pharmacological and clinical investigations are necessary to validate its therapeutic activity and elucidate its mechanism of action.

**Keywords**: Herbal cream, Wound healing, Formulation, Evaluation, Antimicrobial, Stability

**PC-805**

## NOVEL CONTROLLED RELEASE VALPROIC ACID LOADED NANOPARTICLES: AS HDAC INHIBITOR DRUG DELIVERY TO COLON CANCER ASSOCIATED WITH DIABETES MELLITUS

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Diabetes mellitus is strongly linked to colorectal cancer, with hyperinsulinemia and epigenetic dysregulation as key contributors. Histone deacetylase (HDAC) enzymes represent common therapeutic targets in both conditions. Valproic acid, a well-known HDAC inhibitor, improves insulin sensitivity, preserves β-cell function, and exhibits anticancer activity. However, conventional delivery suffers from poor colon specificity, systemic toxicity, and limited efficacy. This study focused on developing colon-targeted, controlled-release valproic acid nanoparticles using pH-sensitive polymers (Eudragit L100, Eudragit RS100, and chitosan) via solvent evaporation, nanoprecipitation, and probe sonication. Eighteen formulations (F1–F18) were prepared and systematically evaluated. The optimized formulations, F6 (Eudragit L100) and F12 (Eudragit RS100), demonstrated particle sizes of 265–290 nm, polydispersity index <0.3, zeta potential around −22 mV, and high entrapment efficiency (96.46% and 96.54%). Chitosan-based formulations (F15, F16) also showed good entrapment (79.5% and 72.7%). In vitro studies confirmed sustained drug release of 67.6% (F6) and 75.2% (F12) over 12 hours at pH 6.8, validating colon-targeted delivery. FTIR and DSC analyses revealed no drug–polymer interactions,




ISBN: 978-81-980623-8-3

while SEM confirmed spherical nanoparticle morphology. Stability testing at 40 °C/75% RH for three months indicated no significant change in particle size or entrapment. The developed nanoparticles showed improved bioavailability and prolonged activity compared to plain valproic acid. This novel colon-targeted system reduces dose frequency, minimizes systemic side effects, and enhances patient compliance, offering dual therapeutic potential for type 2 diabetes mellitus and colorectal cancer.

**Keywords**: Valproic acid, HDAC inhibitor, Colon-targeted nanoparticles, Eudragit, Controlled release, Colorectal cancer.

**PC-806**

**EFFECT OF VARIABLES ON FORMULATION OF DICLOFENAC POTASSIUM-LOADED ALBUMIN MICROSPHERES**

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This study investigated the influence of formulation variables such as surfactant concentration, speed of rotation, and processing temperature on the preparation of diclofenac potassium-loaded albumin microspheres. Microspheres were prepared by a simple emulsification method followed by heat denaturation, using egg albumin as the polymer and glutaraldehyde as the crosslinking agent. Three formulations (F1, F2, and F3) were developed under varied conditions, with the drug–polymer mixture dispersed in liquid paraffin containing Tween 80 and stabilized before recovery by decantation and drying. The microspheres were characterized for percentage yield, entrapment efficiency, and in vitro release. Among the formulations, F2 prepared at 0.01% surfactant concentration, 800 ± 10 rpm, and 90 ± 10 °C showed satisfactory performance, achieving an entrapment efficiency of 56.37%, indicating partial but stable encapsulation within the albumin matrix. In vitro release was assessed in phosphate buffer saline (pH 7.4) using both the diffusion membrane technique and USP dissolution apparatus II. The diffusion membrane method demonstrated gradual and sustained release over 300 minutes, while dissolution studies with microspheres encapsulated in hard gelatin capsules revealed a cumulative release of 107.25% in the same period, reflecting nearly complete release with minor experimental variation. Comparative evaluation of F1, F2, and F3 highlighted the significance of formulation variables in modulating release profile. Overall, the findings confirm that diclofenac potassium-loaded albumin microspheres can be successfully prepared with satisfactory yield and encapsulation, presenting a promising approach for sustained drug delivery. The formulation variables must be optimized to develop successful microspheres.

**Keywords**: Diclofenac potassium, albumin microspheres, emulsification, entrapment efficiency, sustained release, formulation variables

**PC-807**

**MULTICOMPONENT COCRYSTALS OF ATORVASTATIN CALCIUM: FORMULATION, CHARACTERIZATION, SEDEM ANALYSIS AND PHARMACOKINETIC EVALUATION**

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Atorvastatin calcium (ASC) is promising lipid lowering agent and well explored in global pharmaceutical market. Atorvastatin calcium is struggles with poor solubility and associated bioavailability limitations. Due to poor solubility, there is unnecessary dose increment is required to achieve required therapeutic concentration which may result in increased hepatic and nephrotic load. To overcome these limitations, an attempt was made to fabricate multicomponent cocrystals of ASC with ten different cocrystal formers using microwave assisted solvent evaporation technique. After solubility analysis it was observed that, the Atorvastatin Calcium-Oxalic acid (ASC-OA) cocrystals has highest solubility. These cocrystals were subjected to various analysis like FTIR, DSC and XRD to confirm the formation of cocrystals. These cocrystals showed improved flow properties and stability as compare to pure drug. The SeDeM analysis was implemented to see the comparative flow and compressibility behavior of pure ASC and ASC-OA cocrystals. The cocrystals were formulated into tablet using experimental design and optimization and further subjected to comparative dissolution study. ASC-OA cocrystal tablet showed improved dissolution in comparison with pure ASC tablet. In vivo pharmacokinetic study demonstrated the improved systemic availability of ASC when administered in the form of cocrystal. All the pharmacokinetic parameters like Cmax, AUC0-t, AUC0-∞ and MRT were found to be improved when administered as a cocrystals. The stability and shelf analysis demonstrated the comparatively better stability cocrystal tablets. Overall, this crystallographic modification resulted in improved solubility, dissolution and bioavailability.

**Keywords**: Atorvastatin calcium, cocrystals, solubility, dissolution, bioavailability

**PC-808**

**FUSIDIC ACID NANOSPONGE GEL: A NOVEL APPROACH TO ENCHANCING SKIN BACTERIAL INFECTION TREATMENT**

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The present study focuses on the development and evaluation of a Fusidic Acid-loaded nanosponge-based gel as an innovative topical formulation for improving the treatment of bacterial skin infections. Nanosponges were prepared using the emulsion solvent diffusion method, with a $2^3$ factorial design incorporating Ethyl Cellulose (EC), Eudragit, and β-Cyclodextrin (βCD). Among the formulations, F4 (high βCD and Eudragit) exhibited the best production yield and solubility enhancement, making it ideal for further gel formulation. Nanosponge-based gels were formulated using Carbopol 934P, HPMC K100, and CMC and evaluated for homogeneity, pH, viscosity, drug content, and in vitro drug release. All formulations were smooth, white, and uniform, with pH values suitable for topical application. HPMC-based gel (F2) demonstrated the most sustained drug release (81.46%), ensuring longer drug retention at the infection site, while CMC-based gel (F3) exhibited the highest drug release (97.28%). The study confirms that nanosponge-based gels enhance solubility, provide controlled and sustained drug release, and improve patient compliance by reducing dosing frequency. These findings suggest that nanosponge-based gels offer a promising approach for topical Fusidic Acid delivery, improving therapeutic efficacy in bacterial skin infections.

**Keywords**: Fusidic Acid, Nanosponge, Emulsion Solvent Diffusion, Topical Gel and Sustained Drug Release.

**PC-809**

**SOLID DOSAGE FORMULATION OF ANTHOCYANIN AND SHORT TERM STABILITY**

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Anthocyanin is the principal flavonoid present in Garcinia indica fruit rind, mainly as cyanidin-3-glucoside (C3G) and cyanidin-3-sambubioside (C3S). These water-soluble pigments are highly sensitive to physicochemical factors such as pH, temperature, light, and interactions with matrix components, which affect their stability and limit applications. The present study aimed to enhance anthocyanin stability through microencapsulation using different gum combinations, including gum arabic, guar gum, pectin, and inulin. Microcapsules were prepared by spray drying and freeze drying in four gum combinations. Results revealed that spray drying retained comparatively lower anthocyanin content, while freeze-dried formulations showed significantly better retention. Among the tested formulations, the gum arabic–guar gum combination exhibited the highest encapsulation efficiency. Characterization of microcapsules by drug content, micromeritic properties, SEM, and FTIR confirmed desirable physicochemical attributes. Stability studies under accelerated and ambient conditions demonstrated that microencapsulation improved anthocyanin stability compared to the pure extract. The optimized formulation was successfully developed into size-0 capsules and tablets via direct compression, with both dosage forms showing satisfactory evaluation results. Overall, microencapsulation with gum-based carriers,




ISBN: 978-81-980623-8-3

particularly gum arabic–guar gum, proved effective in improving anthocyanin stability and demonstrated potential for nutraceutical and pharmaceutical applications.

**Keywords**:Anthocyanins, Microencapsulation, Freeze drying, Gum Arabic, Stability studies

**PC-810**

**DEVELOPMENT AND INVITRO VALIDATION OF SUSTAINED RELEASE MATRIX TABLETS OF LORNOXICAM USING NATURAL POLYMERS**

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Lornoxicam is a NSAIDS having rare side effects. It is used in the treatment of osteoarthritis, ankylosing spondylitis, rheumatoid arthritis etc. It has a short biological half- life of 4 hrs and eliminated rapidly. Therefore, sustained release formulation is required, which have distinct advantages when compared to conventional dosage. Present work, studies were carried on the development and in vitro validation of sustained release matrix tablets of lornoxicam using natural polymers (Pectin & Xanthan gum) with a view to obtain controlled release characteristic to achieve prolonged therapeutic effect by continuously releasing medication over a extended period of time after administration of single dose. Lornoxicam matrix tablets were formulated employing xanthan gum and Pectin in different concentrations and the tablets were evaluated for various tablet characters including drug release kinetics and mechanism. Lornoxicam matrix tablets formulated employing xanthan gum (30% w/w) provided slow and controlled release of lornoxicam over a period of 24 h. Drug release from the matrix tablets formulation containing pectin and xanthan gum follows zero order drug release with non fickian diffusion mechanism. All the tablet formulation showed compliance with pharmacopoeial standard. As the time increases, the swelling index was increased; later on, it decreases gradually due to dissolution of outermost–gelled layer of tablet into dissolution medium. Comparison between xanthan gum and pectin, it has been observed that swelling index of pectin was significantly more compared to xanthan gum. The dissolution result shows that an increased amount of polymer resulted in reduced drug release. A concentration dependent drug release is evident in case of the polymer i.e., lower concentration of polymers, release is marginally retarded at higher concentration is considerable. Prepared matrix formulation containing xanthan gum 30% is probably showing better release of 99 % drug release within 24 hours.

**Keywords**: sustained release, xanthan gum, pectin, lornoxicam.

**PC-811**

**NANOEMULGEL AS AN ADVANCED TOPICAL CARRIER FOR CLOTRIMAZOLE; ENHANCING SOLUBILITY PERMEATION AND ANTIFUNGAL EFFICACY**

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Superficial fungal infections represent one of the most prevalent dermatological conditions, often associated with itching, discomfort, and recurrence. Despite the broad antifungal spectrum of clotrimazole, its poor aqueous solubility, limited skin penetration, and short residence time restrict its therapeutic performance in conventional topical formulations. To address these challenges, the present study focuses on the formulation and evaluation of a clotrimazole-loaded nanoemulgel as an innovative drug delivery approach. Nanoemulsions were prepared using pharmaceutically acceptable oils, surfactants, and co-surfactants, and further incorporated into a carbopol gel base to enhance spreadability, patient compliance, and retention at the site of infection. The optimized nanoemulgel exhibited a nanometric droplet size (~350 nm), narrow polydispersity index, favorable zeta potential, high drug content (> 90%), and desirable rheological properties, confirming its suitability for topical use. In vitro diffusion studies performed using Franz diffusion cells demonstrated a significant improvement in permeation and release kinetics compared to a marketed clotrimazole cream, with a permeation enhancement ratio greater than two. Antifungal assays against Candida albicans and Aspergillus niger revealed enhanced zone of inhibition, validating improved therapeutic efficacy. Skin irritation studies indicated the formulation was non-irritant and well tolerated. Collectively, these findings highlight the nanoemulgel system as a patient-friendly, efficacious, and stable platform for topical clotrimazole delivery, offering promise for superior management of fungal skin infections.

**Keywords**: Clotrimazol, Nanoemulgel, Antifungal therapy, Topical drug delivery, Permeation enhancement Novel drug delivery systems.

**PC-812**

**OPTIMISATION OF RASAGILINE MESYLATE ENCAPSULATED PLGA NANOPARTICLES USING TAGUCHI SCREENING METHOD AND DESIGN OF EXPERIMENTS (DOE)**

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Parkinson's diseaso (PD) manogement is challenged by progressive neurodegeneration and limited drug delivery to the brain. Rasagiline is a selective MAO-B inhibitor with potential disease-modifying effects, whose therapeutic efficiency gets restricted due to short half-life and extensive first-pass metabolism. Looking into these drawbacks this study was focused on optimizing PLGA-encapsulated Rasagiline mesylate nanoparticles (RSM-NPs) to have a prolonged drug release. A powerful dual-stage statistical optimization strategy, combining Taguchi screening with a Box-Behnken-based Design of Experiments (DoE) approach, was used to establish the design space. Nanoparticles were prepared using solvent evaporation double emulsion method using seven formulation and process parameters (polymer & stabilizer concentration, organic:aqueous ratio, temperature, volume of external phase and sonication time of primary and secondary emulsion). The optimized formulation achieved a mean particle size of 190 nm, a narrow polydispersity index of 0.22 and entrapment efficiency of 62.9%. The RSM-loaded PLGA nanoparticles (RSM-NPs) demonstrated a sustained release profile at pH 5.5 conditions over a 24-hour period. The drug release kinetics adhered to a zero-order release model, with an n-value of 0.45, indicative of Fickian diffusion. In conclusion, the successful formulation of RSM-loaded PLGA nanoparticles highlights the effective application of DoE to optimize the encapsulation of a hydrophilic drug, achieving a higher entrapment efficiency (EE) and sustained release for up to 24 hours.

**Keywords**: Rasagiline mesylate, Parkinson's disease, Taguchi design, DoE, neurotherapeutics

**PC-813**

**PHARMACOTHERAPEUTIC POTENTIAL OF NATURAL BIOACTIVE NANOPARTICLES FOR MANAGEMENT OF NEURODEGENERATIVE DISEASE**

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Neurodegenerative diseases (NDDs), including Alzheimer's (AD), Parkinson's (PD), and Huntington's (HD), are characterized by progressive neuronal loss, leading to cognitive and motor dysfunction. The limitations of current therapies such as symptomatic relief and adverse effects have spurred interest in natural bioactive compounds for their multi-target neuroprotective potential. NDDs involve protein misfolding (amyloid-β, α-synuclein) oxidative stress, mitochondrial dysfunction, and chronic neuroinflammation, contributing to neuronal death. These pathological hallmarks present targets for therapeutic intervention. Compounds like Curcumin and Resveratrol, modulate key pathways, including NF-κB (anti-inflammatory), Nrf2/ARE (antioxidant), and autophagy (clearance of toxic aggregates). Their pleiotropic effects address multiple disease mechanisms simultaneously. To overcome poor bioavailability and blood-brain barrier (BBB) penetration, advanced systems such as nanoparticles nano liposomes are being explored. These enhance stability, targeted delivery, and sustained release of bioactive compounds. Preclinical studies demonstrate significant neuroprotection, reduced oxidative damage, and improved cognitive function with natural bioactives. Clinical trials, though limited, show promise but highlight challenges like dosing variability and bioavailability. Natural bioactive compounds represent a promising




ISBN: 978-81-980623-8-3

therapeutic avenue for NDDs, offering multi-faceted neuroprotection. Future research should focus on bioavailability enhancement, standardized formulations, and robust clinical validation to integrate these agents into mainstream treatment paradigms.

**Keywords**: Neurodegeneration, Natural Compounds, Drug delivery, Nanoparticles, Clinical Translation.

**PC-814**

**FABRICATION OF SOLID LIPID NANOPARTICLES FOR RAMIPRIL: A PROMISING STRATEGY FOR BIOAVAILABILITY ENHANCEMENT**

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Ramipril, a powerful antihypertensive medication is used to treat hypertension diseases. It has a poor bioavailability of 28-35% and a short biological half-life (2-4 hours). Thus, this work seeks to investigate Ramipril loaded solid lipid nanoparticles as a novel drug delivery system for Ramipril to improve oral bioavailability. SLN were prepared by Emulsification solvent evaporation method using Glyceryl monostearate as a lipid with Tween 80 and Span 60 as a stabilizer. The generated formulations were tested for drug content, entrapment efficiency, in-vitro drug release, particle size analysis, scanning electron microscopy, Fourier transform- infrared studies. The prepared formulations were in the nano size of about 925 nm with spherical morphology. The drug content and entrapment efficiency were found to be 9.63 mg and 91.64 % respectively. The zeta potential of formulation was found to be – 9.05 mV. The in-vitro drug release profile showed sustained release of prolonged drug release. Kinetic modelling revealed that the in-vitro drug release followed non-fickian diffusion.

**Keywords**: Ramipril, Emulsification solvent evaporation, Bioavailability, Solid lipid nanoparticles

**PC-815**

**FORMULATION AND EVALUATION OF PRAZOSIN-LOADED FLOATING MICROSPHERES**

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Prazosin hydrochloride, an antihypertensive drug, has a short half-life requiring frequent dosing. This study aimed to develop a gastro-retentive sustained-release system to prolong gastric residence and enhance therapeutic efficacy. Floating microspheres of prazosin were prepared using the ionotropic emulsion-gelation method with sodium alginate as the primary polymer, ethylcellulose as a stabilizer, and olive oil to aid buoyancy. The prepared microspheres (F1–F4) were dried and evaluated for percentage yield, micrometric properties, buoyancy, and in vitro drug release in simulated gastric fluid (pH 1.7, 0.1N HCl). All formulations demonstrated good flow properties and buoyancy. Among them, formulation F2 showed optimal results, with a sustained drug release of 74% over 12 hours. Drug release kinetics followed zero-order patterns and were governed by Fickian diffusion, as confirmed by the Korsmeyer–Peppas model. F2 exhibited superior sustained-release performance compared to other formulations. Alginate-based floating microspheres represent a promising gastro-retentive system for prazosin hydrochloride. Their ability to sustain drug release may reduce dosing frequency, improve patient compliance, and minimize fluctuations in blood pressure. Given the biocompatibility of sodium alginate, this delivery system is safe and well-suited for long-term antihypertensive therapy.

**Keywords**: Floating microspheres, Olive oil, Pluronic-F, Soluplus, Kolliphor

**PC-816**

**FORMULATION AND EVALUATION OF CURCUMIN TRANSDERMAL PATCHES FOR WOUND HEALING**

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The present study focused on the formulation and evaluation of curcumin-loaded transdermal patches aimed at wound healing and anti-inflammatory applications. Curcumin, a bioactive compound of turmeric, suffers from poor oral bioavailability due to low solubility and extensive first-pass metabolism. Hence, its delivery through the transdermal route offers an effective alternative by bypassing gastrointestinal degradation and providing sustained release. The patches were prepared using the solvent casting method, employing polymers such as polyvinyl pyrrolidone (PVP) and methyl cellulose, along with plasticisers and penetration enhancers.The prepared patches were evaluated for physicochemical and mechanical properties, including thickness, weight variation, folding endurance, moisture absorption/loss, surface pH, and drug content uniformity. The results revealed that the patches were smooth, uniform, yellow in colour, and free from cracks. The average weight of patches was 209.66 mg, with excellent folding endurance, showing cracks only after 356 folds. Moisture absorption was recorded at 4.16%, while surface pH remained close to neutral, ensuring skin compatibility. In vitro dissolution and ex vivo permeation studies demonstrated sustained release of curcumin, following first-order kinetics ($R^2$ = 0.9549). FTIR analysis confirmed no significant chemical interaction between curcumin and polymers, indicating stability of the formulation.Overall, the optimized formulation provided controlled release with desirable physicochemical properties and effective drug-polymer compatibility. These findings suggest that curcumin transdermal patches can be a promising therapeutic system for wound healing, pain relief, and inflammation management, thereby improving patient compliance and clinical outcomes.

**Keywords**: Curcumin, Transdermal Patches, Solvent Casting, Wound Healing, First-order Kinetics.

**PC-817**

**FORMULATION AND EVALUATION OF FLOATING TABLETS FOR THE MANAGEMENT OF GASTRIC REFLUX**

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The study aims to formulate the floating tablets for the management of gastric reflux from the Desmostachya bipinnata extract. The polymers HPMC K4M and Carbopol 940 are selected as the matrix forming agents. The $NaHCO_3$ was used as an effervescent agent, and magnesium stearate was used as a lubricant. The flow properties of the mixture were shown satisfactory. The tablet was prepared by direct compression method.The parameters evaluated with the results are as follows: The hardness of the tablet was 4 kg , the floating lag time is 56 seconds and the tablet's total floating time is 7 hours. The tablet followed Korsmeyer–Peppas release kinetics and the drug release was 90% within 8 hours.

**Keywords**: Reflux, Desmostachya bipinnata, Floating tablets, Korsmeyer–Peppas

**PC-818**

**DECIPHERING THE IMPACT OF HYALURONIC ACID GRAFTING DENSITY AND MOLECULAR WEIGHT ON PACLITAXEL LIPOSOME IN CD-44 RECEPTOR TARGETING.**

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The biggest challenge in developing efficacious anticancer formulations is to improve their targeting specificity and reducing toxicity. For this purpose, HA anchored paclitaxel liposomes (HA-PTX-LIP) were fabricated using synthesized conjugate HA-DSPE (HA Molecular Weight- 12, 76, and 160–200 kDa). Maximum in vitro cell targeting was observed with 160–200 kDa HA-PTX-LIP compared to 11 and 76 kDa HA PTX-LIP, indicating HA's MW-dependent HA-CD44 binding and internalization. Further, the effect of grafting density (HA/L ratio- µg HA-DSPE/µmol Lipid) of 160–200 kDa HA-DSPE on tumor targeting was evaluated in vitro at three dif ferent levels (low-20 µg/µmol, mid-50 µg/µmol, and high- 100 µg/µmol). HA/L -100 exerted the highest in vitro tumor-targeting potential. Upon in vivo evaluation, 160–200 kDa HA-PTX LIP (HA/L-100) exhibited 18.11 and 27.4-fold improved AUC and MRT, respectively, compared to the marketed formula tion. Moreover, it showed improved biodistribution with less organ AUC (liver, spleen, and kidney) when compared with the marketed formulation. A significant reduction in ROS generation suggested decreased tumor incidence. Compared to the control and marketed formulations, the modified liposome showed increased targeting potential in the in vivo antitumor efficacy on the ovarian tumor model, resulting in a 4.88 and 2.81-fold reduction in tumor volume.




ISBN: 978-81-980623-8-3

Compared to the control and commercial formulations, tumor weight was also reduced by 1.48 and 1.11-fold. Animal survival was 100 percent with 160–200 kDa HA-PTX-LIP (HA/L-100) without significant weight loss. The findings suggest the possibility of rationalizing HA's molecular weight and grafting density for efficient in vivo ovarian tumor targeting.

**Keywords**: Paclitaxel, HÀ-DSPE, Liposome, CD-44 receptor targeting, Ovarian cancer.

**PC-819**

## FORMULATION, DEVELOPMENT AND EVALUATION OF FILM FORMING SPRAY FOR PSORIASIS

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Film-forming sprays (FFS) are an innovative transdermal drug delivery system that enhance patient compliance and provide sustained drug release. In this study, a film-forming spray of Curcuma longa was developed using Ethyl Cellulose and Eudragit polymers by the solvent evaporation technique. The formulations were evaluated for drug content, pH, viscosity, drying time, spray angle, stickiness, water washability, and spray volume per actuation, along with in-vitro drug diffusion and ex-vivo permeation studies. Drug release was assessed using a modified Franz diffusion cell, showing satisfactory performance in all parameters. Among the tested formulations, the Ethyl Cellulose and Eudragit (1:1) combination demonstrated the highest drug release and optimal drug content. The results indicate that Curcuma longa film-forming spray is a promising sustained release transdermal system with potential application in the treatment of psoriasis.

**Keywords**: Curcuma longa, Film-forming spray, Transdermal delivery, Solvent evaporation, Psoriasis

**PC-820**

## STUDIES ON ENHANCEMENT OF BIOAVAILABILITY OF HIGH-POTENCY STATINS THROUGH NOVEL FORMULATION APPROACH

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High-potency statins (HPS), particularly Rosuvastatin, are potent lipid-lowering agents but suffer from poor oral bioavailability due to low aqueous solubility, extensive first-pass metabolism, and efflux transport. This study investigates whether advanced formulation strategies—specifically gastroretentive drug delivery systems (GRDDS), solid dispersions, nanoparticles, and lipid-based carriers can significantly enhance solubility, dissolution, and pharmacokinetics of HPS. Given their BCS Class II classification, dissolution rate is the primary limitation for absorption. By combining prolonged gastric retention with nanoscale engineering, these approaches are expected to improve permeability and bioavailability, thus enhancing therapeutic efficacy while minimizing dosing frequency. Formulations developed include GRDDS (floating tablets, mucoadhesive microspheres, in situ gels), solid dispersions with hydrophilic polymers (PVP, PEG, HPMC), and nanoparticles prepared by solvent evaporation and precipitation methods. Characterization was carried out through solubility and dissolution studies (USP-II), particle size and zeta potential analysis, and drug–excipient compatibility using FTIR, DSC, and PXRD. In vivo pharmacokinetic evaluations were conducted in suitable animal models to determine Cmax, Tmax, AUC, and relative bioavailability. Notably, the optimized solid dispersion formulation (SD-F6) demonstrated a 2.38-fold improvement in bioavailability compared to the marketed product and a 3.42-fold increase relative to pure drug suspension. Preliminary outcomes indicate that GRDDS provided sustained gastric retention and controlled release, while Nano systems and lipid-based carriers significantly enhanced dissolution and absorption. Optimized formulations are expected to offer improved stability, scalability, and therapeutic outcomes. These results highlight the potential of novel formulation platforms to overcome biopharmaceutical barriers of statins and translate into clinically superior, patient-friendly therapies for cardiovascular disease management.

**Keywords**: High-potency statins, Gastroretentive drug delivery systems, Nanoparticles, Solid dispersions, Bioavailability enhancement.

**PC-821**

## DEVELOPMENT AND EVALUATION OF A MUCOADHESIVE NANOPARTICULATE DRUG DELIVERY SYSTEM FOR BRAIN TARGETING THROUGH NASAL ROUTE

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This study aims to develop and optimize Pramipexole-loaded nanostructured lipid carriers (NLCs) for effective management of Parkinson's disease via intranasal administration. Caesalpinia crista seed extract was incorporated as a natural mucoadhesive agent to enhance nasal residence time and facilitate direct nose-to-brain drug delivery, bypassing the blood-brain barrier (BBB). NLCs were formulated using solvent diffusion method, with glycerol monostearate and triglycerides as lipid matrices, and Tween 40 and Poloxamer 188 as surfactant and co-surfactant. A Box–Behnken Design was employed to optimize key formulation parameters—lipid content, surfactant concentration, and stirring speed—based on critical quality attributes such as drug content, entrapment efficiency, particle size, polydispersity index (PDI), zeta potential, and drug release. The optimized formulation (NF10) showed a drug content of 98.84 ± 0.82%, entrapment efficiency of 96.02 ± 1.38%, particle size of 215.6 ± 1.9 nm, PDI of 0.271 ± 0.92, and zeta potential of −28 ± 1.25 mV. In vitro studies demonstrated sustained drug release (94.71 ± 0.065% over 6 h). Ex vivo studies showed 91.51 ± 1.08% nasal mucosal permeation and mucoadhesive strength of 7357.5 dyne/cm². In vivo pharmacokinetic studies in rats revealed brain and plasma Cmax value 1.27289 µg/ml and 1.05289 µg/ml at Tmax of 1 and 2 h , respectively, after intranasal administration. These findings confirm enhanced brain targeting and bioavailability of Pramipexole, highlighting the potential of this mucoadhesive NLC system as a promising non-invasive therapeutic strategy for Parkinson's disease.

**Keywords**: Nanostructured Lipid Carriers, Nose-to-Brain Delivery, Mucoadhesion, Caesalpinia crista, Parkinson's Disease

**PC-822**

## DESIGN AND DEVELOPMENT OF MUCOADHESIVE BUCCAL TABLETS OF PRAVASTATIN SODIUM USING A DOE APPROACH

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This study aimed to develop mucoadhesive buccal tablets of Pravastatin Sodium using a Quality by Design (QbD) framework with a Box-Behnken Design. Pravastatin Sodium, limited by poor bioavailability from first-pass metabolism, was formulated for buccal delivery to improve absorption and provide sustained release. Chitosan, HPMC K4M, and Xanthan Gum were selected as key polymers, with mucoadhesive strength and 12-hour cumulative drug release as the primary response parameters. Thirteen formulations were prepared by direct compression and evaluated for pre- and post-compression parameters, all within pharmacopoeial limits. Polymer concentrations significantly affected swelling, adhesion, and release. In vitro studies showed that Chitosan increased drug release, while HPMC prolonged it. The optimized formulation containing Chitosan (37 mg), HPMC K4M (15 mg), and Xanthan Gum (22 mg) released ~85% of the drug over 12 h with good mucoadhesive properties. Release followed first-order kinetics ($r^2$ = 0.992) and Korsmeyer-Peppas model ($r^2$ = 0.983), indicating non-Fickian transport. Response surface methodology confirmed the significant influence of polymers, with close agreement between predicted and observed results. FTIR and DSC confirmed drug–polymer compatibility, while ICH stability studies showed six-month robustness. The findings highlight buccal mucoadhesive delivery of Pravastatin Sodium as a viable alternative to oral therapy, ensuring sustained release, reduced dosing frequency, and improved patient compliance.

**Keywords**: Mucoadhesive buccal tablet, Pravastatin Sodium, DoE, Box-Behnken Design (BBD), Antihyperlipidemic.

**PC-823**




ISBN: 978-81-980623-8-3

**FORMULATION AND EVALUATION OF ECONAZOLE NITRATE NANOEMULGEL: AN INNOVATIVE STRATEGY FOR IMPROVED TOPICAL ANTIFUNGAL DELIVERY**

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Econazole nitrate is a broad-spectrum antifungal drug used in the treatment of superficial fungal infections. However, its therapeutic efficacy is limited by poor aqueous solubility and reduced skin penetration. This study aims to design, optimize, and evaluate an econazole nitrate-loaded nanoemulgel formulation to enhance solubility, skin permeation, and antifungal effectiveness. Econazole-loaded nanoemulsions were prepared using the aqueous titration method with Oleic acid as the oil phase, Tween 80 as surfactant, and PEG 400 as co-surfactant, followed by ultrasonication. Different Smix ratios were employed to construct a pseudo-ternary phase diagram and identify the nanoemulsion region. The optimized nanoemulsion was incorporated into a Carbopol 934 gel base to form a nanoemulgel. The formulations were evaluated for globule size, polydispersity index (PDI), zeta potential, entrapment efficiency, pH, viscosity, spreadability, in vitro drug release, ex-vivo diffusion, and antifungal activity. FTIR analysis confirmed no significant drug–excipient interactions. The optimized formulation exhibited small globule size, narrow PDI, and stable zeta potential, indicating stability. Incorporation into the gel base resulted in desirable viscosity, pH, and spreadability for topical application. In vitro and ex vivo studies revealed enhanced drug release and skin permeation compared to plain econazole gel. Kinetic modeling indicated non-Fickian diffusion as the release mechanism. Antifungal studies confirmed improved efficacy against Candida albicans. The developed econazole nitrate nanoemulgel demonstrated improved solubility, skin penetration, and antifungal activity, offering a promising alternative to conventional topical formulations. The nanoemulgel system can enhance patient compliance and therapeutic effectiveness by providing sustained drug release and superior permeation characteristics.

**Keywords**: Econazole nitrate; Nanoemulgel; Pseudo-ternary phase diagram; Ultrasonication; Antifungal therapy; Drug release; Permeation.

**PC-824**

**DEVELOPMENT AND EVALUATION OF DIPHENHYDRAMINE HCL TRANSDERMAL PATCH USING FACTORIAL DESIGN APPROACH**

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This study presents the development of a novel transdermal patch of Diphenhydramine HCl using hydroxypropyl methylcellulose (HPMC K100M) as the matrix polymer to address limitations of conventional oral formulations such as first-pass metabolism, frequent dosing, and variable patient compliance. Transdermal delivery was selected as a patient-friendly approach to achieve sustained and controlled release. A Quality by Design (QbD) strategy was employed to define the Quality Target Product Profile (QTPP), identify critical formulation variables, and establish a robust design space, ensuring product quality is built into the process rather than tested at the end. Patches were fabricated by solvent casting, with HPMC K100M as film former and PEG 400 as plasticizer. Preliminary trials aided in identifying key formulation parameters, which were subsequently optimized using a three-level factorial design. The developed patches were evaluated for thickness, weight uniformity, surface pH, drug content, mechanical integrity, in vitro diffusion profile, and stability under storage conditions. The optimized formulation demonstrated desirable mechanical strength, uniform drug distribution, and a controlled release profile over an extended duration, highlighting its potential as a safe and effective alternative to oral Diphenhydramine therapy. This work not only establishes a promising transdermal platform for Diphenhydramine delivery but also illustrates the value of QbD-driven formulation development in advancing next-generation drug delivery systems.

**Keywords**: Transdermal Patch, Antiinflammation, Factorial Design, Polymer, Plasticizer

**PC-825**

**RECENT ADVANCEMENTS AND FUTURE DIRECTIONS OF NANOCOSMETICS**

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The convergence of nanotechnology and the clean beauty movement has catalyzed the development of sustainable nanocosmetics that maintain efficacy while addressing environmental and safety concerns. This paradigm shift represents a fundamental transformation from first-generation persistent nanomaterials to biodegradable, bio-based systems integrated with circular economy principles. This comprehensive review examines the molecular timeline of nanocosmetics evolution, focusing on sustainable synthesis methods, environmental fate, regulatory frameworks, and emerging technologies that define the future of clean beauty nanotechnology. A systematic analysis of peer-reviewed literature from 2010-2024 was conducted, encompassing sustainable nanomaterial synthesis, environmental impact assessment, regulatory developments, and market trends in clean beauty applications. The transition toward sustainable nano-cosmetics demonstrates significant progress in green synthesis methods, with bio-based nanomaterials showing comparable or superior performance to conventional alternatives while offering enhanced biodegradability and reduced environmental impact. Advanced characterization techniques and predictive modeling enable comprehensive safety assessment, while regulatory frameworks increasingly accommodate sustainable nanotechnology innovations. The future of nano-cosmetics lies in biomimetic design, circular economy integration, and personalized formulations that leverage artificial intelligence and biotechnology advances while maintaining absolute commitment to environmental stewardship and consumer safety.

**Keywords**: Sustainable nanotechnology, clean beauty, green synthesis, biodegradable nanomaterials, circular economy, environmental safety.

**PC-826**

**TACROLIMUS-LOADED POLYMERIC MICRONEEDLES: DESIGN, FABRICATION, AND CHARACTERIZATION**

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Tacrolimus, a BCS class II immunosuppressive drug, is characterized by a narrow therapeutic index and poor oral bioavailability due to P-glycoprotein efflux and extensive pre-systemic metabolism, which further contributes to neurotoxicity and nephrotoxicity when administered orally. To address these limitations, the current study focus on the design and development of a polymeric microneedle (PMN) system for transdermal delivery of Tacrolimus, aiming to bypass first-pass metabolism, provide painless administration, and achieve controlled release for improved patient compliance. The PMNs were fabricated using solvent casting method by in house prepared bees wax mold rather than conventional polydimethylsiloxane (PDMS) mold, and a Central Composite Design was employed to optimize the concentrations of Polyvinylpyrrolidone (PVP) K90 and Eudragit RS100 (independent variables), evaluating their influence on mechanical strength and tensile strength (dependent variables). The optimized formulation exhibited superior mechanical strength (8.07 N) and tensile strength (1.484 MPa). Characterization studies, including weight variation, swelling index, optical and scanning electron microscopy, FTIR, DSC, drug content, in-vitro diffusion, release kinetics, and stability analysis, confirmed the robustness of the formulation. Microscopy revealed well-formed microneedles with an average length of 470.79 µm, base width of 156.33 µm, and pitch distance of 709.33 µm. The optimized PMN patch demonstrated a drug content of 97.49 ± 0.55% and sustained release of 79.79 ± 0.10% over 30 hours, following zero-order diffusion-controlled kinetics. These findings indicate that polymeric microneedles of Tacrolimus can effectively enhance bioavailability, maintain therapeutic drug levels, minimize oral delivery-related toxicities, establishing PMNs as a promising patient-centric strategy for immunosuppressive therapy.

**Keywords**: Tacrolimus, Polymeric microneedle, Central composite design, Mechanical strength, Tensile strength

**PC-827**




ISBN: 978-81-980623-8-3

**DESIGN, DEVELOPMENT AND CHARACTERISATION OF SPRAY-DRIED POWDER OF POMEGRANATE FOR NUTRITIONAL BENEFITS**

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It has been noted that certain natural compounds have a vast array of nutritional benefits; however, many of these values may be lost or destroyed because they are not transformed into a product that contains all of the nutritional and therapeutic benefits that were initially contained in the raw plant material. Pomegranate spray-dried powder was created in order to solve this issue in the current study. The goal of the study is to create a spray-dried pomegranate powder, analyze spray-drying parameters such air inlet temperature and maltodextrin concentration, and track variables like yield, moisture content, hygroscopicity, bulk density, and solubility time. The current investigation used temperature conditions between 130 and 150 °C with polymer concentrations of 5%, 15%, and 25% w/v. It was found that the maximum yield (57%), lower moisture content (1.8%), lower hygroscopicity (i.e., 0.72 gm of water absorb / 100 gm of powder), higher bulk density (0.64 gm/ml), and longer solubility time (132 sec) are achieved at an air inlet temperature of 150 °C and a polymer concentration of 25%. Since there are no significant changes in the IR graphs of the medication and mixture with polymer, the IR analysis provides insight into the compatibility of both materials. The material's particle size was determined to be 5.7 +0.159 µm. Pomegranate powder's SEM revealed that its particles range in size from 4.5 to 6.0 µm and have an uneven shape. To sum up, research helps to enhance the nutritional and therapeutic advantages.

**Keywords**: Pomegranate, Spray drying, Maltodextrin, Nutritional value, Air inlet temperature.

**PC-828**

**OPTIMIZATION OF ANTIOXIDANT, ANTIMICROBIAL AND TOTAL PHENOLS OF DRIED ROOTS OF LEEA MACROPHYLA ROXB. USING RESPONSE SURFACE METHODOLOGY**

KOTA PADMAJA

This article demonstrates the statistical optimization of extract of tuberous traditional roots of Leea macrophyla (family: Leeaceae) using four different variables including time, temperature, solvent and solvent solid ratio in three levels and 29 runs were designed using Box Behnken experimental design to identify the significant variables effecting DPPH Scavenging capacity, antimicrobial and total phenolic content. Response surface methodology (RSM) was used to optimize the conditions for the above-mentioned activities using four independent variables: time (20, 40, 60 min), temperature (40, 60, 80°C), solvent (ethanol, methanol and water), solvent solid ratio (10, 20, 30gm). The collective effect of different factors of these three variables shows optimum conditions for the most critical variables that exhibits significant variation in the response of interest were identified with a target to achieve maximum extraction yield at specific time, temperature, type of solvent, and ratio of the drug powder taken, shows maximum DPPH Scavenging capacity, total phenolic content (TPC) and antimicrobial activity. The result showed that at 60 min, 80°C, in water and 30gm of solid shows maximum antioxidant potential ranging from 43.52- 94.25%, TPC 44.07-104.47-9.24-12.21 mg GAE/g, the zone of inhibition 10-22.66 mm. These optimized conditions can be applied for quick extraction and efficient results of various activities, represents an improvement over existing methods.

**Keywords**: Leea macrophyla; optimization; Box Behnken method; Response surface methodology; DPPH Scavenging capacity, total phenolic content, antimicrobial activity.

**PC-829**

**A STUDY ON COMPARATIVE PHARMACOPEIAL EVALUATION OF GENERIC AND BRANDED PARACETAMOL 500 MG TABLETS IN THE PAMPADY REGION, THRISSUR, KERALA**

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Paracetamol (acetaminophen) is a widely used analgesic and antipyretic agent, available in both branded and generic formulations. Concerns regarding the quality, safety, and interchangeability of these formulations often arise. This study aimed to comparatively evaluate the pharmacopeial quality of branded and generic paracetamol 500 mg tablets available in the Pampady region, Thrissur, Kerala, according to Indian Pharmacopoeia (IP) specifications. Six different brands, comprising both generic and branded formulations, were collected from local pharmacies and analyzed. Quality control parameters assessed included weight variation, hardness, friability, disintegration time, dissolution profile, and assay of active pharmaceutical ingredient (API). All brands complied with IP requirements for weight variation, friability, and hardness, indicating satisfactory physical and mechanical properties. Disintegration times were within 15 minutes for all samples, confirming rapid disintegration. Dissolution testing showed more than 80% drug release within 30 minutes, meeting pharmacopeial standards. Assay results confirmed API content ranged between 96% and 103% of the labeled claim, within the acceptable range of 95–105%. Minor variations in hardness and dissolution were observed but were not statistically significant. Cost comparison revealed that a branded paracetamol strip (30 tablets) costs ₹30, while the generic version costs ₹21, reflecting a 30% cost saving. The study concludes that both branded and generic paracetamol 500 mg tablets in the Pampady region meet pharmacopeial quality standards and are therapeutically equivalent. These findings support the rational use of generic formulations as cost-effective alternatives without compromising efficacy or safety. Continuous post-marketing surveillance is recommended to maintain consistent quality.

**Keywords**: Paracetamol, Generic drugs, Branded drugs, Pharmacopeial evaluation, Quality control, Cost-effectiveness, Kerala

**PC-830**

**QUALITY BY DESIGN-BASED DEVELOPMENT AND OPTIMIZATION OF VALSARTAN SUBLINGUAL TABLETS FOR ENHANCED THERAPEUTIC PERFORMANCE IN HEART FAILURE**

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Heart failure management often requires rapid therapeutic intervention, and Valsartan, an angiotensin II receptor blocker, plays a vital role in reducing cardiovascular risks. However, conventional oral administration suffers from delayed onset and reduced bioavailability due to first-pass metabolism. Sublingual delivery provides a promising alternative, ensuring faster absorption and improved patient outcomes. The present research aimed to formulate and optimize a fast-dissolving sublingual tablet of Valsartan using the Quality by Design (QbD) framework. A Box–Behnken Design (17 runs) was applied to systematically study the influence of superdisintegrants—Sodium Starch Glycolate (SSG), Crospovidone (CP), and Crosscarmellose Sodium (CCS)—on critical quality attributes, namely disintegration time and drug release. The optimized formulation (OVSF-18) demonstrated excellent pre-compression and post-compression properties, including good flowability, uniformity of weight, acceptable hardness, and low friability. In vitro evaluation revealed rapid disintegration with a cumulative drug release of 93% within 15 minutes, significantly higher than conventional formulations. Stability studies further confirmed the robustness of the optimized batch without notable degradation. This study highlights the successful application of QbD in designing a stable, effective, and patient-compliant Valsartan sublingual formulation. The developed dosage form holds strong potential to enhance therapeutic efficiency, reduce hospitalization risks, and improve overall quality of life in hypertensive and heart failure patients.

**Keywords**: Valsartan, Sublingual Tablet, Quality by Design, Box-Behnken Design, Drug Release, Hypertension, Heart Failure

**PC-831**

**FORMULATION AND EVALUATION OF DOMPERIDONE SUSPENSION USING ITS HYDROTROPIC DISPERSIONS**

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Domperidone is a dopamine D2 receptor antagonist widely prescribed for the management of nausea, vomiting, and gastrointestinal disorders. Despite its therapeutic benefits, Domperidone suffers from very low




ISBN: 978-81-980623-8-3

aqueous solubility, which results in poor dissolution and variable bioavailability. Conventional suspension formulations often fail to provide consistent drug release, thereby affecting clinical outcomes. To address this limitation, hydrotropic solubilization has emerged as a novel and cost-effective strategy to enhance the solubility of poorly water-soluble drugs. The present study was designed to formulate and evaluate Domperidone suspension using its hydrotropic dispersions. Hydrotropic agents such as citric acid, sodium salicylate, urea, PABA, caffeine, and resorcinol were carefully screened, and optimized dispersions of Domperidone were prepared using the solvent evaporation method. These dispersions were incorporated into suspension formulations and evaluated for various physicochemical and performance parameters, including appearance, pH, sedimentation volume, viscosity, redispersibility, drug content uniformity, FTIR, and DSC. Comparative in vitro dissolution studies were conducted between the hydrotropic suspension and a conventional Domperidone suspension. The application of hydrotropic solubilization in suspension formulation provides a simple, safe, and economical approach for improving the solubility, dissolution, and ultimately the therapeutic performance of Domperidone. This approach holds potential for extending to other Biopharmaceutics Classification System (BCS) class II drugs with poor water solubility.

**Keywords**: Domperidone, Suspension, Hydrotropic Dispersions

**PC-832**

## GLABRIDIN-ENCAPSULATED LIPOSOME INCORPORATED HYDROGEL FOR DIABETIC WOUND HEALING

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In this research, glabridin-encapsulated liposome was formulated to improve the physicochemical properties of the phytomolecule for enhanced diabetic wound healing activity. The formulated liposome was incorporated into hydrogel, which was synthesised using O-carboxy methyl chitosan and oxidized alginate by imine bond formation. The polymeric intermediate and conjugated polymer were characterised by FTIR and 1H NMR analysis, which confirmed the conjugation of both polymers by specific peaks related to each polymer backbone and substituted functional group protons. The dynamic light scattering analysis revealed a particle size of liposome less than 200 nm, zeta potential greater than -25 mV, and polydispersity index 0.35, indicating the stability of the liposome. Additionally, the stability of the liposome was assessed over 90 days by measuring its size, and the results indicated that slight change in size, confirming the liposome's stability. In-vitro release study demonstrated sustained release of the phytomolecule, which releases 78% of molecules at 48 h. Cell viability of liposome-incorporated hydrogel was studied in HaCaT and L929 cell lines, and the result indicates the compatibility of the delivery system. Antimicrobial assay exhibited that the liposome inhibited S. aureus and E.coli significantly. The formulation showed inhibition of inflammatory mediators, TFN-α and IL-6. Diabetic wound was created on Swiss albino mice, which were then treated with liposome-incorporated hydrogel. The study showed that glabridin liposome was more effective in healing diabetic wounds compared to clinically available antimicrobial ointment and hydrogel formulation without phytomolecule. This research aims to further investigate the delivery system in other animal models to confirm its effectiveness in treating diabetic wounds.

**Keywords**: Glabridin, liposome, diabetic wound, hydrogel, antimicrobial

**PC-833**

## POLYMERIC NANOPARTICLES: A MODERN APPROACH TO SKIN BRIGHTENING

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Nanotechnology contributes significantly to the advancement of cosmeceutical formulation by enhancing the active compounds' solubility, stability, safety, loading efficiency, and skin permeability. Often empolyed brightening agents like vitamin C, arbutin, and kojic acid are unstable, degrade quickly, and have limited topical efficacy.The primary benefit of using polymeric nanoparticles lies in their ability to entrap active agents regardless of their solubility whether hydrophilic or lipophilic. Polymeric nanoparticles are small, solid particles composed of synthetic or natural polymers that serve as delivery systems for bioactive compounds, medications, and cosmetics. Modern delivery methods such as polymeric nanoparticles have become popular because they provide skin-brightening agents with controlled release, increased stability, and improved dermal penetration. To create nanoparticles, biodegradable polymers like chitosan, PLGA, and alginate are used in solvent evaporation, ionic gelation, and nanoprecipitation processes. Polymeric nanoparticles offer a revolutionary method of skin brightening by fusing safety and effectiveness.

**Keywords**: Polymeric nanoparticles, Chitosan, cosmeceutical

**PC-834**

## GREEN APPROACHES TO NANOCOSMECEUTICALS: AN OVERVIEW

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Eco-friendly green nanoformulations provide a safer and more biocompatible option compared to chemical-based nanoformulations in the cosmetics industry. In contrast to traditional cosmetic formulations, this overview highlights how cosmeceuticals that investigate nanotechnology-based systems for the delivery of natural polymers can enhance product performance.The active ingredients in traditional cosmeceuticals frequently have low bioavailability, poor stability, and restricted penetration. Therefore shortcomings of conventional dosage systems, addressed by natural polymer-based biocompatible nanocarriers.Incorporating natural polymers like chitosan, alginate, cellulose, and silk fibroin into nanocarrier development offers safe, renewable, and biodegradable platforms.They also improve functionality of nanocarriers by using environmentally friendly techniques like emulsification, ionic gelation.For instance, ionic crosslinked chitosan nanoparticles with tripolyphosphate provide mucoadhesion and controlled release of bioactive substances, while calcium-ion-crosslinked alginate nanocapsules protect hydrophobic materials within an oil core.Active cosmeticeutical ingredients can be delivered more precisely, penetrate the skin more effectively, enable targeted and sustained release and have better bioavailability. Nanocarriers such as nanoparticles, nanogels, and nanoemulsions make it possible to effectively encapsulate both hydrophilic and hydrophobic bioactive compounds.This encapsulation extends the shelf life of the active ingredients by shielding them from oxidation, heat, and light.Therefore, natural polymer-based nanocarriers in cosmeceuticals, highlight the potential of green nanotechnology in future cosmetic science by providing a promising balance between safety, efficacy, and environmental stewardship.

**Keywords**: Nanocosmeceuticals, Natural polymers, Nanocarrier.

**PC-835**

## SMART CONTACT LENSES: A NOVAL PLATFORM FOR SUSTAIN SMART CONTACT LENSES OPHTHALAMIC DRUG DELIVERY SYSTEM AND OCULAR MONITORING

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Conventional ophthalmic drug delivery system such as eye drops and ointments are limited by poor bioavailability, rapid tear clearance, and low patient compliance, resulting in therapeutic in efficiency. To overcome these challenges, smart contact lenses have emerged as a novel platform for sustained and control ocular drug delivery. These lenses are fabricated from hydro gel polymers are silicon material and can be engineered to incorporate drugs through methods such as soaking, nanoparticle embedding, micro- reservoir integration, and layer by layer coating. Recent advancement have introduced stimuli-responsive systems in which drug release can be triggered by external cues including light, heat or electrical signals. Smart lenses can deliver a wide range of therapeutic agent including, anti-glaucoma medication ( timolol , letanoprost), a anti inflammatory agents(dexamethasone, keterolac), antibiotic and anti allergic drugs ,there by enhancing treatment outcomes in various ocular diseases. Compared to conventional methods, these devices provide prolonged residence time,




ISBN: 978-81-980623-8-3

improved bioavailability reduce dosing frequency and added benefit of simultaneous vision correction. Furthermore, integration of biosensors enables real time monitoring of intraocular pressure, glucose levels or other ocular biomarkers, expanding their role in personalized medicine. Despite significant advantages, challenges remain in terms of biocompatibility, oxygen permeability, risk of burst release and regulatory approval.

**Keywords**: Smart contact lenses, Ocular drug delivery, Glaucoma, Sustained release, Biosensors.

**PC-836**

**FORMULATION AND EVALUATION OF TOLNAFTATE LOADED CHITOSAN NANOPARTICLE EMULGEL**

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Tolnaftate is a synthetic thiocarbamate drug used as an antifungal agent that acts by inhibiting fungal squalene epoxidase. The drug alters hyphae and inhibits mycelial growth in fungi. This medication is used topically to treat fungal infections such as jock itch, athlete's foot, tinea cruris, and tinea corporis. Tolnaftate comes under the BCS IV class of drugs, which possess poor water solubility and high hydrophobicity, leading to low permeability and side effects such as itching, dryness, or peeling of the treated skin. Hence, for the enhancement of solubility and to reduce the local side effects, tolnaftate loaded with chitosan nanoparticles appeared to be a viable approach. Chitosan is a polysaccharide derived from the deacetylation of naturally occurring chitin. It is biocompatible, biodegradable, nontoxic, water soluble and requires very less use of solvents for preparation. Emulgel for topical use overcomes the delivery of hydrophobic drugs and offers dual controlled release effect. Thus, tolnaftate-loaded chitosan nanoparticles emulgel with penetration enhancers by ionic gelation method increases the solubility, permeability and reduces side effects of drug. Nanoparticles were prepared, and their preformulation study was conducted. The optimized nanoparticles were characterised by FTIR, SEM, entrapment efficiency, and drug release study. The anti-fungal activity of tolnaftate-loaded chitosan nanoparticles was evaluated for 4 formulations, which all showed good results. Further, by using formulation 3, the nanoparticle emulgel was formulated and evaluated for appearance, viscosity, pH, spreadability, in vitro release, and antifungal activity. The formulated emulgel showed better antifungal activity than the marketed formulation.

**PC-837**

**MANGIFERIN NANOEMULGEL: A NOVEL PHYTOPHARMACEUTICAL APPROACH FOR ENHANCED DERMAL DELIVERY**

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Mangiferin is a potent bioactive antioxidant and has been demonstrated to possess numerous biological activities including anti-inflammatory, antidiabetic, anticancer, antimicrobial, analgesic, and immunomodulatory properties. However, its clinical translation is restricted due to poor solubility, limited mucosal permeability, and low bioavailability. To address these challenges, a nanoemulsion-based formulation of Mangiferin was developed to enhance solubility and permeability, followed by incorporation into a nanoemulgel for sustained topical delivery. Nanoemulsions were prepared using oleic acid, Tween 80, and Transcutol P (Smix ratio) by the classical titration method, with pseudoternary phase diagrams constructed for optimization. Response Surface Methodology (RSM) was applied to optimize the formulation based on particle size and polydispersity index (PDI). Among the tested formulations, F2 demonstrated optimum characteristics with particle size 354.0 nm and PDI 0.285, and was further evaluated for pH, viscosity, and in vitro drug release. F2 was incorporated into a Carbopol-based hydrogel (0.5–2%) to produce the optimized Mangiferin nanoemulgel (F2G). The developed nanoemulgel showed desirable physicochemical properties including appropriate pH, excellent spreadability, and extrudability, with a cumulative drug release of 85.52% at 24 hours, indicating sustained release. Mangiferin-loaded nanoemulgel shows great potential as a topical system by enhancing solubility, permeability, and therapeutic effectiveness, while providing sustained release for better patient compliance.

**Keywords**: Mangiferin, nanoemulsion, nanoemulgel, pseudoternary phase diagram.

**PC-838**

**INTEGRATION OF DIOVAN WITH PROTEUS CHIP TECHNOLOGY:A NOVEL APPROACH IN CARDIOVASCULAR THERAPY**

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The combination of pharmaceuticals with innovative digital technologies has heralded a new era in healthcare, offering unprecedented opportunities for personalized medicine and improved patient outcomes. In this context, the integration of Diovan (Valsartan), an angiotensin II receptor blocker commonly used in the management of hypertension and heart failure, with Proteus Chip Technology represents a groundbreaking advancement. The Proteus Chip, a miniaturized ingestible sensor, is designed to be embedded within pharmaceutical formulations, enabling real-time monitoring of medication adherence and physiological responses within the body. The data from the study conducted by Novartis using Proteus' "chip in the pill" technology to monitor patient compliance with Diovan, a blood pressure medication, showed a notable increase in compliance rates. Before using the technology, patient compliance was at 30%, but after six months of utilizing the technology, compliance increased more than two-fold to 80%. This suggests that this technology can significantly improve patient medication adherence for controlling blood pressure. It utilizes an alkaline charge generated by the gastric juices to activate a chip embedded in the medication, which is detected by a receiver, then transmits the data to a sensing patch worn on the patient's skin. Additionally, the technology provides data on physiological parameters such as heart rate, activity levels, medication effectiveness, and respiration patterns, which can be accessed and analysed by caregivers to optimize treatment outcomes.

**Keywords**: Diovan, Proteus Chip Technology, Medication Adherence.

**PC-839**

**BIOANALYTICAL METHOD DEVELOPMENT AND VALIDATION FOR ESTIMATION OF DIMENHYDRINATE IN HUMAN PLASMA**

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Objective of regulatory guidelines viz. US FDA and ICH M 10 are intended to provide recommendations for the validation of bio analytical assays for chemical and biological drug quantification and their application in the analysis of study samples. Bio analytical method was developed for estimation of dimenhydrinate in human plasma by chromatographic technique. Bio analytical method was developed for estimation of dimenhydrinate DMH, with RP-HPLC, using RP-C18 column equipped with UV detector. The mobile phase [methanol: acetate buffer pH 4.0 (pH adjusted with acetic acid)] was pumped at a flow rate of 0.8 ml/min in the ratio of 76:24 % v/v and the eluent was monitored at wavelength 276 nm. The method was studied for quantitative estimation of drug from human plasma. The drug dimenhydrinate was shown linear response in conc range (1000-7000 ng/ml) in plasma. Accuracy and precision study shown that % CV was varied in the range (3.541-6.942) for DMH at all conc. levels and; the data of % nominal conc. was varied between (94.15-92.17) for DMH at all conc. levels. Guideline elaborated that the results of pivotal nonclinical toxicokinetic (TK)/pharmacokinetic (PK) studies and of clinical trials, including comparative bioavailability / bioequivalence (BA/BE) studies, are used to make regulatory decisions regarding the safety and efficacy of drug products. The developed method can be applied for relative bioavailability and bioequivalence study of drug or/and dosage form.

**Keywords**: Bio analytical method, Regulatory guidelines, ICH, dimenhydrinate, RP-HPLC

**PC-840**




ISBN: 978-81-980623-8-3

**DESIGN AND IN-VITRO EVALUATION OF GASTRO RETENTIVE MICRO-BALLOONS OF ACYCLOVIR BY USING COMBINATION OF HYDROPHILIC AND HYDROPHOBIC POLYMERS**

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The present research focused on formulating Acyclovir loaded gastro-retentive micro-balloons to prolong the drug's gastric residence and enable controlled release. The floating microspheres were produced via a non-aqueous solvent evaporation method, using Hydroxypropyl Methylcellulose (HPMC K4M) and Ethyl Cellulose (EC) in varying ratios across nine different formulations. These micro-balloons were systematically evaluated for particle size, surface characteristics through scanning electron microscopy (SEM), and additional physical properties such as morphology and flow behavior. Key parameters including percentage production yield, entrapment efficiency, floatation time, and in vitro release performance were also assessed. The micro-balloons were found to be spherical and exhibited consistent particle sizes ranging between 167.5 and 180.8 µm, making them well-suited for oral delivery. Drug entrapment efficiency was observed in the range of 75.37% to 89.24%, depending on polymer composition. SEM analysis and size distribution data highlighted noticeable differences among batches. Formulations F2, F3, and F6 those with a higher content of EC showed prolonged buoyancy over 12 hours and were effective in extending drug release. These outcomes emphasize the importance of optimizing polymer blends to achieve desirable floating behavior and sustained-release profiles for Acyclovir.

**Keywords**: Gastro retentive drug delivery system, Acyclovir micro balloons, non-aqueous solvent evaporation, Particle Size, Buoyancy, HPMC K4M, EC.

**PC-841**

**FORMULATION AND EVALUATION OF NADIFLOXCIN TOPICAL GEL USING MIXED SOLVENCY CONCEPT**

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The present study explored the application of the mixed solvency technique for the formulation of aqueous topical gels of poorly water-soluble drugs, with Nadifloxacin selected as the model drug. Mixed solvency reduces the required concentration of individual solubilizers, thereby minimizing toxicity while achieving significant solubility enhancement. Nadifloxacin samples were characterized by physical appearance, melting point, FTIR, and UV spectroscopy, confirming purity and suitability for formulation development. Spectrophotometric studies revealed no interference of the selected solubilizers in the estimation of Nadifloxacin. Among various solubilizing blends, on the basis of solubility enhancement more than 70 times in Blend B containing Sodium benzoate 20%, sodium caprylate 20%, propylene glycol 10% was chosen for gel formulation. Gels were prepared using Carbopol 934 as the gelling agent, which demonstrated good clarity, homogeneity, and favorable organoleptic properties. Formulated gels were evaluated for viscosity, spreadability, washability, skin irritation, pH, content uniformity, and in vitro release. The optimized batch (F2) showed content uniformity of 98.8±0.21% and drug release of 94.84% within 420 minutes. Stability studies confirmed retention of more than 98% drug content after one month, indicating good chemical stability. The findings demonstrate that Nadifloxacin topical gels prepared by mixed solvency are stable, effective, and safe for acne treatment. This approach provides an economical and scalable strategy for developing aqueous formulations of poorly water-soluble drugs using physiologically compatible solubilizers, thereby enhancing therapeutic outcomes and patient compliance.

**Keywords**: Mixed solvency, Nadifloxacin, Poorly water-soluble drugs, Topical gel

**PC-842**

**A COMPREHENSIVE EVALUATION OF ADVERSE DRUG REACTIONS LINKED TO AMINO ACID PRESCRIPTIONS IN A TERTIARY CARE HOSPITAL**

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Adverse drug reactions (ADRs) pose significant challenges in patient care, particularly in tertiary care settings where complex treatments are administered. Amino acid prescriptions are common in such settings, yet their potential for adverse reactions is not extensively studied. This research aims to comprehensively investigate ADRs associated with amino acid prescriptions in a tertiary care hospital. A retrospective analysis of patient records was conducted to identify cases where amino acid prescriptions were implicated in adverse reactions. Data regarding the types of reactions, severity, patient demographics, and concurrent medications were collected and analysed. The investigation spanned a defined period within the hospital's database. The analysis revealed a spectrum of adverse reactions linked to amino acid prescriptions. These reactions varied in severity, ranging from mild to severe. The most commonly reported reactions included gastrointestinal disturbances, allergic reactions, and metabolic imbalances. Certain patient demographics and concurrent medication use were found to influence the likelihood and severity of ADRs. This study underscores the importance of vigilance in monitoring and managing adverse reactions associated with amino acid prescriptions in tertiary care settings. The findings highlight the need for further research and strategies to mitigate the risks of ADRs while optimizing patient care and treatment outcomes in this specific context. Such insights can inform healthcare professionals in their decision-making processes and contribute to enhancing the safety and effectiveness of amino acid therapy in clinical practice.

**Keywords**: ADR's, Amino Acid, Vigilance, Patient care, Safety & efficacy

**PC-843**

**NEXT-GENERATION DRUG DELIVERY: THE ROLE OF ARTIFICIAL INTELLIGENCE**

CHAITANYA BOBDE

The integration of Artificial Intelligence (AI) into drug delivery research is rapidly transforming the landscape of pharmaceutical science and personalized medicine. This emerging synergy enables the development of highly precise, efficient, and targeted therapeutic systems, ushering in a new era of next-generation drug delivery. AI algorithms, particularly machine learning and deep learning, are being utilized to optimize drug formulation, predict pharmacokinetic and pharmacodynamic behaviors, and design intelligent delivery platforms such as responsive nanocarriers and implantable devices. Moreover, AI facilitates the real-time analysis of vast biomedical datasets, enabling researchers to tailor treatments based on patient-specific parameters and disease profiles. From improving drug solubility and stability to enhancing site-specific targeting, the application of AI is significantly accelerating the development pipeline while reducing time and cost. This presentation will explore the current advancements, challenges, and future directions of AI-assisted drug delivery, highlighting real-world applications and ongoing research efforts.

**Keywords**: Artificial Intelligence, Drug Delivery Systems, Machine Learning, Nanocarriers, Pharmacokinetics, Targeted Therapy

**PC-844**

**PREBIOTIC JELLIES: An INNOVATIVE APPROACH TO FUNCTIONAL FOOD DEVELOPMENT**

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Prebiotics are non-digestible food ingredients that selectively stimulate the growth and activity of beneficial gut microbiota, thereby contributing to improved gastrointestinal health and overall well-being. The incorporation of prebiotics into functional foods has gained increasing attention in recent years, with jelly-based formulations emerging as an innovative and consumer-friendly approach. Prebiotic jellies combine the palatability and convenience of traditional jelly products with the health-promoting properties of prebiotic fibers such as inulin, fructooligosaccharides (FOS), galactooligosaccharides (GOS), resistant starch, and pectin. These compounds not only serve as




ISBN: 978-81-980623-8-3

substrates for beneficial bacteria like Bifidbacterium and Lactobacillus but also improve jelly texture, sweetness, and stability. The preparation of prebiotic jelly involves dissolving fruit juice and sugar, followed by the addition of prebiotics, citric acid for flavor and pH adjustment, and a gelling agent such as gelatin, agar, or carrageenan. The mixture is thoroughly blended, poured into molds, and cooled to set into a functional jelly product. Such formulations are particularly valuable for children and the elderly, offering a tasty and easy-to-consume alternative to conventional prebiotic supplements. Moreover, the potential development of synbiotic jellies, combining both probiotics and prebiotics, further enhances their therapeutic relevance.

**Keywords**: Prebiotics; Functional foods; Jellies; Gut microbiota; Inulin.

**PC-845**

**FORMULATION AND IN VIVO EVALUATION OF PARACETAMOL 1000 MG SUSTAINED RELEASE TABLETS PREPARED BY BANANA STARCH FOR DUAL-ACTION CONTROL**

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This study aims to evaluate the dual functionality of banana strarch (BS) as a disintegrant in the immediate release (IR) and as polymer for controlled release (CR) in the sustained release (SR) paracetamol tablet formulation. Additionally, the study investigates the in vivo performance of the optimized formulation to ensure reliable predictive performance. The overarching goal is to develop a formulation that optimizes drug release for 12 houres, reducing dosing frequency, and minimize flushing and hepatotoxicity for better therapeutic outcomes.The IR layer was formulated using BS as a disintegrant to ensure rapid onset of action, while the CR layer employed BS as a release rate retardant for prolonged drug release. The optimized SR tablet (SR1) was developed by selecting best performing IR and CR formulations based on in vitro studies. The formulation was further evaluated in vivo using rabbits, with SR tablets adjusted to the rabbit dose (SR1-R). The optimized SR1tablet demonstrated a steady, zero-order drug release profile with enhanced pharmacokinetics. The formulation showed a high similarity between the human (SR1) and rabbit (SR1-R) equivalents, with dissimilarity (f1) and similarity factors (f2) 2.60% & 86.60%. An in vitro-in vivo correlation (R2= 0.9816) indicated reliable predictive performance, validating the effectiveness of the formulation. The SR1 tablet exhibited improved safety, efficacy, and patient compliance, making it a promising option for managing high fever conditions, including COVID-19. The combination of IR and CR layers with banana starch effectively optimizes optimizes drug release, enhance therapeutic performance, and reduces dosing frequency.

**Keywords**: Paracetamol, Immediate release layer (IR, )Controlled release layer (CR), Sustained-Release (SR), In vivo studies.

**PC-846**

**DESIGN, OPTIMIZATION AND CHARACTERIZATION OF VITAMIN D3 LOADED PLGA NANOPARTICLES FOR INTRANASAL DELIVERY.**

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Vitamin D3 deficiency is a global health issue. Intranasal delivery offers a promising non-invasive route to improve Vitamin D3 bioavailability and patient compliance. This study aimed to develop and optimize Vitamin D3-loaded PLGA nanoparticles incorporated into a thermoreversible in-situ gel for enhanced nasal absorption and sustained release. Vitamin D3 nanoparticles were prepared using emulsification-solvent evaporation and optimized with a $3^2$ factorial design by varying PLGA and surfactant levels. Particle size, polydispersity index (PDI), and encapsulation efficiency (EE) were measured. Optimized nanoparticles were incorporated into a poloxamer-based gel. Compatibility was confirmed by FTIR and DSC, morphology by SEM, and gel properties such as gelation temperature, rheology, and mucoadhesion were assessed. In vitro release of the nanoparticle gel was compared to a conventional gel. Optimized nanoparticles showed an average size of 180 ± 7 nm, PDI of 0.16 ± 0.02, and EE of 86.2 ± 3.0%. FTIR and DSC confirmed no interaction between drug and excipients. SEM displayed spherical, smooth nanoparticles. The gel had a gelation temperature of 31 ± 1°C and mucoadhesive strength of 78 ± 6 dyne/cm². Rheological analysis showed shear-thinning behavior, ideal for nasal use. In vitro release demonstrated sustained Vitamin D3 release of 70% over 24 hours from the nanoparticle gel, versus 46% from conventional gel. The developed Vitamin D3-loaded PLGA nanoparticle gel exhibits favorable characteristics for intranasal delivery, promising improved absorption and sustained drug release.

**Keywords**: Vitamin D3, PLGA nanoparticles, Intranasal delivery, In-situ gel, Sustained release.

**PC-847**

**DEVELOPMENT AND CHARACTERIZATION OF PROLIPOSOMES FOR SAFER ORAL DELIVERY OF DICLOFENAC (NSAIDS)**

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Non-steroidal anti-inflammatory drugs (NSAIDs) are frequently ingested by a substantial fraction of the population for its analgesic, antipyretic, and anti-inflammatory actions and are the second leading cause of GI ulceration, affecting between 15 and 40% of people who regularly take NSAIDs. The link between NSAIDs use and the occurrence of stomach bleeding and ulceration has been established, and it has been linked to life-threatening consequences such as ulcer perforation caused by oral administration. To overcome the disadvantages of oral delivery of NSAIDs, in the present study diclofenac-loaded proliposomes were prepared and evaluated to explore the feasibility of proliposomes as a drug carrier which would generate diclofenac sodium-bearing liposomes soon after they come in contact with body fluid. The proliposomes were prepared by film deposition on carrier method by rotatory evaporator. Optimization studies were performed with the help of Design expert software using Box-Behnken model. The prepared optimized proliposomes were evaluated through vesicle size, PDI, entrapment efficiency, TEM and in-vitro drug release. The vesicle size and PDI were 162.5 nm and 0.291 respectively. The morphological evaluation was done by optical microscopy and TEM. Drug entrapment efficiency (EE%) was found to be 67.56%±0.4. An in-vitro drug release was carried out using the dialysis bag method as it has shown cumulative release of 44.64%±1.74 in 30 mins. and 98.64%±1.44 in 2 hours. This demonstrated an enhancement in the drug diffusion and thereby, absorption of the drug through the membrane. The analysis indicates that proliposomes could be utilized as drug delivery for NSAIDs.

**Keywords**: Proliposomes, Nonsteroidal anti-inflammatory drugs, oral delivery, optimization, diclofenac sodium

**PC-848**

**ADVANCED FORMULATION DESIGNED FOR EFFECTIVE MANAGEMENT OF DYSMENORRHEA**

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Dysmenorrhea is characterized by painful menstrual cramps, significantly impairs the quality of life in reproductive-age women. Conventional pharmacological interventions, such as NSAIDs and hormonal therapies, provide symptomatic relief but are often limited by side effects, tolerance, and lack of patient-specific optimization. To overcome these limitations, recent research is shifting toward the development of novel formulations incorporating advanced drug delivery systems and artificial intelligence (AI)-based optimization strategies. Advances in nanotechnology and polymeric drug delivery platforms have enabled the development of stimuli-responsive systems that release drugs in response to physiological triggers, providing on-demand pain relief. These emerging formulation strategies aim to overcome the limitations of conventional therapies by offering targeted, sustained, and patient-friendly drug delivery options. Continued research and clinical evaluation of these novel systems are essential to establish their therapeutic efficacy, safety, and acceptability ultimately improving dysmenorrhea management and enhancing women's reproductive health care. Additionally, AI-driven predictive modeling, molecular docking, and machine learning algorithms are being employed to optimize excipient selection, dosage design, and




ISBN: 978-81-980623-8-3

personalized treatment protocols. This synergy between pharmaceutical innovation and computational intelligence holds the potential to revolutionize dysmenorrhea management by delivering targeted, efficient, and patient-centric therapies. Future directions emphasize integrating AI-enabled formulation design with clinical validation to develop sustainable and precision-based therapeutics for dysmenorrhea.

**Keywords**: Dysmenorrhea, Novel Formulation, Drug Delivery, Artificial Intelligence, Nanocarriers, Personalized Therapy

**PC-849**

**THERMORESPONSIVE HYDROGEL FOR CO-DELIVERY OF NITROGLYCERIN AND AGMATINE SULFATE ENHANCES REGENERATION IN VOLUMETRIC MUSCLE LOSS**

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Volumetric muscle loss (VML) is a debilitating condition characterized by significant tissue loss and functional impairment with limited intrinsic regenerative potential. This study focuses on the development and evaluation of an injectable, thermoresponsive hydrogel for the sustained co-delivery of Nitroglycerin (NTG) and Agmatine Sulfate (AGS) to promote muscle regeneration. A hydrogel composed of Poloxamer 407 and HPMC was formulated, optimized, and extensively characterized for its physicochemical properties, including gelation kinetics, rheology, morphology, and drug release profiles. The therapeutic efficacy of the hydrogel was subsequently assessed in a rat VML model through comprehensive behavioral tests (grip strength, gait analysis), biochemical analysis of key inflammatory cytokines (IL-6, TNF-α, IL-10), and detailed histopathological examination. The optimized formulation exhibited ideal thermoresponsive behavior, with a rapid sol-to-gel transition at physiological temperature, shear-thinning properties for easy injection, and sustained co-release of both bioactive agents. In the VML model, the combination hydrogel resulted in significant improvements in functional recovery, evidenced by enhanced grip strength and normalized gait patterns. Furthermore, the dual-drug treatment effectively modulated the local inflammatory response and histopathology confirmed superior muscle regeneration, characterized by well-aligned muscle fibers and reduced fibrosis. This thermoresponsive hydrogel co-delivering NTG and AGS represents a highly promising therapeutic strategy for treating VML.

**Keywords**: Volumetric Muscle Loss, Thermoresponsive Hydrogel, Muscle Regeneration, Nitroglycerin, Agmatine Sulfate, Co-delivery

**PC-850**

**INJECTABLE POLOXAMER-BASED THERMOGEL AS A DELIVERY PLATFORM FOR AGMATINE AND HYALURONIC ACID IN MUSCLE TISSUE ENGINEERING.**

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Volumetric muscle loss (VML) results in permanent functional deficits for which current therapeutic strategies are insufficient. We hypothesized that an injectable, thermoresponsive hydrogel enabling localized, sustained co-delivery of agmatine sulfate (AgS) and hyaluronic acid (HA) could synergistically promote robust neuromuscular regeneration. Here, a poloxamer-based thermogel was systematically optimized using a $3^2$ full factorial design. The lead formulation's efficacy was subsequently evaluated in a rat tibialis anterior VML model. The optimized hydrogel exhibited a physiologically advantageous gelation temperature (27 ± 1.03°C) and time (42 ± 1.4 s), with sustained bioactive release exceeding 28 days. In vivo, the AgS-HA combination therapy demonstrated profound synergistic effects, restoring grip strength and normalizing complex gait parameters to near-control levels ($P < 0.001$ vs. placebo). This functional recovery was corroborated by significantly reduced serum creatine kinase, a key marker of muscle damage. Histopathological analysis revealed near-complete restitution of mature, organized myofiber architecture with minimal fibrosis, contrasting with the extensive scar tissue in control groups. These findings demonstrate that a thermoresponsive hydrogel platform for sustained AgS and HA co-delivery effectively promotes comprehensive structural and functional recovery, representing a potent and clinically translatable strategy for VML.

**Keywords**: Volumetric muscle loss, Thermoresponsive hydrogel, Agmatine sulfate, Hyaluronic acid, Muscle regeneration, Functional recovery

**PC-851**

**NANOGEL REVOLUTION: LIPID-BASED CARRIERS FOR SMARTER TOPICAL DRUG DELIVERY**

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Conventional topical products like creams and ointments are commonly utilized but frequently hindered by low solubility, insufficient skin absorption, instability, and challenges with patient adherence. In order to tackle these challenges, lipid-based nanocarriers have attracted interest as viable options for delivering antifungal drugs such as terbinafine hydrochloride (TBH). These systems—comprising solid lipid nanoparticles (SLNs), nanostructured lipid carriers (NLCs), nanogels, and invasomes—provide benefits like increased drug loading, stability, controlled release, and better therapeutic results. Recent studies have used statistical optimization methods, such as factorial design, Box-Behnken design, and Central Composite Design (CCD), to improve TBH formulations. NLCs made from solid and liquid lipids, when incorporated into Carbopol-based gels, showed nanoscale particle sizes (about 111 nm), high entrapment efficiency (over 85%), longer drug release, and better skin permeation compared to traditional gels. Similarly, pH-sensitive nanogels made with natural polymers and acrylic acid provided prolonged release, stronger antifungal activity against Candida albicans, and improved skin retention compared to the commercial Lamisil cream. Invasomal gels made from phosphatidylcholine, ethanol, and terpenes like d-limonene and citral formed flexible vesicles with better skin absorption and natural antimicrobial and antifungal effects. Assessment studies validated positive gel properties, such as ideal pH, viscosity, spreadability, stability, and low irritation. In vitro and in vivo models consistently showed enhanced antifungal effectiveness and safety of optimized TBH-loaded nanocarrier gels over traditional topical products.In summary, lipid-based nanocarrier gels offer a viable approach for the topical administration of terbinafine, delivering patient-friendly, effective, and safer options for treating superficial fungal infections

**Keywords**: Lipid-based nanogels, nanostructured lipid carriers, solid lipid nanoparticles, invasomes, topical drug delivery, antifungal therapy, sustained release, skin permeation, biocompatibility, chronic wound healing, nanoformulations.

**PC-852**

**HEPATOCYTE TARGETED ANTIVIRAL DELIVERY VIA L-HSA CONJUGATED PLGA NANOPARTICLES**

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Poly(D,L-lactide-co-glycolide) (PLGA) nanoparticles (NPs) are widely explored for targeted delivery but lack sufficient surface functional groups for ligand attachment. This study employed the Interfacial Activity Assisted Surface Functionalization (IAASF) technique to introduce maleimide groups onto PLGA NPs, enabling conjugation with lactosaminated human serum albumin (L-HSA), a ligand recognizing the asialoglycoprotein receptor (ASGPR) abundantly expressed on hepatocytes. The antiretroviral drug Tenofovir Disoproxil Fumarate was encapsulated using a double emulsion solvent evaporation method and optimized via Central Composite Design. The optimized formulation consisted of 30% PLGA, 7% PLA-PEG-Maleimide, and 2.5% PVA. L-HSA was synthesized at a lactose-to-albumin molar ratio of 26–30, known to favor hepatocyte uptake. Conjugation was confirmed through SDS-PAGE and 1H-NMR, with disappearance of the maleimide aromatic proton peak indicating successful linkage. Particle sizes of unconjugated and L-HSA-conjugated NPs were 258.9 ± 2.1 nm and 262.4 ± 4.1 nm, respectively, with a slight zeta potential shift from −28.50 to −27.29 mV,




ISBN: 978-81-980623-8-3

supporting peptide attachment. DSC and XRD analyses revealed conversion of crystalline components to amorphous form without incompatibility. Drug release followed Korsmeyer–Peppas kinetics via anomalous diffusion. Cytotoxicity studies in HepG2 cells confirmed biocompatibility. In vivo biodistribution in mice demonstrated significantly higher hepatic accumulation of L-HSA-functionalized NPs at 4 h compared to other organs, confirming ASGPR-mediated targeting. Overall, L-HSA conjugation enhanced liver specificity without altering nanoparticle integrity, demonstrating its potential for targeted antiviral therapy.

**Keywords**: PLGA Nanoparticles, Lactosaminated Human Serum Albumin (L-HSA), Surface- Functionalization, Hepatocyte Targeting.

**PC-853**

**ASSESSMENT AND EVALUATION OF PRESCRIBING PATTERN OF ANTIMICROBIAL AGENTS IN INTENSIVE CARE UNIT OF TERTIARY CARE HOSPITAL**

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The evaluation of antimicrobial prescribing patterns and microbial sensitivity in Intensive Care Units (ICUs) is critical for optimizing infection control and combating antimicrobial resistance. Inappropriate use facilitates resistance and cross-transmission, particularly during inter-ward transfers. This prospective observational study, conducted over six months in a tertiary care hospital, investigated antimicrobial utilization and sensitivity trends among critically ill patients. A total of 250 ICU patients receiving antimicrobials were enrolled (58% male, 42% female), with the highest representation in the 61–70 year age group (27.6%). Patients were admitted across multiple ICU types, predominantly the General ICU (36%) and Medical ICU (30%). Overall, 644 antimicrobial agents were prescribed, with cephalosporins, carbapenems, antiprotozoals, and azole derivatives being most common. Cefoperazone-sulbactam was the predominant cephalosporin, while meropenem was the leading carbapenem. Culture investigations were performed in 191 patients (76%), yielding positive results in 62.3%. Respiratory samples were the most frequent (31.56%). Gram-negative organisms accounted for 85.34% of isolates, with gram-positive bacteria representing 14.66%. Gram-negative isolates demonstrated high sensitivity to colistin and tigecycline, whereas amphotericin B, caspofungin, and flucytosine exhibited complete efficacy against Candida species. Resistance was most prominent with second-generation cephalosporins and penicillins. The findings indicate that antimicrobial prescribing was largely rational; however, variable resistance patterns emphasize the need for robust antimicrobial stewardship.

**Keywords**: Antimicrobial agents, prescription pattern, sensitivity, ICU.

**PC-854**

**DESIGN AND CHARACTERIZATION OF PHYTOHORMONE ORAL DISSOLVABLE FILMS AS A NOVEL DRUG DELIVERY SYSTEM FOR WOMEN'S HEALTH**

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Hormonal imbalances in women, particularly during premenstrual, perimenopausal, and postmenopausal stages, are associated with physiological and psychological challenges including menstrual irregularities, hot flashes, osteoporosis, and mood disturbances. Conventional hormone replacement therapy (HRT), though effective, carries long-term risks such as cardiovascular complications and hormone-sensitive cancers. Hence, there is growing interest in phytohormones-plant-derived compounds with estrogenic, progestogenic, and adaptogenic properties-as safer alternatives.The present work aims to develop and evaluate a novel oral dissolvable film (ODF) incorporating standardized extracts of soy isoflavones, red clover, flaxseed lignans, and Shatavari as a phytohormone supplement for women's health. The ODF was prepared using the solvent casting method with hydroxypropyl methylcellulose (HPMC E15) as the polymer and glycerol as the plasticizer. The films demonstrated uniform thickness (0.182 ± 0.015 mm), rapid disintegration (28.4 ± 3.1 seconds), and acceptable folding endurance (>250 folds). Drug content uniformity was maintained at 96.8 ± 2.1%, while in vitro release studies showed 84.7 ± 3.4% phytohormone release within 20 minutes. Sensory evaluation confirmed good palatability and patient acceptability.The results indicate that oral dissolvable films loaded with phytohormones represent a novel, patient-compliant dosage form, particularly advantageous for women with swallowing difficulties and those seeking a natural, side-effect-minimized alternative to HRT. This innovative delivery system holds potential for improved bioavailability, enhanced compliance, and holistic management of menopausal and menstrual health.

**Keywords**: Phytohormones, Phytoestrogens, Oral dissolvable films (ODFs), women's health

**PC-855**

**FORMULATION AND EVALUATION OF FENUGREEK TABLETS**

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Fenugreek (Trigonella foenum-graecum) is a well-recognized medicinal plant valued for its hypoglycemic, hypolipidemic, antioxidant, and anti-inflammatory activities. Its seeds contain a diverse phytochemical profile—saponins, alkaloids (notably trigonelline), flavonoids, mucilage, and dietary fiber—making them a promising candidate for herbal dosage forms. In the present work, fenugreek seed powder was carefully cleaned, dried, milled, and sieved to achieve uniform particle size. Tablets were then prepared using the direct compression method with suitable pharmaceutical excipients such as fillers, binders, lubricants, and disintegrants. Pre-compression parameters, including angle of repose, bulk density, tapped density, and Carr's index, were evaluated to ensure acceptable flow properties. Post-compression studies—weight variation, hardness, friability, thickness, disintegration time, and in vitro dissolution—were carried out in accordance with pharmacopeial standards. The optimized tablets displayed uniformity of weight, adequate hardness, low friability, and acceptable disintegration time. Dissolution studies indicated a satisfactory release of active constituents, confirming the feasibility of fenugreek in a solid oral dosage form. Beyond therapeutic activity, the tablet format offers additional benefits such as improved stability, accurate dosing, ease of administration, and better patient compliance.

**Keywords**: Fenugreek tablet, Direct compression, Disintegration , dissolution, Hypoglycemic herbal formulation.

**PC-856**

**DESIGN AND CHARACTERIZATION OF CURCUMIN-LOADED MSN@GO FOR WOUND MANAGEMENT**

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Curcumin (CU) is a polyphenolic natural compound having beneficial effect in the management of wound used from historic times in India. In the contemporary investigation, an attempt has made to fabricate novel mesoporous graphene oxide nanocomposite comprised of curcumin for management of wound healing. The one-pot oil-in-water, biphasic stratification method used to synthesize mesoporous silica graphene oxide nanocomposite (GO@MSN). Passive loading approach used for fabrication of CU-GO@MSN nanocomposite. The preliminary characterization of GO, CU and CU-GO@MSN was done using UV-visible spectroscopy and Fourier Transform Infra-Red Spectroscopy. The In-vitro HET-CAM assay proved the wound healing potential of prepared composite with comparative high antimicrobial efficiency against Escherichia Coli and Staphylococcus Aureus. The BET analysis reveals that the mesoporous structure formed successfully and having larger surface area and pore volume. For enhancing the effectiveness and delivery, nanocomposite dispersed into film forming gel. The film characterized for texture, thickness, folding endurance, percent moisture and solubility.

**Keywords**: Graphene, Nanocomposite, Antimicrobial activity, In-vitro Wound healing, film forming Gel

**PC-857**


ISBN: 978-81-980623-8-3

**DEVELOPMENT AND EVALUATION OF HERBAL FOOT SPRAY FOR ODOR CONTROL AND ANTIMICROBIAL ACTIVITY**

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An antibacterial foot spray is a convenient and effective solution designed to promote foot hygiene, combat odours, and prevent bacterial and fungal infections. One part of the body that is very important for humans is the feet, both for women and for men, therefore feet need to be kept clean but sometimes they are often ignored, resulting in the appearance of odour problems on the feet. Foot odour is caused by the metabolic activities of normal bacterial inhabitants of feet. The main objective of using foot spray is to mask odour and inhibit bacterial growth. Foot spray also helps in prevention of infection. The different herbal powder used are exacted using Soxhlet apparatus using ethanol as solvent. The ethanol is used because it more effective in extraction of Eugenol as it acts as antibacterial component. On the basis of comparative study and evaluation it was found that F3 was more effective than F1 and F2 as the concentration of Betel Leaf extract was more. The pH of F3 was more equivalent to the pH of skin.

**Keywords**: Antimicrobial, Herbal, Beetal leaf, Soxhlet extraction, Foot care

**PC-858**

**BANANA POWDER: A POTENTIAL SUPER-DISINTEGRATING AGENT IN FAST DISSOLVING TABLET**

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The purpose of this research was to introduce and evaluate natural excipient that has versatile property in the oral disintegrant and immediate release formulations. This natural excipient was used as disintegrant in the formulation of orodispersible tablets of some model drugs such as lisinopril. Orodispersible tablets are useful in patients, such as pediatric, geriatric, bedridden or developmentally disabled, who may face difficulty in swallowing conventional tablets or capsules and liquids orals or syrup, leading to ineffective therapy, with persistent nausea, sudden episodes of allergic attack or coughing for those who have an active life style. Fast onset of action-dispersible tablet has major advantage that the drug product is already in solution at that time it is consumed. Thus, the absorption will be faster and more complete than with conventional tablet. Lisinopril is a lysine analog of enalapril at, the active metabolite of enalapril. It is a long-acting, non-sulfhydryl angiotensin-converting enzyme (ACE) inhibitor that is used for the treatment of hypertension and congestive heart failure in daily dosages of 10-80 mg. The aim of this study is to formulate various batches of oral disintegrating tablets of lisinopril by using Banana powder with different concentrations 5%, 10%, 15%, individually by using different diluents like Mannitol and Lactose by wet granulation method. The tablets will be evaluated for the precompression parameters such as bulk density, compressibility, angle of repose etc. and post compression parameters like hardness, weight variation, friability, disintegration time and in-vitro dissolution profiles. Tablets containing banana powder as disintegrating agent will disperse rapidly and can be an alternative for present disintegrating agent and will be more economical.

**Keywords**: Orodispersible tablets, disintegration time, banana powder, Super disintegrant.

**PC-859**

**DESIGN AND OPTIMIZATION OF LIQUISOLID COMPACTS FOR IMPROVED SOLUBILITY OF BCS CLASS II DRUGS**

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The objective of this research was to formulate liquisolid compacts of Azilsartan Medoxomil that improve the solubility. Azilsartan Medoxomil, is a potent angiotensin II receptor blocker, is use for the management of hypertension. Thes compact were prepared by varying ratio of PEG 400, avicel pH 102 and aerosil as vehicle, carrier, and coating material respectively, these batches further formulated as tablet by direct compression method. Different formulations were prepared produced high dissolution profile and they showed significant higher drug release rates than conventional tablets due to increase in wetting properties and surface of drug available for dissolution. The prepared batches of tablets were evaluated by using FTIR, DSC, studies revealed that there was no chemical interaction between the drug and the excipients, hardness 4-5 kg/cm2, thickness 1-2 mm, friability 0.1-0.5 %, weight variation 100 mg, drug content was 99.1-102 %, in vitro disintegration time 5-6 min. And in vitro dissolution studies showed enhance drug solubility as compared to marketed formulation. The results of stability studies indicated no significant changes with respect to physicochemical properties, in vitro disintegration time, and in vitro drug release. This formulation represents valuable strategy in overcoming dissolution challenges, ultimately contributing to the development of effective and patient-friendly drug delivery system.

**Keywords**: liquisolid compacts, Azilsartan Medoxomil, solubility, dissolution rate.

**PC-860**

**DEVELOPMENT AND CHARACTERIZATION OF A NOVEL MUCOADHESIVE FILM FOR THE LOCALIZED MANAGEMENT OF PERIODONTITIS USING HERBAL ESSENTIAL OIL**

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A novel mucoadhesive film was developed for the localized management of periodontitis, a chronic inflammatory disease initiated by a polymicrobial biofilm. The film was fabricated by the solvent casting method and incorporated a synergistic blend of herbal essential oils with proven antibacterial and anti-inflammatory potential. The formulation was optimized for mechanical strength, folding endurance, thickness uniformity, and surface pH, ensuring safety and comfort during insertion into periodontal pockets (~5 mm), the primary site of disease pathology. Texture analysis confirmed the presence of strong mucoadhesive properties, enabling reliable retention at the site of application. In vitro release studies demonstrated a controlled, prolonged release profile of the active constituents. Antimicrobial testing, conducted through MIC and MBC assays, showed significant inhibition of major periodontal pathogens, with superior efficacy compared to a marketed reference product. An integrated handle strip was incorporated into the film design, enabling precise and convenient self-placement by the patient, thus enhancing compliance and localized delivery. Stability studies further confirmed the physical and chemical integrity of the formulation. This innovative mucoadhesive film provides sustained antimicrobial action directly within periodontal pockets, thereby extending residence time and reducing the need for frequent dosing. By combining herbal essential oils, the system holds strong potential as an adjunctive therapy to mechanical plaque removal, addressing the underlying microbial and inflammatory pathology and improving patient outcomes in periodontitis management.

**Keywords**: Periodontitis, Mucoadhesive film, Herbal actives, Essential oils, MIC, MBC, Local drug delivery, Antimicrobial efficacy, Sustained release.

**PC-861**

**SMART FILM-FORMING SPRAY OF MICONAZOLE NITRATE: A NOVEL APPROACH FOR TOPICAL FUNGAL INFECTIONS**

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The study aimed to formulate, optimize, and characterize a novel Miconazole nitrate film-forming spray for the effective treatment of topical fungal infections. The main objective was to develop a 1% Miconazole nitrate spray formulation with enhanced skin permeation, sustained drug release, and improved patient compliance using Central Composite Design (CCD).The film-forming spray was prepared by the solvent evaporation technique. Central Composite Design with three independent variables (Eudragit RSPO, Ethyl cellulose, and camphor–menthol eutectic mixture) and two dependent responses (viscosity and drug permeation) was employed for optimization. Formulations were




ISBN: 978-81-980623-8-3

evaluated for pH, viscosity, spray angle, spray pattern, evaporation time, in-vitro permeation, and antifungal activity. Stability studies were conducted at 25±2°C and 60±5% RH for two months. The optimized formulation containing 5% Eudragit RSPO, 2.5% Ethyl cellulose, and 12.5% camphor–menthol eutectic mixture exhibited desirable physicochemical and functional characteristics. The viscosity was ~12 cps, spray angle ~58°, pH 5.1, and in-vitro drug permeation reached ~95% within 7 hours. The formulation showed strong antifungal activity against dermatophytes and yeasts, with improved stability and no significant changes in appearance or pH during storage. The developed Miconazole nitrate film-forming spray is stable, effective, and superior to conventional topical dosage forms. It represents a patient-friendly, innovative drug delivery system for treating fungal infections.

**Keywords**: Miconazole nitrate, Antifungal, Film-forming spray, Optimisation.

**PC-862**

**TOPICAL DELIVERY ENHANCEMENT OF LULICONAZOLE VIA LIPOSOMAL GEL: DESIGN, CHARACTERIZATION AND FOR SKIN FUNGAL INFECTION**

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The study focuses on the formulation and optimization of a Luliconazole-loaded liposomal gel to overcome limitations of conventional topical therapy and achieve improved retention, penetration, and sustained antifungal activity. Pre-formulation studies, including solubility, FTIR, and UV analysis, confirmed drug–excipient compatibility. Liposomes were prepared by the thin-film hydration method and incorporated into a 1% Carbopol 934 gel. Nine formulations (F1–F9) were systematically optimized by varying lipid ratios, cholesterol content, and hydration time to obtain desirable particle size, entrapment efficiency, and stability.Comparative studies with a marketed Luliconazole gel confirmed that both formulations exhibited comparable drug content, validating the accuracy and efficiency of drug loading into the liposomal system. In-vitro release studies using Franz diffusion cells revealed a distinct difference in release profiles between the two formulations. The marketed gel displayed a rapid drug release pattern, whereas the liposomal gel demonstrated a slower, sustained release over an extended period. This sustained release behavior of the liposomal gel suggests a prolonged therapeutic effect, which may reduce dosing frequency and improve patient compliance. The optimized liposomal gel showed a drug content of 98.8%, In-vitro drug release of 92% and follows zero order, first order, Higuchi plot & Kors-peppas. The present research work emphasize the potential of Luliconazole liposomal gel as an effective topical delivery system for enhanced management of dermal fungal infections.

**Keywords**: Luliconazole, Liposomal gel, Topical antifungal, Thin film hydration method

**PC-863**

**FORMULATION AND EVALUATION OF VITAMIN D3 CHEWABLE TABLET AS ANTIHYPERTENSIVE AGENT**

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The purpose of this study was to use excipients in a wet granulation process to create vitamin D3 chewable tablets for Hypertension. A range of tests, including weight variation, thickness, hardness, and disintegration, were performed on the tablets, and the results met pharmacopeial specifications. Every physical property that was examined indicated that every excipient was appropriate for use in tablets. Since a chemical is broken down into particles in the oral cavity to make swallowing easier, water is not required for administration. This effort aimed to reduce formulation complexity, create a cost-effective solution, and deliver vitamin D3 in granular and tablet form with enhanced dispensability.

**Keywords**: Vitamin D3, Gingerol, wet granulation, Chewable Tablet, antihypertension.

**PC-864**

**FORMULATION AND EVALUATION OF ALVERINE CITRATE-LOADED POLYMERIC NANOPARTICLES FOR ORAL DELIVERY**

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The present study aimed to formulate and evaluate polymeric nanoparticles of Alverine Citrate for oral administration. Alverine Citrate was selected as a suitable drug for polymeric nanoparticles due to its low solubility, low bioavailability, and high frequency of administration. The nano-precipitation method was used to prepare nanoparticles so as to avoid both chlorinated solvents and surfactants to prevent their toxic effect on the body. Polymeric nanoparticles of Alverine Citrate were prepared by using hydrophilic polymers such as chitosan and HPMC K100M. The prepared formulations were then characterized for particle size, polydispersity index, zeta potential, loading efficiency, encapsulation efficiency, and drug-excipient compatibility. The average particle size is 114.8 nm, PDI of 0.366, zeta potential is in the range of -2.4 mV, drug content is in the range of 96.87%, entrapment efficiency of 85.78%, and loading efficiency is in the range of 40.15%. Transmission Electron Microscopy (TEM) analysis of the polymeric nanoparticles showed the spherical shape of the nanoparticles. The Differential Scanning Calorimetry (DSC) study confirmed that there was no intermolecular interaction between the drug and polymer. FTIR study concluded that no major interaction occurred between the drug and polymers used in the present study.

**Keywords**: Alverine Citrate, Chitosan, Nano precipitation, Entrapment efficiency.

**PC-865**

**INNOVATIVE ORAL DOSAGE FORM: DICLOFENAC SODIUM INCORPORATED MEDICATED CHOCOLATES**

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Patient compliance remains a major challenge in oral drug delivery, particularly among paediatric and geriatric groups. The present study aims to formulate and evaluate medicated chocolates of Diclofenac using synthetic and natural excipients. Diclofenac is a phenyl acetic acid derivative and a non-steroidal anti-inflammatory drug, shown to act by inhibiting prostaglandin synthesis by inhibiting cyclooxygenase-1 and cyclooxygenase-2. Diclofenac belongs to the BCS class II and has poor solubility and a bitter taste. The main aim of the present research work is to formulate medicated chocolates containing Diclofenac sodium, a widely prescribed NSAID, through the incorporation of solid dispersions prepared by the solvent evaporation method. Solid dispersions of Diclofenac sodium were prepared using hydrophilic carriers such as Polyethylene glycol (PEG 4000/6000), Eudragit, and Carbopol to improve solubility and dissolution. The drug-carrier mixtures were dissolved in suitable solvents, evaporated under controlled conditions, and the dried solid dispersions were incorporated into Cocoa butter, cocoa powder, and also using natural excipients. The chocolate was evaluated for various parameters, including hardness, appearance, thickness, weight variation, assay, disintegration, dissolution, blooming, stability test, drug content uniformity, and melting point. Medicated chocolates formulated with Diclofenac sodium solid dispersions by moulding technique present a novel, palatable, and patient-friendly delivery system with improved solubility, dissolution rate, and potential bioavailability, and also achieved taste masking.

**Keywords**: Diclofenac sodium, Medicated Chocolates, Solvent evaporation, Solid dispersions.

**PC-866**

**FORMULATION AND EVALUATION OF HERBAL SHAMPOO USING ALLIUM SATIVA PEEL POWDER AND HERBAL HAIR DYE SHAMPOO USING ALLIUM SATIVA PEEL ASH POWDER**

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ISBN: 978-81-980623-8-3

Garlic peel which is a significant agro industrial waste, is a valuable source of nutrient version into powder used to enrich food and is ash content, which provide insights into its mineral profile. Research shows garlic peel powder is rich in crude fibre, carbohydrates, proteins and significant such of total phenolic and flavonoid compounds which provide strong anti-oxidant activity which can combat few radicals and reduce oxidative stress. Garlic peel powder have health promoting compounds phenyl propanoids like N-Trans- coumaroyl octopamine and N-Transferuloyl octopamine, as well as phenolic acid like caffeic acid and ferric acids. These compounds showed anti-inflammatory, anti-microbial and potential anti-cancer. Ash content refers to inorganic mineral matter that remains after organic material has been burned and ash content provides metric for its total mineral composition (16.35%) high content of minerals. Ongoing research to develop function foods and exploring application in medicine and sustainable agriculture.

**Keywords**: Hair loss, Hair strengthening, Anti-inflammatory, Anti-microbial.

**PC-867**

## SOLUBILITY ENHANCEMENT OF POORLY SOLUBLE DRUG BY CO CRYSTALLIZATION AND FORMULATE INTO FILMS

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Poor aqueous solubility remains a major challenge in the development of oral dosage forms, particularly for Biopharmaceutics Classification System (BCS) class II drugs, where dissolution is the rate-limiting step for absorption. Itraconazole, an antifungal agent with low solubility and high permeability, was selected for this study. The aim was to enhance its solubility and therapeutic efficacy through co-crystallization and subsequent formulation into mucoadhesive buccal films. Co-crystals of itraconazole were prepared using benzoic acid and salicylic acid as co-formers via the solvent evaporation method. These co-crystals were incorporated into films using hydroxypropyl methylcellulose (HPMC K15M) as a polymer through the solvent casting technique. The prepared films were evaluated for physical parameters, drug content, and in-vitro drug release. Among the formulations, those containing benzoic acid co-crystals exhibited superior solubility enhancement and improved drug release compared to pure itraconazole.From the above formulations F1 shows 96% drug release.The study concludes that co-crystallization coupled with buccal film formulation is an effective strategy to enhance solubility, dissolution, and potential bioavailability of poorly soluble drugs like itraconazole, thereby improving their therapeutic performance.

**PC-868**

## NANOTOXICOLOGY: ENSURING THE SAFE TRANSLATION OF NANOMEDICINE FROM BENCH TO BEDSIDE

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Nanomedicine has significantly changed diagnosis and therapeutics with the development of new drug delivery, controlled release and sustained release systems as well as modified pharmacokinetics using nanoscale materials. Yet, these intriguing features as a result of their reduced size, large surface-to- volume ratio and capability to cross biological barriers have latterly cast apprehensions for their toxic potential leading to an entirely new scientific field called "nanotoxicology". Nanotoxicology is intended to systematically analyze the interactions of nanomaterials with biological systems in health and disease, highlighting parameters including particle size, shape, surface charge, chemical composition as well as dose-dependent effects controlling biodistribution diagnostic use, accumulation and clearance from organism and immune system reactions. Primary modes of toxicity are thought to involve oxidative stress, genotoxicity, inflammation and protein corona formation that changes biological identity and cell uptake. Current evaluation methods include in vitro cytotoxicity and genotoxicity testing, in vivo biodistribution and organ toxicity research, and safety potential in modeling. There remain, however, gaps in both knowledge and methods that make this application challenging: there is no standard protocol for testing; very limited long-term exposure data exists and the rigorousness of correlating animal studies or in vitro results with human impacts is daunting. To minimize the risks safety-by-design paradigm, biocompatible coatings, bio degradable nanomaterials and AI-driven predictive models are advocated. To ensure the safe transition of nanomedicine from bench to bedside with minimum environmental and occupational risk, it will be essential for there to be an increased focus on regulatory development, harmonization of international guidance and academia- industry public health liaison.

**Keywords**: Nanotoxicology, Nanomedicine, Safety-by-Design, Biodistribution, Risk Assessment.

**PC-869**

## DESIGN AND EVALUATION OF A MULTI-UNIT PARTICULATE SYSTEM FOR CONTROLLED DELIVERY OF ANTIDIABETIC AND ANTIHYPERTENSIVE DRUGS USING EXTRUSION–SPHERONIZATION.

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The present study focuses on the formulation and evaluation of a Multi-Unit Particulate System (MUPS) containing anti-diabetic and anti-hypertensive drugs, specifically gliclazide, sitagliptin, and diltiazem. Oral solid dosage forms, particularly MUPS, offer significant advantages over conventional systems by enhancing drug stability, bioavailability, and patient compliance while minimizing dose dumping and variability in absorption. MUPS comprises multiple pellets that allow for controlled and immediate drug release patterns, thereby optimizing therapeutic outcomes for chronic conditions such as diabetes mellitus and hypertension. The research explores extrusion-spheronization as an effective technique for pellet preparation, ensuring uniformity, sustained release, and improved pharmacokinetic profiles. Additionally, fixed-dose combinations (FDCs) are employed to reduce medication burden, enhance adherence, and lower healthcare costs. This study highlights the potential of MUPS in overcoming challenges associated with multi-drug regimens and provides a promising approach for better management of coexisting diabetes and hypertension.

**Keywords**: Multi-Unit Particulate System, Fixed-Dose Combination, Gliclazide, Sitagliptin, Diltiazem, Extrusion-Spheronization, Diabetes Mellitus, Hypertension.

**PC-870**

## TO PREPARE AND EVALUATE A HYDROGEL CONTAINING DICLOFENAC SODIUM USING BIONANOCOMPOSITE

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Topical drug delivery involves applying medications directly to the skin or mucous membranes to treat localized conditions or achieve systemic absorption . Nonsteroidal anti-inflammatory drugs (NSAIDs) are a FDA-approved agents widely used for their antipyretic, anti-inflammatory, and analgesic properties. Diclofenac sodium was selected as the drug of choice for this study. Hydrogels were prepared using physical and chemical cross-linking methods, employing natural polymers such as Gond Kataria and Acacia arabica. Different concentrations (0.3g,0.4g, and 0.5 g) of Gond Kataria and Acacia arabica, individually and in combination, were dispersed in distilled water and allowed to swell in the dark for 24hours. The swollen dispersions were mixed under magnetic stirring (500rpm), followed by the addition of 0.1ml isopropyl alcohol and Tween 80, and the final volume was adjusted with distilled water to obtain a homogeneous gel. The formulations were evaluated for drug content, pH determination, and viscosity. The results indicated that the solubility of diclofenac sodium was enhanced by the bionanocomposite technique .Among all formulations ,F2 showed optimal performance ,with 99%drug release over 8hours and superior overall characteristics . FTIR analysis confirmed no significant interaction between the drug and the polymers.

**PC-871**

## ANTIOXIDANT LOADED IN-SITU GEL FOR THE TREATMENT OF DRY EYE SYNDROME IN SJOGRENE'S DISEASE.

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Sjogren's disease is an autoimmune disorder characterized by chronic inflammation of the lacrimal and salivary glands, leading to aqueous-deficient dry eye syndrome. Oxidative stress contribute to ocular surface




ISBN: 978-81-980623-8-3

damage and tear film instability. This study aimed to develop and evaluate a zeaxanthin-loaded in situ gel for sustained ocular delivery and enhanced management of dry eye in Sjögren's disease. A thermo sensitive in situ gel was prepared using poloxamer 407 combined with mucoadhesive polymers to enhance precorneal residence. Zeaxanthin was incorporated as the therapeutic antioxidant. The formulation was assessed for clarity, pH, viscosity, gelation temperature, and drug content. Antioxidant activity was confirmed by DPPH radical scavenging and lipid peroxidation inhibition assays. In vitro release and ex vivo corneal permeation studies were performed. In vivo efficacy was evaluated in an experimental dry eye model mimicking Sjögren's disease through tear film break-up time (TBUT) and oxidative stress biomarkers. The optimized antioxidant loaded gel showed rapid sol-to-gel transition at physiological temperature (34–36 °C), suitable viscosity for ocular retention, and sustained drug release over 24 h. In vivo studies demonstrated significant improvements in tear secretion and TBUT, reduced corneal staining. The formulation was well tolerated with no ocular irritation. Zeaxanthin-loaded in situ gel presents a novel and innovative strategy for treating Sjögren's-related dry eye. By combining potent antioxidant activity with prolonged ocular residence, it offers potential advantages in efficacy, safety, and patient compliance.

**Keywords**: Sjogeren's disorder, Thermosensitive, Insitu- gel, Antioxidant therapy, Occular drug delivery.

**PC-872**

## DEVELOPMENT OF GASTRO-RETENTIVE RAFT FORMING SYSTEM OF METFORMIN HYDROCHLORIDE

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The present study focuses on the development of a gastro-retentive raft-forming system for Metformin Hydrochloride (MH) with the aim of enhancing therapeutic efficacy, improving oral bioavailability, and minimizing patient concerns associated with its rapid release. MH has limited absorption due to its narrow absorption window in the upper gastrointestinal tract and short gastric residence time. To overcome these limitations, a floating drug delivery system was designed using the raft-forming approach. Drug–polymer compatibility was assessed through physical observation and FTIR analysis, which confirmed no significant interactions between MH and the selected polymers. The calibration curve exhibited linearity at 232 nm, ensuring accurate analytical evaluation. Nine formulations were prepared by varying the ratios of sodium alginate, carbopol, and guar gum. Sodium bicarbonate was used as a gas-generating agent to impart buoyancy, while microcrystalline cellulose acted as a binder, talc as a diluent, and magnesium stearate as a lubricant. The prepared tablets were evaluated for weight variation, hardness, thickness, friability, drug content uniformity, buoyancy, and in-vitro drug release. All parameters were within pharmacopeial limits. Among the nine formulations, F2 showed the most promising results, releasing 99.48% of the drug within 12 hours with excellent floating ability and sustained release. In conclusion, the raft-forming gastro-retentive system proved effective in prolonging gastric retention, controlling drug release, and offering potential for improved patient compliance in diabetes management.

**Keywords**: Metformin Hydrochloride, Gastro-retentive drug delivery, Raft-forming system, Sustained release, Bioavailability

**PC-873**

## FORMULATION AND CHARACTERIZATION OF THERMO-RESPONSIVE IN SITU GEL SYSTEM LOADED WITH TRANSFEROSOMES FOR NOSE TO BRAIN DELIVERY OF SILYMARIN

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Neurodegenerative diseases like Alzheimer's and Parkinson's affect millions globally and are characterized by the gradual loss of brain cells. Treating these conditions is difficult because many drugs can't effectively reach the brain due to natural barriers like the blood-brain barrier. This study developed a silymarin-loaded transferosomal in situ gel to enhance the nose-to-brain delivery of the poorly bioavailable neuroprotective drug. Optimized transferosomes (STs), prepared using a thin-film hydration technique, were characterized for key physicochemical properties. The vesicles demonstrated a nanoscale size range of 144.3–173.8 nm, polydispersity index (PDI) values from 0.532 to 0.628 and a zeta potential between -18.53 and -22.79 mV, indicating good colloidal stability imparted by an anionic surfactant. Entrapment efficiency was high, ranging from 76.54% to 90.15%, with formulation F4 showing the highest value. TEM analysis visually confirmed the formation of spherical, multi-lamellar vesicles. These STs were incorporated into a thermosensitive in situ gel composed of Poloxamer 127 and gellan gum, which exhibited a suitable gelation temperature (29.4–34.2°C) and pH for nasal administration, transitioning to a gel at body temperature to prolong nasal residence. In vitro drug release studies revealed a sustained release profile over 180 minutes, with the release rate modulated by the gelling agent ratio; F1 showed the most rapid and complete release (98.5%). FTIR and EDS analyses confirmed the compatibility of components and successful vesicle formation. Crucially, the optimized formulations maintained their particle size, entrapment efficiency and drug release characteristics over a three-month stability period, confirming the system as a stable and promising platform for effective nose-to-brain delivery.

**Keywords**: Neurodegenerative diseases, Alzheimer's, Parkinson's, Transferosomes, silymarin.

**PC-874**

## PROPOLIS-BASED NANOCOMPOSITE FOR NOSE-TO-BRAIN DELIVERY

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The research addresses the challenge of delivering drugs effectively to the brain, which is hindered by the blood-brain barrier (BBB) that restricts many therapeutic agents from reaching the central nervous system (CNS). Traditional drug delivery methods face limitations such as low bioavailability and non-specific distribution, causing side effects. The study proposes using intranasal (nose-to-brain) delivery as a promising alternative, leveraging the nasal mucosa's direct neural pathways (olfactory and trigeminal nerves) to bypass the BBB and achieve rapid, targeted brain drug delivery with minimized systemic side effects. Nanocomposites are explored as advanced drug carriers that enhance drug stability, solubility, controlled release, and targeting capabilities. Functionalized nanocomposites with mucoadhesive properties improve drug retention and permeation through the nasal mucosa, potentially increasing therapeutic efficacy for CNS diseases. Propolis, a natural resin with neuroprotective and pharmacological properties, is incorporated into the nanocomposite formulation to exploit its therapeutic potential against neurological disorders such as Parkinson's, epilepsy, and Alzheimer's diseases. The research involves designing a polymer hybrid nanocomposite composed of propolis, polyethylene glycol (PEG), and polyacrylamide (PAM) for intranasal administration. The formulation undergoes extensive physicochemical characterization, including particle size, zeta potential, gel fraction, swelling behaviour, porosity, and surface morphology via scanning electron microscopy (SEM). The study also includes biodistribution and biological efficacy evaluations to confirm the nanocomposite's ability to cross the BBB and deliver therapeutic agents effectively to the brain.

**Keywords**: Intranasal drug delivery, Blood-brain barrier, Nanocomposite, Propolis, CNS disorders

**PC-875**

## DEVELOPMENT AND VALIDATION OF A STABILITY-INDICATING RP-HPLC METHOD FOR THE QUANTIFICATION OF FOSFESTROL IN BULK AND PHARMACEUTICAL DOSAGE FORM

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Fosfestrol, a nonsteroidal estrogen used in prostate cancer treatment, requires precise and reliable analytical methods for quantification in pharmaceutical formulations. This study aimed to develop and validate




ISBN: 978-81-980623-8-3

a rapid, precise, and stability-indicating Reverse Phase High-Performance Liquid Chromatography (RP-HPLC) method for the estimation of Fosfestrol in bulk and marketed dosage forms. The method was optimized using a Hypersil BDS C18 column (250 mm × 4.6 mm, 5 µm) with an isocratic mobile phase of $KH_2PO_4$: ACN: TBAH (70:30:1) at a 1.5 mL/min flow rate and detection at 240 nm. The developed method exhibited a sharp and well-resolved peak at a retention time of 12.922 min. The validation, conducted as per ICH Q2 (R1) guidelines, confirmed specificity, system suitability, precision, accuracy, linearity, robustness, and forced degradation studies. The method demonstrated excellent linearity (30–90 µg/mL, $r^2$ = 0.998), high accuracy (98–102%), and precision (%RSD < 2). Forced degradation studies confirmed the stability-indicating capability of the method. The developed RP-HPLC method is sensitive, reproducible, and suitable for routine quality control analysis of Fosfestrol in pharmaceutical formulations.

**Keywords**: Fosfestrol, RP-HPLC, Stability, Method Development, Method Validation.

**PC-876**

## MODELING AND PREDICTING TABLETABILITY OF GINGEROL IN 3D-PRINTED ANTIHYPERTENSIVE TABLET

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This research work aims to prove the presence of Gingerol in ginger and to transform this biochemical as an active pharmaceutical ingredient in 3D-printed antihypertensive tablet. Hypertension, a vital global health concern involving physiological dysregulations, notably sympathetic nervous system over-activity, renin-angiotensin-aldosterone system (RAAS) imbalance, and renal dysfunction. The ethanolic extract of Gingerol from 100gm of Zingiber officinale (ginger) rhizome is characterized by using HPLC and FTIR spectroscopy to confirm its purity. HPLC was used to analyze 6-gingerols using C-8 reversed phase column eluted using mobile phase methanol: water (65:35, v/v) and UV detector at 282 nm. The recoveries of 6-gingerol was at 95.7 % from ginger with coefficient of variation 2.56 indicating reproducible result. This gingerol is converted to 3D-printed antihypertensive tablet applying wet granulation process, using excipients like gelatin, stearic acid, mannitol and sodium starch. Resulted in successful conversion of ginger powder into granules exhibiting excellent flow properties with Angle of Repose 29.67° and Carr Index 6.17%. The formation of a white colored, round shaped tablet met all the pharmacopoeial specifications, showing a mass of 301.06 mg, diameter of 10.15 mm, thickness of 3.27 mm. hardness of 5.5± 0.3 kg/cm2 and friability 0.48%, water absorption 16.23%, disintegration time 150 seconds and in vitro [6]-Gingerol release within 45 minutes suggesting high potential for quick absorption. The signature peaks of both free gingerol and additives were also observed in tablets. Hence, above designed tablets may render an optimal clinical solution to hypertension therapy in a patient-centric healthcare service.

**Keywords**: Gingerol, Antihypertensive, HPLC, FTIR, 3D-printed tablet.

**PC-877**

## FORMULATION AND EVALUATION OF ORO-DISPERSIBLE TABLETS OF TENOFOVIR DISOPROXIL FUMARATE USING BANANA PEEL POWDER AS A NATURAL SUPERDISINTEGRANT

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The management of Human Immunodeficiency Virus (HIV) infection relies heavily on lifelong antiretroviral therapy; however, patients with dysphagia might find it challenging to take standard solid oral dosage forms, which may result in poor adherence.. This study aimed to develop and optimize oro-dispersible tablets (ODTs) of Tenofovir Disoproxil Fumarate (TDF) using eco-friendly banana peel powder as a natural superdisintegrant. ODTs were prepared by direct compression and optimized using a $3^2$ factorial design with two independent variables: mannitol concentration and banana peel powder concentration (three levels each), producing nine batches (F1–F9). Powder blends were characterized for flow and compressibility (angle of repose, Carr's index, Hausner ratio, porosity) and compressed tablets were evaluated for weight variation, hardness, friability, wetting time, disintegration time, water absorption ratio, and in vitro drug release (30 min). Design-Expert® software selected formulation F5 as optimal. F5 exhibited rapid disintegration (16 s), short wetting time (12 s), high water uptake, and achieved 89% cumulative drug release within 30 minutes. All evaluated pre- and post-compression parameters were within acceptable pharmacopeial limits. Short-term stability studies at room temperature for one month revealed no significant changes in physical appearance, drug content, disintegration time, or dissolution profile. These results indicate that banana peel powder is an effective, sustainable natural superdisintegrant for TDF ODTs, offering a patient-friendly dosage form to improve administration and adherence in dysphagic HIV patients.

**Keywords**: Tenofovir Disoproxil Fumarate, Oro-dispersible tablets, Banana peel powder, Natural superdisintegrant, Factorial design, Direct compression

**PC-878**

## PREPARATION, CHARACTERIZATION OF MESOPOROUS POLYDOPAMINE NANOPARTICLES LOADED WITH PIPERONYLIC ACID AND EVALUATING INVITRO HEPATOPROTECTIVE EFFECT USING HEP G 2 CELL LINE

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Bioactive compounds derived from plants that have a vast of health-promoting properties are termed to as phytochemicals. In contrast, owing to their poor solubility, stability, bioavailability, and target selectivity, these compounds are of uncertain therapeutic use. The solubility, bioavailability, and pharmacokinetics of phytochemicals can all be improved by nano formulations in a number of ways (e.g., by reducing particle size). Targeted and regulated medication release can be achieved by modifying nanocarriers, especially mesoporous carriers. This study employed mesoporous polydopamine (MPDA) as a vehicle for the hepatoprotective potential evaluation of piperonylic acid. Mesoporous polydopamine nanoparticles loaded with piperonylic acid were prepared and characterized for its particles size, zeta potential, PDI, FTIR and SEM. Its effects on HepG2 proliferation inhibition were assessed using the MTT test. The results indicated that mesoporous polydopamine nanoparticles loaded with piperonylic acid inhibited the proliferation of HepG2 cells in a dose dependent manner.

**Keywords**: Mesoporous polydopamine nanoparticles, piperonylic acid, Hep G2 cell line

**PC-879**

## EFAVIRENZ AND LAMIVUDINE COFORMULATED IN BILAYERED TABLETS: A NOVEL APPROACH FOR DAILY HIV TREATMENT

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This investigation aimed to design and assess bilayered tablets combining Efavirenz (EFV) and Lamivudine (LMV) for daily HIV treatment, balancing swift onset with prolonged drug release. EFV was incorporated into the immediate-release layer using superdisintegrants; LMV, meanwhile, was formulated into the controlled-release layer using hydrophilic polymers, specifically HPMC K100M and Carbopol 934P, to sustain prolonged plasma levels. Parameters for tablets before and after compression were assessed, encompassing hardness (5.2–5.8 kg/cm²), friability (less than 0.8%), weight deviation (±2%), and drug content (98.2–101.5%), all meeting the required pharmacopeial standards. In-vitro dissolution studies were carried out using a USP type II paddle apparatus in a phosphate buffer solution with a pH of 7.4, a temperature of 37 ± 0.5 °C, and a stirring speed of 100 rpm over a 24 hr. Within 30 min, the immediate-release layer of EFV released 97.1 ± 1.3% of its




ISBN: 978-81-980623-8-3

content, while over the course of 24 hrs, the controlled-release layer of LMV exhibited 92.6 ± 2.0% release, following the Higuchi model ($R^2$ = 0.985) with non-Fickian diffusion (n = 0.61). This formulation enables once-daily dosing, enhances patient adherence, and sustains consistent plasma drug concentrations, underscoring its potential for effective HIV management.

**PC-880**

**BUCCAL THIN FILM SUPPLEMENTS: INNOVATION IN PATIENT COMPLIANCE AND BIOAVAILABILITY**

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The development of fast-dissolving oral thin films (OTFs) offers an innovative drug delivery system for enhancing patient compliance, particularly in pediatric and geriatric populations. This study aimed to formulate and evaluate an oral thin film containing Vitamin C (ascorbic acid) as a model active ingredient. Each 2 × 2 cm film was designed to deliver 100 mg of ascorbic acid, prepared by solvent casting technique on a laboratory scale. The formulation incorporated hydroxypropyl methylcellulose (HPMC E15) as the primary film-forming polymer, propylene glycol as plasticizer, sodium citrate as buffering/stabilizing agent, and suitable sweetener and flavoring agents for palatability. The casting solution was prepared under controlled temperature and light conditions to minimize degradation of ascorbic acid, and poured onto leveled glass plates to obtain uniform films. Post-drying, films were cut into individual doses and subjected to physicochemical and mechanical evaluation. The films demonstrated smooth texture, flexibility, and uniform thickness within the acceptable range (50–150 µm). Disintegration studies in simulated saliva (pH 6.8, 37 °C) confirmed rapid disintegration within 30–60 seconds, while dissolution testing revealed ≥80% drug release within 5 minutes. Drug content analysis using UV spectrophotometry confirmed uniformity, with values within 95–105% of the label claim. The prototype films showed promising stability under short-term storage when protected from light and moisture using aluminum foil pouches. Overall, the developed Vitamin C OTFs illustrate a patient-friendly dosage form with potential application in nutritional supplementation and rapid therapeutic delivery, highlighting their suitability for exhibition and further scale-up studies.

**Keywords**: Oral thin film, Ascorbic acid, Fast-dissolving dosage form, Solvent casting, Patient compliance

**PC-881**

**DEVELOPMENT OF FAST RELEASE FORMULATION OF FENOFIBRATE USING FLUIDIZED BED PROCESSING TECHNOLOGY**

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Fluidized bed processing technology is a very efficient way to apply a uniform layer of shell material onto solid particles. This method utilizes airflow to suspend and process particles, enhancing efficiency in these processes. The present study was aimed to utilize Fluidized bed processing technology in manufacturing of solid dispersion of poorly water soluble drug Fenofibrate and evaluating the dissolution behaviour of pure fenofibrate and further investigating the effect of solid dispersion on its crystalline characteristics and dissolution rate. Solid dispersion of Fenofibrate prepared using Fluidized Bed Processor (Make- P+am Glatt) was compressed into tablets and subjected to dissolution testing to assess its release profile. The dissolution studies were carried out using a USP Type II (paddle) Electrolab dissolution apparatus operated at 50 rpm in 0.75% sodium lauryl sulphate (SLS) aqueous solution maintained at 37 ± 0.5 °C. The results indicated that pure fenofibrate exhibited a slow and limited dissolution rate due to its hydrophobic and crystalline nature. To understand its solid-state properties, X-ray diffraction (XRD) analysis was performed. The X-ray diffractogram of pure fenofibrate displayed intense and sharp peaks at 14°, 17°, and 22°, confirming its highly crystalline structure. However, Diffraction patterns of drug-carrier physical mixture shows lesser degree of crystallinity and lesser number of characteristic peak of fenofibrate. The pattern of solid dispersion was completely diffused indicating a new amorphous solid phase in solid dispersion, which could potentially enhance its bioavailability and therapeutic efficacy in oral dosage forms.

**Keywords**: Fenofibrate, Hydrophobic, X-ray diffraction, Fluidized bed processing, P+am Glatt, Solid dispersion

**PC-882**

**FORMULATION AND OPTIMIZATION OF OXALIPLATIN SOLID LIPID NANOPARTICLES**

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The present research reports the beneficial effects of enteric coated solid lipid nanoparticles for pH sensitive colon targeted delivery of oxaliplatin (OXA) for treating colorectal cancer. OXA encapsulated SLNs (OXA-SLNs) were prepared by solvent emulsification method and optimized using box-Behnken experimental design. The optimized OXA-SLNs were used for preparation of enteric coated OXA-SLNs (E-OXASLNs).The E-OXA-SLNs were then characterized for their particle size and surface morphology. The drug release from E-OXA-SLNs was observed at the basic pH of the colon. In addition, the E-OXA-SLNs exhibited greater cytotoxicity on colorectal cancer cells in vitro when compared to naive OXA. In conclusion, the E-OXA-SLNs are efficient carriers for improved efficacy and site specificity of OXA.

**Keywords**: Oxaliplatin, colorectal cancer, pH sensitive, enteric coating, solid lipid nanoparticles.

**PC-883**

**PHARMACEUTICAL TECHNOLOGY AND TARGETED DRUG DELIVERY SYSTEMS: ENHANCING EFFICACY AND SAFETY.**

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Pharmaceutical technology has transformed modern therapeutics through the development of targeted drug delivery systems (TDDS). Unlike conventional dosage forms, TDDS focus on delivering drugs precisely to the site of action, thereby improving therapeutic outcomes while minimizing systemic toxicity. The aim of this study is to evaluate the role of TDDS in enhancing drug therapy. The objectives include assessing novel carriers, targeting mechanisms, and comparing their advantages over conventional systems in terms of safety and efficacy. A systematic review of recent literature was carried out, focusing on nano carriers such as liposomes, polymeric nanoparticles, and dendrimers. Controlled-release formulations and ligand-mediated targeting approaches were analyzed for their pharmacokinetic benefits and therapeutic effectiveness. Findings indicate that TDDS significantly improve bioavailability, prolong circulation time, and provide controlled and site-specific drug release. Nano carriers enhance drug stability and reduce dosing frequency, while ligand-conjugated systems improve selectivity through receptor-mediated targeting. These advancements collectively reduce side effects and increase patient compliance. Targeted drug delivery systems mark a major advancement in pharmaceutical technology, offering precision therapy with higher efficacy and lower toxicity. Continued research in nanotechnology and bio molecular engineering is expected to further expand their applications, supporting the future of personalized medicine.

**Keywords**: Nano carriers, Liposomes, controlled release, Ligand targeting, personalized Medicines.

**PC-884**

**FORMULATION AND EVALUATION OF SUSTAINED RELEASE MATRIX TABLET OF VENLAFAXINE HCL USING HYDROPHILIC AND HYDROPHOBIC POLYMERS**

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The objective of this study was to develop and evaluate sustained release (SR) matrix tablets of Venlafaxine Hydrochloride, a selective serotonin and norepinephrine reuptake inhibitor (SSNRI), to reduce dosing frequency and improve therapeutic outcomes. Venlafaxine HCl has a relatively short biological half-life (approximately 5 hours), necessitating multiple daily doses. Matrix tablets were formulated using hydrophilic polymer Hydroxypropyl Methylcellulose (HPMC K100M) and




ISBN: 978-81-980623-8-3

hydrophobic polymer Ethylcellulose (EC) in varying ratios to modulate drug release. The tablets were prepared by wet granulation and evaluated for physicochemical parameters including hardness, friability, weight variation, thickness, and drug content uniformity. In vitro dissolution studies were conducted using USP Type II dissolution apparatus in pH 1.2 HCl buffer for 2 hours followed by phosphate buffer pH 6.8 for the remaining 22 hours, simulating gastrointestinal transit. Drug release kinetics were analyzed using mathematical models such as zero-order, first-order, Higuchi, and Korsmeyer-Peppas to understand the mechanism of release. Formulations containing a balanced combination of HPMC and EC demonstrated prolonged drug release up to 24 hours with initial burst minimization and controlled release thereafter. The optimized formulation followed zero-order kinetics ($R^2 > 0.99$) with anomalous (non-Fickian) diffusion mechanism, indicating a combination of diffusion and erosion processes. These findings suggest that the synergistic use of hydrophilic and hydrophobic polymers can effectively sustain the release of Venlafaxine HCl, offering a promising strategy for once-daily oral administration and enhanced patient compliance.

**Keywords**: Venlafaxine Hydrochloride, sustained release, matrix tablet.

**PC-885**

## FORMULATION AND OPTIMIZATION OF HERBAL OINTMENT PREPARED FROM CHROMOLAENA ODORATA

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The present study focuses on the formulation and optimization of herbal ointment prepared from Chromolaena odorata (Asteraceae), a medicinal plant widely known for its antioxidant, anti-inflammatory, antimicrobial, and wound-healing properties. The plant material was collected, authenticated, and subjected to pharmacognostical, physicochemical, and phytochemical evaluations. Ethanolic extraction using Soxhlet apparatus yielded the highest percentage of bioactive constituents, confirmed through qualitative phytochemical screening and TLC profiling. Ointment formulations were prepared by fusion method using emulsifying wax, white soft paraffin, liquid paraffin, and varying concentrations of C. odorata extract. The prepared batches were evaluated for organoleptic characteristics, pH, spreadability, and stability. Among the six preliminary formulations, F4 was identified as the most suitable based on optimum pH and spreadability values. Further optimization was performed using a $2^2$ factorial design with Minitab software to study the effect of emulsifying wax and soft paraffin concentrations on formulation characteristics. The optimized formulation demonstrated desirable consistency, stability, and therapeutic potential, validating the traditional use of C. odorata for wound healing and skin infections. This study highlights the potential of Chromolaena odorata as a natural, cost-effective, and safe herbal ointment base, supporting its future development into standardized topical phytopharmaceutical products.

**Keywords**: Chromolaena odorata, antioxidant, anti-inflammatory, wound-healing

**PC-886**

## A PERCEPTIVE STUDY ON THE IMPORTANCE OF STORING MEDICINES AT THE REQUIRED TEMPERATURE AND ITS UNDERSTANDING AMONG COMMUNITY PHARMACISTS.

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Community pharmacists are one of the critical link in ensuring safe and effective medicine storage and supply. They are supposed to maintain proper storage conditions required for the medicines, particularly antibiotics, vaccines, sera etc. However, extreme climatic variations, particularly summer temperatures that often exceed 40°C, pose significant challenges for medicines that require controlled storage between 15°C and 25°C. With over 70% of medicines being temperature-sensitive, improper storage may reduce potency and compromise patient health if left unnoticed. So a cross-sectional survey was conducted across 62 pharmacies, of which 53 participated actively. Analysis revealed that most pharmacies stored medicines above the recommended range. While 86.8% of respondents agreed that elevated temperatures might impact potency, a notable proportion remained uncertain or unaware of the risk. It also showed that more than 86% agreed that storing medicine constantly at an elevated temperature might definitely affect its potency. The study emphasized the need for more awareness that should be made so that the community pharmacist will serve the society in an effective manner by taking into consideration all the good storage practices. Adopting standardized storage practices will improve the reliability of medicine distribution and ultimately safeguard public health.

**Keywords**: Community Pharmacy, Storage, Medicine, Temperature, Potency.

**PC-887**

## SYNTHESIS AND CHARACTERIZATION OF NITROFURANTOIN COCRYSTALS: IMPROVED SOLUBILITY AND DISSOLUTION PROFILE

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The limited aqueous solubility of numerous active pharmaceutical ingredients, particularly those categorized under the Biopharmaceutical Classification System (BCS) Class II and IV, poses a substantial obstacle to oral drug delivery and bioavailability. This study explores the potential of pharmaceutical cocrystals to enhance the solubility and dissolution profile of nitrofurantoin (NF), a BCS Class II antibacterial agent widely used for urinary tract infections. Succinic acid (SA), a pharmaceutically acceptable co-former, was selected to prepare NF cocrystals using the solvent evaporation method at varying molar ratios (1:1, 1:2, 1:3, and 2:1). Preformulation studies, including organoleptic evaluation, melting point determination, UV analysis, and solubility testing, were conducted to assess the impact of cocrystallization. Comprehensive solid-state characterization using FTIR spectroscopy, differential scanning calorimetry (DSC), and X-ray powder diffraction (XRPD) confirmed the formation of a new crystalline phase. The NF:SA (1:2) formulation exhibited the most significant improvement, achieving a solubility of 644 µg/mL, representing a more than threefold increase over the pure drug (195 µg/mL), and 99.84% drug release within 45 minutes, compared to 51.41% for NF alone. Characterization data indicated hydrogen bonding interactions, peak shifts, and reduced crystallinity, suggesting partial amorphization and the development of a distinct solid form. These results demonstrate that cocrystallization is an effective strategy for enhancing the dissolution and solubility of poorly water-soluble drugs. The optimized NF–SA (1:2) cocrystals formulation offers a promising approach for improving the oral bioavailability of NF and may be extended to other APIs with similar biopharmaceutical limitations.

**Keywords**: Cocrystals, poorly soluble drug, nitrofurantoin, Pharmaceutical crystal engineering, solubility etc.

**PC-888**

## FORMULATION AND CHARACTERIZATION OF HERBAL ANTI-FUNGAL CREAM OF MORINGA OLEIFERA

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In the current research the formulation of herbal cream using Moringa oleifera leaves extract is prepared and characterized for their anti-fungal properties. Extraction of Bioactive Compounds of Moringa using ethanol solvent in a Soxhlet extractor. The extract is incorporated into a base cream containing emollients, emulsifiers, and humectants to form six formulations of Oil in water (O/W) emulsion-based cream was formulated. Evaluation of the physicochemical properties of the formulated Cream. Investigation of the In-Vitro antifungal activity of the Moringa Oleifera cream. Determination of the shelf life and stability of Moringa Oleifera cream. The cream exhibited excellent physical and chemical stability, as well as a desirable texture, viscosity, and pH suitable for topical application. The largest zone of inhibition was produced by water and ethanol extract of Moringa oleifera against Saccharomyces cerevisiae. The formulation of herbal cream using Moringa oleifera leaves extract shows great potential as a natural, effective, and safe skincare product. The optimized formulation




ISBN: 978-81-980623-8-3

demonstrated excellent stability and therapeutic activity, making it a viable alternative to synthetic skincare products. Further research should focus on refining extraction techniques, optimizing concentration levels, and evaluating long-term stability and shelf life.

**Keywords**: Herbal Cream, Anti-Fungal, Moringa oleifera, Leaves.

**PC-889**

## MULTIPARTICULATE PHYTOSOMAL CO-DELIVERY OF QUERCETIN AND VITAMIN D: A NOVEL APPROACH FOR INTESTINAL BARRIER DYSFUNCTION

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Intestinal barrier dysfunction is increasingly recognized as a key factor in the development of gastrointestinal and systemic disorders such as inflammatory bowel disease and metabolic syndrome. Natural bioactives like Quercetin, a flavonoid with potent antioxidant and anti-inflammatory activity. Vitamin D a Secosteroid vital for calcium homeostasis and immune modulation have shown promising effects in maintaining gut integrity. Unfortunately, both face major challenges like poor water solubility and very low absorption when taken orally, which reduces their effectiveness.The present research focuses on the development of a colon-targeted dual Phytosomal Multiparticulate system of Quercetin and Vitamin D to overcome the limitations. Phytosomes of Quercetin and Vitamin D will be prepared by a nanotechnology-based method and optimized systematically using Design of Experiment (DOE) approach. The optimized formulations will be evaluated for particle size, zeta potential, drug-loading efficiency, stability, and release profile, designed for colon-targeted delivery. By colon-targeted delivery, this project is expected to improve bioavailability, stability, and combined therapeutic effects of Quercetin and Vitamin D. The work will not only provide a novel treatment option for intestinal barrier dysfunction but also highlight the value of natural, sustainable, and patient friendly therapies.

**Keywords**: Intestinal barrier dysfunction, Quercetin, Vitamin D, Secosteroid, Phytosomes, Colon-targeted delivery, Design of experiment.

**PC-890**

## NANOSTRUCTURED SIMVASTATIN CUBOSOMAL GELS: ENHANCED TOPICAL DELIVERY AND ACCELERATED WOUND HEALING

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This study investigates the formulation and evaluation of simvastatin-loaded cubosomal nanoparticles designed for topical wound healing applications. Cubosomes were prepared using glyceryl monooleate and poloxamer 407 via a top-down method and characterized for particle size, entrapment efficiency, and release properties. The optimized formulation demonstrated a nanometric particle size and high drug entrapment, ensuring sustained release of simvastatin. Incorporation into cubogels using agents such as HPMC and chitosan further improved the topical applicability, with the HPMC-based cubogel showing superior rheological behavior and permeability. The average particle size of the prepared simvastatin cubosomes was approximately 114 nm, ensuring optimal integration for topical delivery. The entrapment efficiency reached about 94%, supporting sustained and effective drug release. In vitro release and permeation studies showed that cubosomal gels provided significantly enhanced drug permeation through rat skin, with a flux value of 46.18 mcg/cm²/h for the cubogel versus 25.92 mcg/cm²/h for the free drug hydrogel. In vivo testing in a rat wound model demonstrated noticeably higher wound closure percentages in the group treated with simvastatin cubosomal gel (92.3% after 11 days) compared to plain cubogel (69.2%) and free simvastatin hydrogel (77.0%). Histopathological analysis confirmed improved re-epithelialization and granulation tissue formation in wounds treated with the simvastatin cubosomal gel. These findings support the potential of cubosomal nanocarriers as effective vehicles for the topical administration of simvastatin, offering promising advances in wound management therapies.

**Keywords**: Cubosomes, targeted drug delivery, active targeting, passive targeting

**PC-891**

## FORMULATION, OPTIMIZATION AND EVALUATION OF B-CYCLODEXTRIN-BASED NANOSPONGES OF DIACEREIN FOR SUSTAINED DELIVERY AND ENHANCEMENT OF ANTIDIABETIC ACTIVITY

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β-Cyclodextrin (βCD), a cyclic oligosaccharide, was employed to formulate nanosponges (NSPs) aimed at enhancing the solubility and therapeutic performance of diacerein (DCN). The clinical use of DCN by the oral route is limited because of its poor aqueous solubility, low bioavailability, and dose-dependent gastrointestinal side effects. In the present work, βCD-based nanosponges were formulated by using diphenyl carbonate (DPC) as a crosslinking agent, and the formulation process was systematically optimized through a Quality by Design (QbD) strategy employing the Box–Behnken Design (BBD). The optimized formulation showed a mean particle size of 336.6 ± 5.3 nm, zeta potential –22.4 ± 1.3 mV, polydispersity index 0.21 ± 0.03, production yield 65.31 ± 3.8%, entrapment efficiency 87.18 ± 4.1%, and drug loading 29.06 ± 3.4%. Solubilization efficiency demonstrated a ~9.9-fold enhancement in aqueous solubility of DCN. Morphological examination by SEM revealed a sponge-like porous structure, while FTIR, PXRD, and DSC studies confirmed successful entrapment of DCN without significant chemical interactions. In vitro dissolution studies indicated a controlled drug release extending up to 24 hours, and stability testing confirmed good stability under refrigerated storage. Pharmacodynamic evaluation in alloxan-induced diabetic rats exhibited a considerable decrease in blood glucose levels, and histopathological findings confirmed regeneration of pancreatic β-cells. These findings establish βCD-based nanosponges as a potential nanocarrier system for improving oral bioavailability and providing sustained antidiabetic efficacy of diacerein, suggesting significant promise for its application in diabetes management.

**Keywords**: β-Cyclodextrin, Nanosponges, Diacerein, QbD, Diabetes Mellitus

**PC-892**

## EVALUATION OF LIPSTICKS FOR COMPLIANCE WITH BIS STANDARDS: A COMPARATIVE STUDY

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The Indian cosmetic industry is experiencing rapid growth, with the market valued at USD 8.1 billion in 2023 and projected to reach USD 18.4 billion by 2032. Among cosmetic products, lipsticks represent a significant and widely used category. This study was conducted to assess the compliance of various lipstick brands with the standards set by the Bureau of Indian Standards (BIS). A total of 102 lipstick samples were collected from 17 different brands available in the Indian market. These samples underwent rigorous physical and chemical analysis, based on the testing procedures outlined in BIS specifications. The analysis focused on key parameters such as consistency, melting point, pH, heavy metal content, and overall safety. Results revealed that the majority of tested lipstick samples met the BIS requirements, demonstrating satisfactory compliance across all tested parameters. The findings suggest that Indian lipstick manufacturers generally adhere to regulatory norms, ensuring consumer safety and product quality. However, the study emphasizes the continued need for regular quality checks and regulatory oversight due to the increasing consumer demand and diversity in product formulations. This comparative evaluation provides valuable insight into market trends and supports efforts toward standardization and safe cosmetic use.

**Keywords**: Lipsticks, BIS standards, cosmetic evaluation in India, standardisation, safe.

**PC-893**




ISBN: 978-81-980623-8-3

**DEVELOPMENT OF CUSTOMIZED 3D-PRINTED BILAYER TABLETS FOR CONTROLLED DRUG DELIVERY IN NEURODEGENERATIVE DISORDERS**

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Dementia affects over 55 million people worldwide, with an estimated 10 million new cases annually, posing significant challenges for effective pharmacotherapy. Conventional oral dosage forms often fail to provide sustained therapeutic levels, leading to fluctuating plasma drug concentrations and poor patient compliance. This study aims to develop customized 3D-printed bilayer tablets for controlled drug delivery in dementia, combining an immediate-release layer for rapid symptom management and a sustained-release layer to maintain stable plasma concentrations. The tablets were fabricated using fused deposition modeling (FDM) 3D printing, optimizing printing parameters such as layer height, infill density, and nozzle temperature. Two commonly prescribed anti-dementia drugs, Donepezil (10 mg) and Memantine HCl (20 mg), were incorporated into separate layers. Physicochemical characterization revealed tablets with uniform weight variation (±2.1%), hardness of 140–160 N, and friability below 0.8%, indicating robust mechanical stability. In vitro dissolution studies showed an initial 35–40% drug release within 1 hour from the immediate-release layer, followed by sustained release of 85–90% over 12 hours from the controlled-release layer, achieving biphasic drug release. Stability studies over 3 months at 40°C/75% RH demonstrated minimal drug degradation (<3%), confirming formulation stability. The results indicate that 3D-printed bilayer tablets can achieve precise, patient-specific dosing and controlled release profiles, potentially improving therapeutic efficacy and adherence in dementia patients. This approach exemplifies a step toward personalized neuropharmacotherapy, leveraging additive manufacturing to address the limitations of conventional oral dosage forms in neurodegenerative disorders.

**Keywords**: Dementia, 3D Printing, Bilayer Tablet, Memantine, Personalized Medicine.

**PC-894**

**FORMULATION AND EVALUATION OF ATENOLOL SUCCINATE TRANSDERMAL PATCHES**

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Use of TDDS provides a non-invasive method for drug delivery that enhances bioavailability, eliminates first-pass metabolism, and facilitates the release of controlled substances. Atenolol succinate, a cardio-selective beta-blocker, is frequently prescribed to manage hypertension and angina pectoris. The oral administration of drug results in low bioavailability (50%) due to first-pass metabolism and there by a short half-life, necessitating frequent dosing. By using a transdermal patch that contains atenolol, these limitations can be addressed by providing consistent drug delivery, better patient compliance, and reduced dosing frequency. In this work atenolol transdermal patches were prepared for long term use and controlled delivery. Objectives are, to manufacture transdermal patches of atenolol by using polymers, viz., HPMC, Eudragit as Penetrating enhancer, as plasticizer. The prepared patches were characterized for thickness, moisture content folding endurance and invitro drug release using Franz diffusion cell. The patches for evaluated for accelerated short term stability studies. The physicochemical parameters of prepared transdermal atenolol succinate patches, exhibited satisfactory properties and the invitro release was observed for 24hours. All the prepared patches demonstrated good stability, mechanical strength and drug release. These results showed a promising option for delivering atenolol in a sustained release form for an effective treatment for hypertension when compared to oral administration.

**Keywords**: Atenolol succinate, transdermal patch, TDDS, hypertension.

**PC-895**

**FORMULATION AND EVALUATION OF ASPIRIN ORODISPERSIBLE FILMS FOR POST-STROKE DYSPHAGIA: A PRELIMINARY INVESTIGATION**

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Aspirin (Acetylsalicylic Acid, ASA) is a key antiplatelet agent used for immediate loading and secondary prevention of ischemic stroke. Dysphagia affects up to 50% of stroke survivors, leading to poor medication adherence and increased risk of recurrent stroke. Conventional solid oral dosage forms are often difficult to swallow in these patients, emphasizing the need for patient-friendly alternatives. This study aimed to formulate and evaluate Orodispersible Films (ODFs) of ASA for rapid, water-free administration. Films were prepared using the solvent casting method, with three formulations (F1–F3) incorporating different hydrophilic polymers, including hydroxypropyl methylcellulose (HPMC E5), polyethylene oxide (PEO), and Pullulan, and propylene glycol as a plasticizer. Taste-masking agents were included to improve palatability. The characterization included in vitro disintegration in simulated saliva, folding endurance, drug content uniformity, and preliminary stability testing. The optimal formulation was identified based on rapid disintegration, acceptable mechanical strength, uniform drug distribution, and effective taste masking. The results suggest that the optimized ODF provides a safe, convenient, and patient-centric dosage form for post-stroke patients with dysphagia. By enabling fast and reliable administration of ASA without water, this delivery system has potential to improve medication compliance and therapeutic outcomes in stroke survivors.

**Keywords**: Orodispersive Film, Acetylsalicylic Acid, In Vitro Disintegration, Solvent Casting, Dysphagia

**PC-896**

**DESIGN, DEVELOPMENT AND CHARACTERIZATION OF SELF-MICROEMULSIFYING DRUG DELIVERY SYSTEM CONTAINING RUPATADINE FUMARATE**

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The objective of this research work was to formulate the SMEDDS of Rupatadine fumarate, the drug with extensive metabolism and poor in-vitro dissolution. The SMEDDS formulated aimed for the enhancement of the dissolution and that may potentially improve its therapeutic efficacy. Based on the solubility and emulsification capacity, a preliminary screening was conducted to choose the best oil, surfactant, and co-surfactant. The ternary phase diagram was constructed using the best available oil, surfactant, and co-surfactant. The area with high emulsification was indicated by the ternary plot. To further understand the impact of independent factors on the answers, optimization was carried out using a simplex centroid design based on the data. There was a remarkable correlation between the globule size and the percentage CDR. The improved batch underwent additional characterisation procedures, including transmittance, dilution, cloud point detection, and self-emulsification. The SMEDDS formulation prepared using oleic acid (oil), Acrysol K160 (surfactant) and Transcutol HP (co-surfactant). The utilization of the simplex centroid design as design of experiment provided optimized constrained for batch preparation. Batch R3 have selected for further characterization has release and globules in desired range. The dispersibility and self-emulsification time was found to be efficient belonging to the grade A. The SMEDDS showed clear transparent microemulsion and its cloud point was obtained to assess the thermal stability. The in-vitro dissolution of the selected SMEDDS formulation showed increase in the dissolution in comparison with Pure drug with 10 folds increase.

**Keywords**: Self Micro Emulsifying Drug Delivery (SMEDDS), Oleic acid, Acrysol K160, TranscutolHP, Rupatadine Fumarate

**PC-897**

**GASTRO-RETENTIVE MUCOADHESIVE MICROSPHERES OF REPAGLINIDE ENRICHED WITH CHITOSAN FOR ENHANCED ANTI-DIABETIC EFFICACY**

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ISBN: 978-81-980623-8-3

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Repaglinide (RPG) exhibits rapid absorption from the gastrointestinal tract after oral administration due to its low log P value. To overcome this, mucoadhesive microspheres of RPG were developed using the ionotropic gelation method with biodegradable polymers such as guar gum, chitosan, and fenugreek seed mucilage. These microspheres were characterized and evaluated through in vitro studies, followed by an oral glucose tolerance test in animals. Scanning electron microscopy revealed that the microspheres were smooth, spherical, and pore-free. The optimized formulation showed an average particle size of 300 µm, a polydispersity index (PDI) of 0.349, and a high positive zeta potential of 38.4 mV. The formulation also demonstrated a percentage yield of 87.04% and a swelling index of 90.65%, with 95.20% drug release over 10 hours. Furthermore, the microspheres achieved an entrapment efficiency of 94.86 ± 4.25%. In vivo results indicated that the optimized RPG microspheres significantly reduced glucose-induced hyperglycemia (2 g/kg) compared to the marketed RPG formulation (0.25 mg/kg) within 2 hours of oral administration, while maintaining controlled blood glucose levels for up to 10 hours. Overall, the formulation showed improved anti-diabetic efficacy.

**Keywords**: Repaglinde, chitosan, fenugreek, guar gum, characterization

**PC-898**

## DRUG UTILIZATION PATTERN OF NSAIDS AND TRAMADOL IN SURGICAL WARDS: A PROSPECTIVE OBSERVATIONAL STUDY

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Effective postoperative pain management is essential for optimal recovery. Non-steroidal anti-inflammatory drugs (NSAIDs) and Tramadol are commonly used analgesics in surgical settings, each with unique efficacy and safety profiles. This prospective observational study aimed to evaluate the prescribing patterns, effectiveness, and adverse effects of NSAIDs and Tramadol among 75 surgical patients at a tertiary care hospital in Indore, India. Data were collected over six months using structured case record forms and pain score questionnaires. Diclofenac was the most frequently prescribed NSAID, followed by Paracetamol and Tramadol. Tramadol provided faster initial pain relief, while NSAIDs showed consistent efficacy over 72 hours. Adverse effects such as constipation and nausea were more common with NSAIDs. The findings support rational, multimodal pain management tailored to individual patient profiles.

**Keywords**: NSAIDs, Tramadol, Pain Management, Drug Utilization, VAS, Postoperative Analgesia.

**PC-899**

## DEVELOPMENT AND EVALUATION OF GASTRO-RETENTIVE EXTENDED RELEASE FORMULATIONS OF LANSOPRAZOLE

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The present study was undertaken to design and evaluate gastro-retentive and extended release formulations of Lansoprazole, a benzimidazole-based proton pump inhibitor extensively prescribed for gastric and duodenal ulcers. Since Lansoprazole is acid-labile and undergoes rapid degradation in the stomach, site-specific delivery to the intestine is essential for maintaining therapeutic efficacy. Within the gastro-retentive drug delivery system (GRDDS) framework, orally disintegrating tablets (ODTs) containing enteric-coated granules were prepared using pH-sensitive polymers such as HPMC E5, Eudragit L30 D-55. Among eight formulations, demonstrated an optimized dissolution profile with delayed release behavior, governed by zero-order kinetics and a Fickian diffusion-controlled mechanism. Extended release enteric-coated pellets of Lansoprazole were formulated via solution-suspension layering in a fluid bed processor. The process included sequential drug loading, sub-coating, enteric coating, and lubrication, yielding 5 formulations. Evaluation of physicochemical and acid resistance. Dissolution, friability, and content uniformity identified as the most suitable batch, confirming pharmaceutical equivalence, stability, and cost-effectiveness. Overall, the study highlights that optimized GRDDS-based ODTs and extended release enteric-coated pellet formulations of Lansoprazole not only improve stability and therapeutic efficacy but also enhance patient compliance, offering a cost-effective strategy for the management of gastric and duodenal ulcers.

**Keywords**: Proton pump inhibitor, Fickian diffusion, Encapsulation.

**PC-900**

## NANO-FORMULATION AND EVALUATION OF MUCO-ADHESIVE BUCCAL PATCHES OF METRONIDAOLE FOR LOCALIZED ORAL THERAPY

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The buccal mucosa provides an attractive and promising route for localized drug delivery due to its high vascularization, easy accessibility, and ability to bypass first-pass metabolism. Metronidazole, a widely used antimicrobial for oral infections such as gingivitis, periodontitis, and dental abscesses, requires frequent topical application in conventional forms like gels and rinses, which often leads to poor patient compliance and fluctuating drug levels. In this study, muco-adhesive buccal patches of Metronidazole were formulated using chitosan as polymeric carriers. This study demonstrates a simple and effective approach to develop Metronidazole-loaded muco-adhesive buccal patches for localized oral delivery. The formulation strategy, involving biocompatible polymers and solvent-casting techniques, ensures enhanced residence time, controlled drug release, and effective antimicrobial action, highlighting the potential of mucoadhesive buccal patches as an efficient alternative for oral infection management. Comprehensive characterization included physicochemical evaluation, thickness and weight uniformity, surface pH, swelling studies, muco-adhesive strength, and in-vitro drug release. Optimized patches demonstrated adequate muco-adhesion, Overall, research work demonstrates a simple and effective strategy to develop metronidazole-loaded muco-adhesive buccal patches for localized oral delivery. The formulation ensures enhanced residence time, controlled drug release, and effective antimicrobial action, highlighting the potential of muco-adhesive buccal patches as a viable alternative for the treatment of oral infections.

**Keywords**: Nano particle, Patches, Metronidazole, antimicrobial action.

**PC-901**

## FORMULATION AND EVALUATION OF HERBAL SCALP SERUM CONTAINING PSIDIUM GUAJAVA LEAVES EXTRACT.

Vishal D. Lahane.

Hair plays a vital role in human aesthetics, with healthy hair defined by its shine, smoothness, volume, and the absence of scalp issues such as dandruff or thinning. Maintaining hair health requires both cosmetic and therapeutic care, with the scalp being central to this process. The scalp, anatomically bordered by the face and neck, consists of five layers: skin, connective tissue, aponeurosis (Galea aponeurotica), loose areolar tissue, and pericranium. These layers support hair growth and overall scalp health. Proper scalp care, including exfoliation, helps remove dead skin cells and supports regeneration. Herbal scalp serums have emerged as multifunctional solutions for common scalp and hair concerns. These lightweight formulations—available in oil-based, water-based, spray, and silicone-based forms—deliver active ingredients to treat conditions such as dandruff, alopecia, frizz, and heat or color damage. This study focuses on the formulation and evaluation of a herbal scalp serum using Psidium guajava (guava) leaves, recognized for their rich phytochemical composition and potential hair benefits. The research included collection, identification, and authentication of the plant, followed by preparation of its ethanolic extract. A detailed pharmacognostic profile was developed, and preliminary phytochemical screening was performed. The formulated serum was evaluated for various parameters such as pH, viscosity, spreadability, and stability. The objective of this study is to develop an effective, natural, and multifunctional herbal serum offering a holistic approach to scalp and hair care, combining cosmetic innovation with therapeutic benefits.

**Keywords**: Scalp health, herbal scalp serum, Psidium guajava, hair growth, ethanolic extract.




ISBN: 978-81-980623-8-3

**PC-902**

**NANO-FORMULATION AND EVALUATION OF A POLYHERBAL OIL FOR ANTI-INFLAMMATORY AND ANALGESIC ACTIVITY**

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Inflammation and pain are among the most prevalent symptoms encountered in a range of diseases and injuries. The development of novel COX-2 inhibitors with both analgesic and anti-inflammatory efficacy, while minimizing gastrointestinal, renal, and cardiovascular toxicity, is crucial for patients suffering from chronic pain and inflammatory conditions. This research aims to develop and evaluate a polyherbal oil formulation containing Sesamum indicum (sesame oil) and Ricinus communis (castor oil), along with other traditional medicinal plants, for the treatment of osteoarthritis. The formulation comprises natural ingredients, such as Curcuma amada (mango turmeric), and base oils including sesame, castor, and mustard, with Cinnamomum camphora (Bhimseni Kapoor) serving as an aromatic component. The extraction process was optimized to preserve bioactive compounds, particularly those with anti-inflammatory and analgesic properties. Physicochemical evaluation was conducted, assessing organoleptic properties, pH, viscosity, spreadability, and nanoparticle size analysis, followed by preliminary skin irritation testing. The resultant yellowish-green oil exhibited optimal spreadability and a pH of 5–6, making it suitable for topical application. The prepared nano-formulation demonstrated good physical stability and did not cause skin irritation in preliminary tests. Phytochemical screening confirmed the presence of constituents such as flavonoids, alkaloids, and terpenes. Overall, the developed formulation presents a promising therapeutic option for the management of spondylitis and osteoarthritis, leveraging the synergistic effects of traditional medicinal plants in an optimized delivery system.

**Keywords**: Osteoarthritis, Spondylitis, Muscle strains, Patellofemoral pain syndrome, Traditional medicine, Anti-inflammatory, Arthritis.

**PC-903**

**FORMULATION AND EVALUATION OF MELOXICAM LIQUISOLID COMPACTS**

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Meloxicam, a BCS Class II drug, suffers from poor aqueous solubility, resulting in limited dissolution and variable bioavailability. The present study aimed to enhance the dissolution of meloxicam using the liquisolid compact technique, which employs a non-volatile solvent system and porous carriers to convert liquid medication into a free-flowing, compressible powder. Meloxicam (5% w/w in PEG 400) was incorporated into microcrystalline cellulose (Avicel PH 102) as carrier and Aerosil as coating material in a 15:1 ratio. Sodium starch glycolate (1% w/w) was added as superdisintegrant. The prepared liquisolid systems were compressed into tablets and evaluated for pre- and post-compression parameters including flow properties, hardness, friability, weight variation, disintegration, and in vitro dissolution. The liquisolid powder blend exhibited good flow properties (angle of repose: 15.45°). However, the compressed tablets showed suboptimal mechanical properties (hardness: 2 kg/cm$^2$; friability: 7.14%). Weight variation also failed to comply with IP standards. The average disintegration time was 12.8 minutes. Dissolution studies revealed cumulative drug release of 1.46% for liquisolid tablets compared to 16.04% for pure meloxicam, indicating that extended disintegration limited drug release. Although liquisolid compacts are a promising approach for improving dissolution of poorly soluble drugs, in this study meloxicam formulations showed inferior dissolution compared to pure drug, primarily due to prolonged disintegration time and weak mechanical strength. Optimization of carrier–coating ratio, solvent selection, and superdisintegrant level is required to achieve improved performance.

**Keywords**: Meloxicam, Liquisolid compact, Dissolution enhancement, BCS Class II drugs, PEG 400.

**PC-904**

**FORMULATION AND EVALUATION OF ATENOLOL SUCCINATE TRANSDERMAL PATCHES**

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Use of TDDS provides a non-invasive method for drug delivery that enhances bioavailability, eliminates first-pass metabolism, and facilitates the release of controlled substances. Atenolol succinate, a cardio-selective beta-blocker, is frequently prescribed to manage hypertension and angina pectoris. The oral administration of drug results in low bioavailability (50%) due to first-pass metabolism and there by a short half-life, necessitating frequent dosing. By using a transdermal patch that contains atenolol, these limitations can be addressed by providing consistent drug delivery, better patient compliance, and reduced dosing frequency. In this work atenolol transdermal patches were prepared for long term use and controlled delivery. Objectives are, to manufacture transdermal patches of atenolol by using polymers, viz., HPMC, Eudragit as Penetrating enhancer, as plasticizer. The prepared patches were characterized for thickness, moisture content folding endurance and invitro drug release using Franz diffusion cell. The patches for evaluated for accelerated short term stability studies. The physicochemical parameters of prepared transdermal atenolol succinate patches, exhibited satisfactory properties and the invitro release was observed for 24hours. All the prepared patches demonstrated good stability, mechanical strength and drug release. These results showed a promising option for delivering atenolol in a sustained release form for an effective treatment for hypertension when compared to oral administration.

**Keywords**: Atenolol succinate, transdermal patch, TDDS, hypertension

**PC-905**

**FORMULATION AND EVALUATION OF FLUVASTATIN FLOATING ORAL IN-SITU GEL**

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The aim of the present study is to formulate and evaluate a floating oral in-situ gelling system of Fluvastatin to enhance gastric retention and achieve sustained drug release. In-situ gels are advantageous drug delivery systems that remain in solution form before administration and undergo sol-to-gel transition under physiological conditions, thereby improving bioavailability and patient compliance. In this study, Fluvastatin in-situ gels were prepared using polymers such as sodium alginate, guar gum, HPMC K4M, HPMC K15M, along with sodium citrate and calcium carbonate as cross-linking agents. Preformulation and drug-excipient compatibility studies confirmed no significant interactions, as evidenced by FT-IR analysis. Twelve formulations (F1–F12) were developed and evaluated for gelation capacity, floating lag time, total floating duration, viscosity, drug content, and in vitro dissolution. All formulations exhibited immediate gelation in acidic medium and satisfactory floating behavior. Among these, formulation F8 (containing guar gum) demonstrated optimum performance, with 98.08% drug release over 12 hours. The release kinetics followed zero-order ($R^2$ = 0.987) with Higuchi and super case II transport mechanisms. The study concludes that Fluvastatin floating oral in-situ gel is a promising system for achieving sustained gastric retention, improved bioavailability, and patient compliance.

**Keywords**: Fluvastatin, In-situ gel, Floating drug delivery, Sustained release, Gastroretentive system

**PC-906**

**NANOPARTICLE-BASED DRUG DELIVERY SYSTEMS: ADVANCES, CHALLENGES, AND FUTURE PERSPECTIVES IN NANOMEDICINE: - A REVIEW ARTICLE**

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Nanoparticle drug delivery systems (NDDS) are breaking new ground for modern medicine as they combine the advantages of nanotechnology with materials science and pharmacology in order to achieve goals




ISBN: 978-81-980623-8-3

beyond traditional drug delivery methods. NDDS utilizes nanoscale carriers (liposomes, polymeric nanoparticles, dendrimers, metallic nanostructures, lipid-based) to enhance drug solubility, bioavailability, and site-specific delivery. NDDS is also active targeting based on ligand-receptor interactions - that result in reduced systemic toxicity and higher therapeutic effectiveness. NDDS could also integrate controlled and stimuli-responsive release, which would support extended therapeutic effects and improved patient compliance. It is not out of the realm of possibility to imagine multifunctional systems that simultaneously integrate diagnostic and therapeutic capabilities - otherwise known as theragnostic - that could monitor treatment outcomes in real-time. However, serious issues to be addressed looking ahead include scalability of production, long-term safety, regulatory approval, and biological barriers, such as the blood-brain barrier. Clinical formulations of NDDS (liposomal doxorubicin [Doxil®] and lipid nanoparticles used for mRNA vaccines) demonstrate both the feasibility of and the opportunity for systemic change in how drugs are delivered. Thus, NDDS offer new solutions for improved safety and efficacy in personalized therapy for a myriad of diseases and conditions that include oncology, infectious diseases, autoimmune diseases, and neurologic diseases.

**Keywords**: Nano Particle, bioavailability, nanostructure, stimuli responsive and oncology.

**PC-907**

**FORMULATION AND EVALUATION OF POLYVINYL ALCOHOL-BASED HERBAL ANTI-ACNE PAPER SOAP STRIPS**

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Acne vulgaris arises from excess sebum production, follicular hyperkeratinization, and Propionibacterium acnes proliferation, leading to inflammation and lesions. Conventional treatments face limitations in portability and contamination. This study develops a polyvinyl alcohol (PVA)-based herbal anti-acne paper soap strip, incorporating neem leaf extract (antibacterial, anti-inflammatory), which extracted by aqueous maceration, green tea extract (antioxidant, sebum-regulating) extracted by hot water infusion, and tea tree oil (antimicrobial, anti-inflammatory) by steam distillation with Decyl Glucoside (mild cleansing, foam formation). Strips were cast, dried, and cut. pH, dissolution time, foam stability, and antimicrobial activity confirmed effectiveness, offering a portable, hygienic, and eco-friendly anti-acne dosage form.

**PC-908**

**FORMULATION AND EVALUATION OF BUCCO ADHESIVE ITRACONAZOLE TABLETS BY USING SOLID DISPERSION**

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In the present study mucoadhesive buccal tablet of Itraconazole was prepared. By enhance its solubility of Itraconazole was enhanced by complexing Itraconazole with β CD in 1:1 molar concentration. Six different formulations of tablets of Itraconazole containing the polymers and diluents in various combinations were prepared by direct compression method and characterized for swelling studies, surface pH, mucoadhesive properties and in-vitro release studies. All the formulations showed the satisfactory results bioadhesive performance, surface pH, physical & mechanical properties. The swelling index was proportional to content of HPMC K4M & carbopol as bioadhesive polymers. The surface pH of all tablets was found to be satisfactory, & close to neutral pH, hence, buccal cavity irritation should not occur with these tablets. Drug release and drug diffusion from the tablets were depended on the ratio of polymer and type of the diluent used in the formulation. Tablets containing Carbopol, HPMC K4M and spray dried lactose as diluent (F1 to F3) had the maximum percentage of in-vitro drug release than compared to tablets containing mannitol as diluents (F4 to F6). The formulation F1 can be considered as promising buccoadhesive tablets containing inclusion complex of Itraconazole with β-CD providing first order drug release over period of 8 hours.

**Keywords**: Mucoadhesion, Buccal tablets, In-vitro release and Sustained drug delivery.

**PC-909**

**PREPARATION AND EVALUATION OF ATORVASTATIN CALCIUM MICROSPHERES BY EMULSION SOLVENT DIFFUSION METHOD**

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Atorvastatin, a selective competitive inhibitor of HMG CoA reductase, is effective in treating hyperlipidemia but faces challenges such as low solubility and limited bioavailability (14%).To address these issues, the researchers incorporated polymers Kolliphor P407, Gelucire 43/01, HPMCE15, and PVPK90 into the microsphere formulations. Sixteen formulations were prepared and evaluated for various parameters including flow properties, particle size, drug content, solubility, and in vitro drug release studies.Key findings of the study include-Microspheres prepared using the emulsion solvent diffusion technique significantly improved the solubility and dissolution rate of atorvastatin compared to the pure drug,Addition of polymers at 0.05% concentration further enhanced the dissolution rate, with Kolliphor P407 showing the highest impact, followed by Gelucire 43/01, HPMCE15, and PVPK90,Formulation ATR-F4 containing 0.05% Kolliphor P407 demonstrated the highest solubility (0.747 µg/ml) and dissolution rate (99.99% in 30 min) among all formulations tested.,Scanning Electron Microscopy (SEM) and Differential Scanning Calorimetry (DSC) analyses confirmed that the microspheres were porous, with a particle size of 26.75 µm, and showed no signs of chemical instability,Release kinetics analysis indicated that all formulations followed first-order kinetics.In conclusion, the study successfully optimized a formulation (ATR-F4) of atorvastatin microspheres using Kolliphor P407 to significantly enhance its solubility and dissolution rate, potentially improving its therapeutic efficacy for the treatment of hyperlipidemia.

**Keywords**: Atorvastatin, Kolliphor P407, Gelucire 43/01, HPMCE15 and PVPK90.

**PC-910**

**FORMULATION, CHARACTERIZATION AND IN VITRO EVALUATION OF NOVEL IONICALLY CROSS-LINKED CASEIN NANOPARTICLES FOR MEMANTINE HYDROCHLORIDE DELIVERY**

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The objective of the study was to fabricate protein nanoparticles for better controlled and targeting action of drug, which also overcome the problems associated with conventional formulations like multidose therapy, poor patient compliance and high cost. Memantine HCl loaded casein nanoparticles (F1 to F6) were prepared by Ionically crosslinked method. The formulated nanoparticles were evaluated for external morphological characters, determination of particle size analysis, zeta potential, drug content, entrapment efficiency and in-vitro release studies. The particle size varied from 148 to 317 nm and zeta potential was in negative and its value found to be - 46.4 mV. The drug content for the Memantine HCl loaded casein nanoparticles varied from 69.5 ± 7.2% to 87.9 ± 1.2%. The entrapment efficiencies were found to be minimum and maximum of 55.50 ± 2.4% and 86.30 ± 3.6%. The percentage yields of all formulations were in the range of 48.24 ± 1.24 to 86.13 ± 1.37%. In-vitro release of drug follows zero order and showed sustained release behaviour for a period of 24 hr. The optimized formulation contains 1:3 ratio of STTP & casein and demonstrated successful sustained release. Memantine HCl loaded casein nanoparticle is a potential new delivery system for treatment of Alzheimer's disease.

**Keywords**: Alzheimer's disease, Protein nanoparticles and ionically crosslinked method.

**PC-911**

**DESIGN, PREPARATION, AND SOLID-STATE CHARACTERIZATION OF DACLATASVIR DIHYDROCHLORIDE POLYMORPHS FOR ENHANCED SOLUBILITY AND DISSOLUTION**

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ISBN: 978-81-980623-8-3

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Polymorphism plays a critical role in the development of active pharmaceutical ingredients (APIs), as different crystalline forms can significantly influence physicochemical properties, manufacturing performance, and therapeutic efficacy. Daclatasvir dihydrochloride, a direct-acting antiviral agent for the treatment of chronic hepatitis C virus (HCV) genotype 3 infection, belongs to the Biopharmaceutical Classification System (BCS) Class II, characterized by low aqueous solubility and high permeability. The present study aimed to develop and characterize novel polymorphic forms of Daclatasvir dihydrochloride to improve its solubility and dissolution profile. Various crystallization techniques, including solvent evaporation, binary solvent crystallization, anti-solvent addition, melt crystallization, and solvent-assisted grinding, were employed using different solvents and mixtures. The resulting solid forms were characterized by Fourier-transform infrared spectroscopy (FT-IR), differential scanning calorimetry (DSC), and powder X-ray diffraction (PXRD) to determine structural variations and thermal behaviour. Solubility and in vitro dissolution studies were conducted in phosphate buffer (pH 6.8). Distinct solid forms with reduced crystallinity were obtained, demonstrating significant differences in melting behaviour, diffraction patterns, and intermolecular interactions. Among the prepared forms, the ethanol–water binary solvent system (Solid Form D) exhibited the highest solubility (63.4 µg/mL) and improved dissolution (53.4% at 45 min) compared to the input material (59.06 µg/mL and 37.17% at 45 min). These findings underscore the potential of polymorphic manipulation to enhance the biopharmaceutical performance of poorly soluble antiviral agents. The study provides a foundation for selecting optimal solid forms of Daclatasvir dihydrochloride to achieve improved oral bioavailability and consistent therapeutic outcomes.

**Keywords**: Daclatasvir dihydrochloride, polymorphism, FT-IR, DSC, PXRD, solid-state characterization.

**PC-912**

## DEVELOPMENT AND OPTIMIZATION OF SELF MICRO EMULSIFYING DRUG DELIVERY SYSTEM OF IRBESARTAN

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The present study aimed to design, develop, and optimize a Self-Micro Emulsifying Drug Delivery System (SMEDDS) to enhance the solubility and dissolution profile of Irbesartan. SMEDDS are isotropic mixtures of oil, surfactant, and co-surfactant that spontaneously form fine oil-in-water microemulsions upon dilution in gastrointestinal fluids, thereby improving the dissolution and absorption of lipophilic drugs. Preformulation studies, including solubility testing and compatibility analysis by FTIR, confirmed the suitability of selected excipients. Pseudo-ternary phase diagrams were constructed to determine the emulsification regions and to optimize the ratios of oil (olive oil), surfactant (Tween 80), and co-surfactant (PEG 400). Various formulations (IF1–IF10) were prepared and evaluated for clarity, emulsification efficiency, and in vitro dissolution studies. Among them, formulation IF7 exhibited superior performance with rapid emulsification, stable microemulsion formation, and enhanced drug release kinetics best fitting a first-order model ($R^2 = 0.965$). Comparative studies demonstrated a significant increase in the dissolution rate of Irbesartan from optimized SMEDDS compared with pure drug. The findings highlight that SMEDDS provide a promising, simple, and industrially feasible approach to overcome solubility challenges, thereby improving oral bioavailability and therapeutic efficacy of poorly water-soluble drugs like Irbesartan.

**Keywords**: Irbesartan, SMEDDS, poorly water-soluble drugs, Oral bioavailability, Pseudo-ternary phase diagram and Drug release kinetics

**PC-913**

## DEVELOPMENT AND OPTIMIZATION OF BENZOYL PEROXIDE LOADED ANISE OIL-BASED EMULGEL FOR EFFECTIVE MANAGEMENT OF ACNE VULGARIS USING BOX-BEHNKEN DESIGN.

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Emulgels are emerging as efficient delivery systems for hydrophobic drugs, combining emulsions' solubilization benefits with gels' controlled release properties. This study optimized a benzoyl peroxide-loaded emulgel for acne treatment using anise oil as the oil phase and Tween® 60/Span® 80 as emulsifiers. A Box-Behnken design evaluated the effects of Carbopol® 934P, Tween® 60, and Span® 80 on % drug permeation at 3 and 10 hours. The optimized formulation demonstrated 15.66% and 78.66% permeation, stable physicochemical properties, and superior antimicrobial efficacy over the marketed product. This patient-friendly emulgel presents a promising alternative for acne management.

**Keywords**: Acne vulgaris, Carbopol® 934P, Benzoyl peroxide, Emulgel.

**PC-914**

## FORMULATION AND EVALUATION OF MEBEVERINE HYDROCHLORIDE GASTRORETENTIVE FLOATING MICROSPHERES

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Mebeverine hydrochloride (MGH) is an antispasmodic agent with a short gastric residence time and site-specific absorption, which limits its therapeutic efficacy. To overcome these drawbacks, gastroretentive floating microspheres were developed to prolong gastric retention and achieve sustained drug release. The microspheres were prepared by an oil-in-water (O/W) solvent evaporation and diffusion technique using polymer combinations such as Eudragit® RS/RL and ethylcellulose/hydroxypropyl methylcellulose (HPMC) blends. The resulting low-density, porous microspheres were evaluated for particle size distribution, surface morphology using scanning electron microscopy (SEM), production yield, entrapment efficiency (EE), in vitro buoyancy, swelling index, true density, and in vitro drug release behavior. Fourier-transform infrared spectroscopy (FTIR), differential scanning calorimetry (DSC), and X-ray diffraction (XRD) analyses were performed to assess possible drug–polymer interactions and confirm the stable incorporation of MGH. The prepared microspheres showed satisfactory yields with uniform spherical morphology. Entrapment efficiencies were high, ensuring adequate drug loading. Buoyancy studies revealed that the optimized formulations maintained more than 80% floating ability over 12 hours. The drug release studies demonstrated sustained release of MGH for up to 12 hours, following Higuchi and Korsmeyer–Peppas kinetics, indicating diffusion-controlled release with anomalous transport. Stability testing under accelerated conditions confirmed good physicochemical stability of the optimized formulations. Overall, the developed floating microspheres of MGH successfully prolonged gastric retention, improved buoyancy, and provided controlled release, offering a promising approach for enhancing therapeutic efficacy in the management of gastrointestinal spasms.

**Keywords**: mebeverine, floating microspheres, gastroretentive, Eudragit.

**PC-915**

## FORMULATION AND EVALUATION OF PRONIOSOMAL GEL FOR TOPICAL DELIVERY OF ORNIDAZOLE

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Acne vulgaris is a common inflammatory skin disorder. It affects the pilosebaceous units followed by an overgrowth by Propionibacterium acne bacteria. The current work aims to develop a topical proniosomal carrier system for ornidazole to manage acne vulgaris which is capable of efficiently delivering entrapped drug over an extended period. The desired ornidazole loaded proniosomal gel was formulated by employing a slurry technique using cholesterol, Span 60, and carbopol 934. The




ISBN: 978-81-980623-8-3

formulated proniosomal gels were characterized by FTIR, drug loading, entrapment efficiency, surface morphology, particle size, zeta potential, pH, and viscosity. Further, evaluated for in vitro drug release, ex vivo permeation, and stability profile. The optimized proniosome F5 suggested that particles were spherical and near homogeneous with relatively smoother surfaces with a particle size of 20 nm. The optimized formulation F5 had shown a drug loading of 25.83% and an entrapment efficiency of 97.66%. Further, the optimized proniosomal gel G2 had shown enhanced permeation (91.12 % in 12h) and displayed sustained release when compared with plain gel (74.29 % to 78.33% over 12h). Stability studies suggested that formulated proniosomal gel was highly stable at 4-8°C. In conclusion, the formulated ornidazole loaded proniosomal gel can be used as a potential therapeutic alternative for managing acne vulgaris.

**Keywords**: Ornidazole; Acne vulgaris; Proniosome; Gel; Sustained drug delivery; Slurry technique

**PC-916**

**MULTI-STAGE COMPUTATIONAL EVALUATION TO EXPLORE THE ANTI-TUBERCULAR POTENTIAL OF BEDAQUILINE PYRIDYL DERIVATIVES**

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Tuberculosis is a major global health issue, worsened by rising drug resistance. ATP synthase, crucial for energy production, is a promising target for anti-tubercular drugs. Bedaquiline, an ATP synthase inhibitor, is effective but has limitations like high lipophilicity. This study explores Bedaquiline pyridyl derivatives using QSAR modeling, molecular docking, and ADMET analysis to develop better treatments. The study utilized QSARINS software for 2D QSAR modeling and descriptor selection, with molecular descriptors calculated using PaDEL and ChemDes. A dataset of 60 bedaquiline pyridyl derivatives with MIC90 values was split (75:25) for training and testing. Molecular docking of ligands with M. tuberculosis ATP synthase (PDB ID: 4V1H) was performed using AutoDock, followed by MD simulations with GROMACS. ADMET properties were analyzed using SWISSADME and pkCSM tools to evaluate pharmacokinetics, toxicity, and drug-likeness. This study developed and validated four QSAR models for predicting ATP synthase inhibition in Mycobacterium tuberculosis, with Model 4 showing optimal statistical performance ($R^2$ = 0.8518, $Q^2LOO$ = 0.8025). Using Model 4, novel bedaquiline derivatives were designed, exhibiting enhanced predicted pMIC90 values compared to the reference drug. Molecular docking revealed BP-2d as the top-performing compound (-8.1 kcal/mol), surpassing Bedaquiline (-6.6 kcal/mol) with key binding interactions. Molecular dynamics simulations confirmed the stability and binding consistency of BP-1d and BP-2d with ATP synthase. The QSAR analysis identified Model 4 as the most reliable for predicting the anti-tubercular activity of bedaquiline-pyridyl derivatives, with robust statistical validation ($R^2$ = 0.8518, $Q^2LOO$ = 0.8025). Key molecular descriptors influencing ATP synthase inhibition were highlighted, enabling the design of novel derivatives. Among the designed compounds, BP-1d (pMIC90 = 7.8810) and BP-2d (docking score = -8.1 kcal/mol) emerged as potent candidates. Computational studies underscore their potential as promising lead compounds for further experimental validation against Mycobacterium tuberculosis.

**Keywords**: QSAR, Bedaquiline Pyridyl derivative, Molecular docking, Molecular Dynamics, Anti-tubercular activity

**PC-917**

**PROLIPOSOME BASED TRANSDERMAL DELIVERY OF SIMVASTATIN**

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Simvastatin is classified as a BCS–II drug and experiences considerable first-pass metabolism, which leads to low oral bioavailability in humans (5-8%). The objective of the present research was to develop and evaluate Simvastatin Proliposomes for Transdermal Delivery. Proliposomes were prepared to improve bioavailability & they were prepared by Coacervation-Phase seperation method using Cholestrol and Lecithin were used in different ratios. Average globule size and Poly Dispersity Index (PDI) were found to be in between 285.2 ± 2.8 to 452.3 ± 1.8 nm and 0.21 ± 0.03 to 0.32 ± 0.04 respectively. Zeta potential values varied from −22.0 ± 0.15 to −30.9 ± 0.20 mV. All formulations showed good entrapment efficiency ranging from 81.52 ± 1.3 to 92.35 ± 2.4%. In-vitro studies, F3 formulation showed better release (94±2.8%). Effect of Charge inducers like Stearyl amine & Sodium cholate were studied. In-vitro release kinetics follows zero order with higuchi model. Histopathological study reveals that, the surface epithelium lining and the granular cellular structure of the skin was disturbed, it indicates vesicle deposition in skin. DSC studies indicated that there are no drug-excipient interactions. From the results, it was concluded that the proliposomal gels offer good controlled delivery of Simvastatin which improves the bioavailability.

**Keywords**: Proliposomes, Bioavailability & Transdermal delivery.

**PC-918**

**FORMULATION & EVALUATION OF ANTIAGING SERUM SHEET MASK**

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The use of more than one herb in a therapeutic preparation is known as polyherbal formulation. The idea comes from Ayurveda and other traditional therapeutic systems, which use various herbs in a specific ratio. Skin serums are light cosmetics with a high active ingredient concentration. Antiaging Serum is one of several different forms of oil and water-based serums that have varied actions. Antiaging serums are primarily concerned with minimising the signs and symptoms of ageing; they are known to absorb swiftly into the skin, delivering an intensive dose of chemicals and preventing fine lines, wrinkles, inflammation, and dark spots. Our formulation consists extracts of Camellia sinensis (Green tea) and Psidium guajava (Guava Leaves) which are known to possess antioxidant properties. The antioxidant action of guava and Tea polyphenols makes them Polyherbal formulation refers to the use of many herbs in a medicinal preparation. The prime ingredient to be used in Antiaging Formulations. Apart from these Aloe vera, Glycerine, Lavender Oil and Honey are used as excipients which enhances the action of active ingredients.

**Keywords:** Anti-ointment, Ointment mask, Guava leaf, Green Tea.

**PC-919**

**A PIONEER REVIEW ON LACTOFERRIN AS VERSATILE MACROMOLECULAR LIGAND FOR TARGETING CANCER: RECENT ADVANCES**

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This review critically evaluates the emerging role of lactoferrin, an iron-chelating glycoprotein, as a macromolecular ligand in precision cancer therapy. Lactoferrin exhibits potent anti-tumour, anti-inflammatory, and immunomodulatory properties and targets cancer cells via high-affinity binding to transferrin and LDLreceptor-related proteins, enhancing selectivity and minimizing off-target toxicity. It modulates key oncogenic pathways such as PI3K/Akt and MAPK to suppress tumour growth and metastasis. Nanoformulations—like liposomes and polymeric nanoparticles—improve pharmacokinetics, enable targeted drug delivery, and enhance therapeutic efficacy. Lactoferrin's ability to cross biological barriers, including the blood-brain barrier via receptor-mediated transcytosis, offers promise for treating difficult cancers such as glioblastoma. Additionally, it enhances anti-tumour immunity by




ISBN: 978-81-980623-8-3

activating NK cells and polarizing macrophages to the M1 phenotype. Importantly, lactoferrin helps overcome multidrug resistance by modulating efflux pumps like P-glycoprotein. Integrating molecular insights with preclinical and clinical evidence, this review underscores lactoferrin's transformative potential in precision oncology through advanced nanoformulations and synergistic immunomodulatory mechanisms.

**Keywords**: Lactoferrin; cancer therapeutics; targeted drug delivery; immunotherapy; nano-oncology; drug resistance

**PC-920**

**LULICONAZOLE - NATURAL DEEP EUTECTIC SOLVENTS PREPARATIONS: SOLUBILITY ENHANCEMENT FORMULATION AND BIOLOGICAL ACTIVITY EVALUATION.**

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Luliconazole (LCZ) a topical antifungal agent shows poor water solubility and skin permeability. The LCZ solubility was enhanced through the synthesis of Natural Deep Eutectic Solvent (NDES) preparation. The LCZ-NDES was formulated and evaluated. A total of 24 various NDES preparations consisting of choline chloride in combination with Malonic acid, Propylene glycol, glycerol, D - Sorbitol, Glucose, Sucrose, Fructose and urea were synthesized with different molar ratios. The preparations were characterized using FT-IR, DSC, Motic digital microscopy, and proton nuclear magnetic resonance and evaluated for solubility enhancement and in vitro drug release. The gel was evaluated for pH, viscosity, spreadability, texture analysis, in-vitro drug release and antifungal activity. From the synthesized NDES, the ChCl: MA combination showed the optimum solubility of LCZ with optimized pH. The solubility enhancement ratio of LCZ was about more than 150 using optimized NDES as compared to water. The crystalline transition of LCZ in NDES was confirmed through characterization studies. The NDES-LCZ gel has better texture properties like hardness, adhesiveness, cohesiveness, gumminess and viscosity and spreadability as compared to a pure drug containing LCZ gel. The % cumulative LCZ release value was higher in the case of NDES-LCZ as compared to LCZ gel. The comparatively higher antifungal activity of NDES-LCZ gel was observed. Thus, the findings of the study demonstrate NDES containing LCZ gel with improved solubility and antifungal activity.

**Keywords**: Luliconazole, Natural Deep Eutectic Solvent, solubility enhancement, choline chloride, antifungal activity.

**PC-921**

**FORMULATION, CHARACTERIZATION AND OPTIMIZATION OF VENLAFAXINE- QUETIAPINE NANOPARTICLES FOR INTRANASAL ADMINISTRATION IN TREATMENT RESISTANT DEPRESSION**

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In the present work, chitosan nanoparticles of venlafaxine (VNLFX) and quetiapine (QTP) were formulated and characterized. The objectives of the present study were to check the physicochemical compatibility among the APIs and Excipients, to formulate, evaluate and optimize venlafaxine- quetiapine chitosan nanoparticles, to perform the in-vitro and ex-vivo study. The nanoparticles were prepared by ionic gelation technique using Box-Behnken Design (BBB). The FTIR & DSC study confirmed compatibility of components for nanoparticles formulation. The prepared nanoparticles were characterized for particle size, zeta potential, polydispersity index (PDI) and % entrapment efficiency. The optimized batch with chitosan concentration 0.5% w/v, cross linker sodium tripolyphosphate 0.2% w/v and homogenization time 5 minutes shown particle size of 115.6 nm, zeta potential 51.6 mV, PDI 0.42 and % entrapment efficiency for VNLFX 86.2% and for QTP 76.3% out of all 15 formulation batches. SEM images of the optimized formulation was found roughly spherical and sub spherical in shape. In-vitro drug release from optimized formulation for both drugs shown initial burst release followed by characteristic sustained release for more than 24 hrs. Ex-vivo permeation study on goat nasal mucosa for 12 hours showed VNLFX 35.3% and QTP 26.2% release. Thus, it can be concluded that this study may be beneficial for the formulation of VNLFX-QTP nanoparticles for intranasal administration in Treatment Resistant Depression.

**Keywords**: chitosan nanoparticles, Box-Behnken Design, ionic gelation technique, intranasal, Treatment Resistant Depression.

**PC-922**

**SMART DRUG DELIVERY SYSTEM: ADVANCING PRECISION, SAFETY AND PATIENT-CENTERED THERAPEUTIC**

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Smart drug delivery systems (SDDS) are an innovative class of therapeutic platforms designed to enhance the safety, efficacy, and patient convenience of pharmacological treatments. Unlike conventional dosage forms, which often release drugs non-selectively, SDDS employ advanced carriers and stimuli-responsive mechanisms to deliver therapeutic agents at the right site, rate, and time. Materials such as nanoparticles, liposomes, dendrimers, polymeric micelles, hydrogels, and implantable reservoirs can encapsulate or conjugate drugs, protecting them from premature degradation and improving bioavailability. A defining feature of SDDS is their ability to respond to internal or external cues—such as pH, temperature, enzymes, redox potential, ultrasound, magnetic fields, or light—to modulate drug release. This "on-demand" functionality enables precise dosing and reduces systemic toxicity, particularly in challenging conditions like cancer, infections, or inflammatory diseases. Integration with microelectronics and biosensors has also given rise to "intelligent" devices, including smart pills and wearable or implantable pumps, which can monitor patient parameters and adjust therapy in real time. Applications of SDDS span oncology, diabetes management, neurological disorders, and gene or protein delivery, supporting the shift toward personalized medicine. Additionally, sustainable manufacturing and biodegradable excipients are being explored to improve the environmental footprint of these technologies. By combining controlled release, site specificity, and patient-centric design, smart drug delivery systems offer a transformative pathway to optimize therapeutic outcomes and minimize adverse effects. Continued interdisciplinary research in materials science, biomedical engineering, and pharmacology is expected to accelerate

**Keywords**: Smart drug delivery system, nanoparticles, liposomes, hydrogels, targeted therapy.

**PC-923**

**DEVELOPMENT AND EVALUATION OF EVEROLIMUS LOADED SOLID LIPID NANOPARTICLES GEL FOR THE TREATMENT OF ATOPIC DERMATITIS**

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The present work reports the successful formulation and assessment of Everolimus-loaded solid lipid nanoparticles (SLNs) embedded in a topical gel, designed for targeted management of atopic dermatitis. SLNs were prepared via hot homogenization followed by solvent evaporation, utilizing stearic acid as the lipid base and Poloxamer 188 as the surfactant. The resulting gel formulations exhibited a uniform, smooth, white appearance and maintained pH values within the optimal topical range (5.0–7.0), ensuring skin compatibility and minimizing irritation risk Rheological characterization demonstrated appropriate viscosity and spreadability, supporting effective application and skin retention. Particle size analyses indicated nanoscale SLNs ranging from 601 to 832 nm with polydispersity indices between 0.341 and 0.392, confirming relatively uniform size distribution. The optimized formulation (F3) achieved a mean particle size of 633 nm and PDI of 0.398, suitable for enhanced dermal penetration. Homogenization at 10,000 rpm for 5 minutes effectively reduced particle size and improved formulation stability. The Everolimus-loaded SLN gel showed favorable physicochemical properties, indicating promise as a topical delivery system for localized therapy in atopic dermatitis. This strategy may improve local therapeutic outcomes and minimize systemic adverse effects compared to conventional oral Everolimus administration.




ISBN: 978-81-980623-8-3

**Keywords**: Atopic dermatitis, Solid Lipid Nanoparticles, PDI, Skin permeation.

**PC-924**

## DIAGNOSTIC INNOVATIONS AND THERAPEUTIC POTENTIAL OF NANOPARTICULATE DELIVERY FOR COLON CANCER

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Colorectal cancer (CRC) is a frequently occurring malignant disease that affects people worldwide, especially those who are 50 years old or older and have a higher chance of developing the disease. Although improvements in diagnostic techniques and early screening have led to a decrease in cancer-related deaths, there remains an urgent want for novel treatment approaches. Scientists are quickly acknowledging the importance of nanoparticles (NPs) in improving the accuracy, effectiveness, and availability of diagnostic and treatments by enhancing the precision, solubility, and accessibility of pharmaceuticals. Nanoparticles (NPs) show potential in reducing medication toxicity and specifically targeting malignant tumors, therefore decreasing adverse side effects. This study comprehensively evaluates the practicality of using various nano products to detect and treat colorectal cancer (CRC). This study adds to the paradigm change in CRC management by conducting a thorough analysis of the potential of NPs. Incorporating cutting-edge nanotechnologies into CRC treatments can bring about significant changes, providing a way to develop individualized and precise therapies. This analysis highlights the need to use new and creative methods to satisfy the ongoing requirement for advanced therapies in light of the worldwide effect of colorectal cancer (CRC). With the increasing need for effective treatments, investigating nanoproducts becomes a new area of study with significant implications for CRC management. This highlights the need for ongoing research and development in this rapidly evolving sector

**Keywords**: Nanoparticles, Colorectal cancer, Targeted drug delivery, Diagnostics, Cancer control, Imaging

**PC-925**

## Niosomal Gel of Capsaicin: A Novel Sustained-Release Topical Approach for Rheumatoid Arthritis

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Rheumatoid arthritis (RA) is a chronic inflammatory disorder characterized by persistent joint pain and swelling, where conventional systemic therapies often lead to adverse effects and poor patient compliance. To address this, the present study was designed to develop a novel niosomal-based topical gel of Capsaicin, a natural analgesic agent, for sustained and localized delivery in arthritis management. Capsaicin-loaded niosomes were prepared by ether injection and thin film hydration methods and optimized using a $3^2$ factorial design, considering cholesterol concentration (A) and surfactant concentration (B) as critical variables, while particle size, entrapment efficiency, and PDI served as responses. Optimized formulations demonstrated particle sizes of 640.1 nm and 728.8 nm, with entrapment efficiencies of 95.2% and 86%, and favorable PDI values (0.010 and 0.394). In-vitro release studies revealed sustained profiles with 81.27% and 98.21% release, respectively. The optimized gel, prepared by incorporating optimized niosomal dispersion into carbopol 934, exhibited ideal topical properties with pH 6.74 ± 0.04, excellent homogeneity, spreadability, and viscosity. Comparative diffusion studies confirmed that the niosomal gel (31.78%) and niosomal dispersion (40.77%) provided markedly sustained release over 8 h compared with plain drug gel (63.21%) and drug solution (85.86%). Furthermore, skin irritation testing confirmed the formulation's safety and tolerability. Overall, the study demonstrates that niosomal gel offers a promising carrier system for localized, sustained, and irritation-free delivery of Capsaicin, potentially improving therapeutic outcomes and patient adherence in arthritis therapy.

**Keywords**: Rheumatoid arthritis; Capsaicin; Niosomes; Factorial design; Sustained release

**PC-926**

## PREPARATION OF ETRAVERINE NANOSUSPENSION WITH DIFFERENT PROPORTION OF POLYMER'S AND IT'S EVALUATION

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The objective of this study was to design, develop, optimize, and evaluate chitosan-based Etravirine nanosuspension to enhance solubility and drug release.Etravirine nanosuspension was prepared using a modified solvent evaporation and ionic cross-linking method, followed by optimization through a Box-Behnken design. The influence of drug, chitosan, and sodium tripolyphosphate concentrations on particle size, entrapment efficiency, and drug release was assessed. Optimized formulations were characterized using Zetasizer, transmission electron microscopy, X-ray diffraction, and saturation solubility studies. A three-level, three-factor response surface design was employed to generate regression equations for predicting responses and identifying the optimal design space. Among the prepared formulations, batch F6 demonstrated superior characteristics: particle size of 225 nm, polydispersity index of 0.2, zeta potential of +30 mV, drug release of 94%, and entrapment efficiency of 80%. The saturation solubility of batch F6 (94.6±3.1%µg/ml) was markedly improved, showing a 22-fold enhancement compared to pure crystalline Etravirine (4.02 ± 0.03 µg/ml).Etravirine, an antiretroviral drug with poor oral bioavailability due to lipophilicity, crystallinity, low permeability, and first-pass metabolism, was successfully incorporated into a chitosan-based nanosuspension. The optimized formulation significantly improved solubility and drug release, suggesting its potential to enhance absorption and bioavailability. This nanosuspension approach offers a promising strategy to overcome biopharmaceutical limitations of Etravirine and improve its therapeutic efficacy in oral administration.

**Keywords**: Etravirine, Nanosuspension, Box Behnken method, Nanoparticles

**PC-927**

## DESIGNING THE DENDRIMER-BASED DRUG DELIVER FOR ANTINEOPLASTIC THERAPIES

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Dendrimers, a sophisticated nanoscale concept, are transforming cancer treatment by tackling the critical challenges plaguing conventional therapies: poor drug solubility, systemic toxicity, oral bioavailability, side effects, and drug resistance therapy. These branched molecular frameworks serve as attractive drug delivery nanocarriers, with their engineered structure enabling controlled release and targeted delivery of chemotherapeutic agents. This breakthrough promises to enhance the therapeutic index of anticancer drugs dramatically. We explore how these systems optimize crucial parameters, such as release kinetics,hydrophobic drug encapsulation, reduced toxicity, and mimic protein. Engineering these molecular carriers necessitates careful consideration ofsurface chemistry and the role of the functional group, with each feature being carefully tweaked to maximize therapeutic effectiveness. The field has observed amazing advances through the application of innovative polymeric studies, particularly poly(amidoamine),poly[lactic-co-glycolic acid], and PEGylated dendrimers. These sophisticated designs have proven exceptional promise in enhancing biocompatibility and achieving accurate drug targeting at the site of action. Our research expands on the phenomenal versatility of dendrimer-based delivery systems across a wide range of new delivery strategies, including targeted delivery, gene therapy, photodynamic therapy, and photothermal treatment as well as immune response enhancement and stimuli-responsiveness. Preclinical and clinical research has provided persuasive evidence that they can reduce


ISBN: 978-81-980623-8-3

off-target toxicity while increasing therapeutic outcomes. Considering these hopeful advancements, significant barriers remain on the way to widespread clinical acceptance. These include complex safety assessments for long-term usage and meeting regulatory standards for FDA approval. As we look ahead, the continued development of multifunctional dendrimers holds remarkable promise for altering cancer therapy; however, additional clinical validation will be required to realize their full potential in medical practice.

**Keywords**: dendrimer, designing methodologies, antineoplastic agents, controlled release dendrimer, macromolecules, cancer targeting, polymers

**PC-928**

**FORMULATION AND EVALUATION OF HERBAL MICRO BEADS LOADED WITH HESPERETIN AND CURCUMIN FOR ANTI-CANCER ACTIVITY**

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Cancer remains the second leading cause of death worldwide, with chemotherapy being the most commonly employed treatment. However, natural products and their derivatives have gained attention as alternative therapeutic agents due to their broad biological activities and relatively low toxicity. The present study investigated the anti-proliferative activity of hesperetin and curcumin in combination therapy, delivered in the form of microbeads, and their effects on cell viability in HeLa cell lines. Microbeads were prepared using a cross-linking method, and the anticancer effects of the formulations (A1, A2, A3) were evaluated using the MTT (3-[4, 5-dimethylthiazol-2-yl]-2,5-diphenyl tetrazolium bromide) assay. Cytotoxicity was quantitatively assessed spectrophotometrically by measuring the formazan product formed via mitochondrial dehydrogenases, which correlates with viable cell count. Among the tested formulations, A3 (2% sodium alginate, hesperetin + curcumin) exhibited the highest swelling index (618.05 ± 5.15) and encapsulation efficiency (56.08%). A3 also demonstrated superior cytotoxicity, with an $IC_{50}$ value of 41.88 µg, which was lower than the $IC_{50}$ values observed for hesperetin and curcumin individually. These findings suggest that the combination of hesperetin and curcumin, delivered through microbeads, may serve as a promising anticancer strategy against HeLa cell lines. Further in vivo research and clinical studies are required to validate these results and establish the efficacy and safety of this approach in human patients.

**Keywords**: Hesperetin, Curcumin, Herbal Micro Beads, Anticancer Activity

**PC-929**

**3D PRINTING: THE NEXT FRONTIER IN PERSONALIZED MEDICINE**

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Applications for 3D printing in the development and targeting of solid, semi-solid, and locally delivered or implanted pharmaceuticals are numerous. This technology enables the incorporation of one or more drugs into a single solid dosage form, offering benefits such as enhanced patient compliance, improved ease of swallowing, customized release profiles, and the creation of novel medications for which no existing dosage forms are available. Long term release Joint replacement treatments, medical prostheses, and cardiovascular applications have been the main uses for 3D-printed implants, stents, and medical equipment. Additionally, 3D printing has been employed to produce locally applied medications, including medicated contact lenses, microneedles, and wound dressings. However, selecting the most suitable 3D printing technique for each application and developing pharmaceutical inks with the required physicochemical and biological properties remain significant challenges. The integration of 3D printing, with nanotechnology based biopharmaceuticals and therapeutics positions customized printed nanomedicines as a key innovation for the future. Continuous fabrication using 3D-printed microfluidic chips further facilitates their adoption in clinical practice.

**Keywords**: 3D Printing, Personalized medicine, Precision Medicine, Bioprinting, Digital Health

**PC-930**

**IN-VITRO EVALUATION OF FEXOFENADINE HYDROCHLORIDE TABLETS: A BIOEQUIVALENCE STUDY ACROSS DIFFERENT BRANDS**

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Fexofenadine Hydrochloride is a second generation oral antihistamine indicated to relieve signs and symptoms of related to seasonal allergic rhinitis in children. The aim of the present study is to establish the pharmaceutical equivalence of different brands of Fexofenadine Hydrochloride 120 mg tablets available in the market. The quality control tests performed are weight variation, friability, hardness, disintegration and invitro dissolution studies. In-Vitro dissolution studies of Fexofenadine Hydrochloride 120 mg tablets were carried out in 6.8 pH phosphate buffer. Two samples are compared with the Innovator product. During the evaluation no major difference was noticed in weight variation, friability, hardness, disintegration and in dissolution between the two market products and the innovator product.

**Keywords**: Fexofenadine Hydrochloride, weight variation, friability & invitro dissolution studies

**PC-931**

**DESIGN, DEVELOPMENT AND CHARACTERIZATION OF GRISEOFULVIN LOADED NLC TABLETS**

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To design, development and characterization of a nanostructured lipid carrier (NLC)-loaded tablet containing griseofulvin to enhance its oral bioavailability and stability for the effective antifungal. The primary objective of this study is to overcome limitations of conventional fungal therapies by formulating optimized NLCs and incorporating them into oral tablets and evaluated. Griseofulvin -loaded NLCs were prepared by high-speed homogenization using varying ratios of solid and liquid lipids with surfactants. The resulting NLCs were characterized; optimized NLCs were compressed into tablets and evaluated. FTIR and DSC confirmed no drug–excipient incompatibility and verified griseofulvin melting point. In vitro studies showed controlled and enhanced drug release. The optimized NLC (CF4) had a particle size of 178.5 nm, high drug content (94.56%), and excellent entrapment efficiency (96.20%). SEM, TEM confirmed smooth, spherical particles. Stability studies indicated good formulation stability. griseofulvin -loaded tablets were prepared by direct compression. Pre- and post-compression evaluations met standard ranges, with batch F7 showing optimal results: drug content (95.75%), drug release (96.86%), and stability study shows good formulation stability. The findings indicate that griseofulvin-loaded NLCs tablet offer a promising strategy for effective and controlled delivery of antifungal agents.

**Keywords**: griseofulvin, NLC, Tablets Antifungal, NDDS etc.

**PC-932**

**FABRICATION AND EVALUATION OF METOPROLOL SUCCINATE TRANSDERMAL PATCHES**

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ISBN: 978-81-980623-8-3

Oral administration of antihypertensive drugs like Metoprolol Succinate is often limited by low bioavailability due to first-pass metabolism and the need for frequent dosing, which reduces patient compliance. Transdermal drug delivery systems (TDDS) offer a promising alternative by enabling controlled drug release, enhanced bioavailability, and improved therapeutic efficacy. This study focused on the formulation and evaluation of Metoprolol Succinate transdermal patches for the treatment of cardiovascular disorders. The patches were developed using solvent casting technique with synthetic polymers such as Hydroxypropyl Methylcellulose (HPMC K4M) and Polyvinylpyrrolidone (PVP K30). Dibutyl phthalate was used as a plasticizer and Dimethyl Sulfoxide (DMSO) as a penetration enhancer. The prepared patches were evaluated for various physical and chemical parameters including thickness, drug content, moisture content, and in-vitro drug release. Among all formulations, MP5 demonstrated most consistent and extended drug release over 24 hours, following zero-order kinetics and a non-Fickian diffusion mechanism. FT-IR spectroscopy confirmed the absence of drug-excipient interactions, supporting the chemical stability of the formulation. The in-vitro studies were validated, while stability studies under accelerated conditions indicated the durability and shelf-life of the patches. Overall, the developed transdermal patches of Metoprolol Succinate are suitable for once-daily administration, and further studies can be carried out for extending the release for few more days and can be viable alternative to oral therapy.

**Keywords**: Beta-1 adrenergic blocker Metoprolol Succinate, non-Fickian diffusion.

**PC-933**

## FORMULATION AND ENHANCED DRUG DELIVERY OF DICLOFENAC SODIUM TRANSDERMAL PATCHES USING POLYMER BLENDS OF ETHYL CELLULOSE, GUAR GUM, HPMC, AND PVP: COMPARATIVE DRUG RELEASE STUDY

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Diclofenac sodium transdermal patches were successfully developed using polymer blends such as Guar gum/PVP, HPMC/PVA, and EC/HPMC, all demonstrating excellent film-forming ability. The prepared patches were thin, flexible, smooth, and transparent, with minimal weight variation, indicating uniform distribution of drug and polymers. Patch thickness increased with higher concentrations of hydrophilic polymers, including PVP, PVA, and HPMC, which also enhanced flexibility and folding endurance. Moisture content was generally low but slightly elevated in hydrophilic formulations. In-vitro drug release studies revealed that patches with larger quantities of hydrophilic polymers (F1–F5) exhibited faster drug release, whereas patches with higher hydrophobic polymer content (F6 and F7) provided sustained release. Permeability measurements confirmed the desired flux and controlled release profile for F6 and F7 formulations. The solvent casting technique proved effective for fabricating transdermal patches with uniform characteristics, mechanical stability, and reproducible drug release. Overall, the results indicate that careful selection and combination of hydrophilic and hydrophobic polymers can modulate drug release kinetics, improve flexibility, and enhance patch stability. Diclofenac transdermal patches developed in this study have the potential to increase bioavailability, reduce dosing frequency, and provide better control of drugs with short half-lives or narrow therapeutic indices, making them suitable for patient-compliant, long-term therapy. The study highlights the importance of polymer composition in optimizing physicochemical properties and in-vitro performance of transdermal drug delivery systems.

**Keywords**: Guargum, Hydrophobic Polymers, Transdermal patches, In-vitro drug release.

**PC-934**

## IMEGLIMIN-LOADED POLYMERIC NANOPARTICLES FOR SUSTAINED DRUG DELIVERY: A NOVEL APPROACH TO TYPE 2 DIABETES MANAGEMENT

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Imeglimin, a novel oral antidiabetic agent that targets mitochondrial bioenergetics and improves insulin sensitivity, faces low oral bioavailability, which restrict its therapeutic potential. The present study aimed to develop and evaluate polymeric nanoparticles of Imeglimin to enhance its oral bioavailability. Polymeric nanoparticles were prepared using the solvent evaporation method, employing biodegradable polymers such as poly(lactic-co-glycolic acid) (PLGA) and stabilizers like polyvinyl alcohol (PVA). The formulations were optimized based on particle size, polydispersity index (PDI), zeta potential, entrapment efficiency, and in vitro drug release profiles. The optimized nanoparticles exhibited a mean particle size in the nanometric range (<200 nm), a narrow PDI indicating uniformity, and high drug entrapment efficiency (>80%). In vitro release studies demonstrated a sustained drug release over 24 h, suggesting potential for prolonged therapeutic action. Morphological evaluation by scanning electron microscopy confirmed spherical and smooth nanoparticles. Furthermore, in vivo pharmacokinetic studies in Wistar rats revealed significantly improved oral bioavailability of Imeglimin nanoparticles compared to pure drug suspension. These findings highlight the potential of polymeric nanoparticle-based delivery of Imeglimin as a promising approach to overcome bioavailability challenges, thereby enhancing its therapeutic efficacy in the management of type 2 diabetes mellitus.

**Keywords**: Imeglimin, polymeric nanoparticles, oral bioavailability, sustained release, antidiabetic activity

**PC-935**

## NEXT-GENERATION GASTRORETENTIVE BILAYER FLOATING TABLETS OF METFORMIN AND CIPROFLOXACIN.

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Gastroretentive floating drug delivery systems (FDDS) provide a promising platform to enhance the bioavailability and therapeutic performance of drugs with a narrow absorption window in the upper gastrointestinal tract. In this work, a novel bilayer floating matrix tablet combining Metformin Hydrochloride (Met HCl) and Ciprofloxacin Hydrochloride (Cip HCl) was developed, characterized, and evaluated to achieve prolonged gastric retention and controlled dual-drug release. Each layer was formulated using hydrophilic polymers (HPMC K4M / K15M) and an effervescent gas-generating system (sodium bicarbonate + citric acid) to ensure buoyancy. Precompression evaluation of powder blends (angle of repose, bulk/tapped density, Carr's index) confirmed suitable flow properties. Tablets were compressed and assessed for physical parameters (weight variation, hardness, friability, thickness) and content uniformity of both drugs using UV and HPLC methods. Floating behavior was studied in 0.1 N HCl at 37 ± 0.5 °C: the optimized formulation exhibited a floating lag time < 2 min and remained buoyant > 10–12 h. In vitro dissolution studies (USP II, 50 rpm) showed release of Met HCl and Cip HCl governed by diffusion and erosion mechanisms, with ~25–30% release at 1 h, ~60–70% at 6 h, and > 85% by 10 h. Release kinetics fitted best to Korsmeyer–Peppas (non-Fickian transport). The developed bilayer floating tablet holds promise as a dual-drug FDDS with favorable mechanical strength, buoyancy, and sustained release, potentially improving patient compliance in combined antidiabetic and antimicrobial therapy.

**Keywords**: Floating Drug Delivery System; Metformin Hydrochloride, Ciprofloxacin Hydrochloride, Bilayer Matrix Tablet, Controlled Release.

**PC-936**

## SMART HYDROGEL-ENHANCED INFLAMMATORY BOWEL DISEASE (IBD) THERAPY: A SYNERGISTIC APPROACH WITH BUDESONIDE, CURCUMIN, AND PROBIOTICS

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Inflammatory Bowel Disease (IBD) is a chronic gastrointestinal disorder with high relapse rates, limited therapeutic success, and gut microbiota imbalance. Budesonide, although effective, causes systemic side effects,




ISBN: 978-81-980623-8-3

while curcumin suffers from poor solubility and bioavailability. Probiotics facilitate the gut homeostasis restoration, gut probiotic instability is a significant challenge. A smart hydrogel integrating these agents offers a novel multifunctional therapeutic strategy. The present work focuses on the development and evaluation of a colon-targeted smart hydrogel encapsulating budesonide, curcumin, and probiotics to achieve controlled release, enhanced therapeutic efficacy, and improved microbiome modulation. A pH-sensitive hydrogel based on alginate, chitosan, and guar gum was prepared and optimized. Budesonide and curcumin were loaded during gelation, while probiotics (Lactobacillus sp.) were encapsulated under mild conditions. The formulation was characterized for swelling behavior, encapsulation efficiency, morphology (SEM), and thermal/chemical stability (FTIR, DSC). In-vitro release was studied in simulated gastrointestinal fluids, and probiotic survivability was tested by plate count method. The hydrogel achieved high encapsulation efficiency (budesonide 82%, curcumin 78%, probiotics 75%), pH-dependent swelling, and colon-targeted release with ~75% drug release at colonic pH over 24 h. Probiotic viability was retained at >72% after simulated GI transit. In vitro assays showed ~65% reduction in TNF-α and IL-6 levels, confirming strong anti-inflammatory action. These findings highlight the hydrogel as a promising triple-action platform for synergistic IBD therapy, combining corticosteroid efficacy, natural antioxidant protection, and microbiome restoration.

**Keywords**: Smart hydrogel, IBD, Budesonide, Curcumin, Probiotics, Colon-targeted therapy.

**PC-937**

## PHARMACOKINETIC EVALUATION OF BUDESONIDE CORE-IN-CUP TABLETS DESIGNED FOR COLON DELIVERY USING LC-MS/MS

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Budesonide is a widely used drug for the treatment of active inflammatory bowel disease (IBD). In this study, core-in-cup tablets were developed to achieve a prolonged release of Budesonide, aiming to alleviate the symptoms of IBD more effectively. The primary objective was to investigate the pharmacokinetic differences between an optimized core-in-cup tablet formulation and pure Budesonide suspension.Based on uniform and reliable in-vitro drug release profiles, in-vivo evaluation studies were carried out. Various pharmacokinetic parameters were compared to analyze the mean plasma drug concentration–time curves. Two groups of white New Zealand rabbits (n = 6) were used in a cross- over design, with both formulations administered orally. Plasma Budesonide concentrations were quantified using the LC-MS/MS method. The pharmacokinetic comparison revealed significant differences in plasma drug levels between the two formulations. The core-in-cup tablet demonstrated an initial lag phase, indicating delayed release. Notably, the mean residence time (MRT) of the core-in-cup formulation was longer than that of the suspension, suggesting prolonged drug retention.The area under the curve (AUC) for the pure drug suspension was 154.1 ± 1.44 ng·h/mL, while the optimized core-in-cup formulation showed a significantly higher AUC of 918.2 ± 3.11 ng·h/mL. This represents a six-fold increase in bioavailability for the optimized formulation. In conclusion, the core-in-cup tablet formulation significantly improved the bioavailability and pharmacokinetic profile of Budesonide and may serve as a promising chronotherapeutic approach for the management of inflammatory bowel disease.

**Keywords**: LC-MS/MS, Budesonide, Core-in-Cup Tablet, In-vivo Studies, Inflammatory Bowel Disease, Pharmacokinetics

**PC-938**

## A QUALITY BY DESIGN CONCEPT ON POLYMERIC MICROPARTICLES CONTAINING ANTIPSYCHOTIC DRUG: SCREENING DESIGN AND OPTIMIZATION USING RESPONSE SURFACE METHODOLOGY

MEETA N JAIN

Discontinuation and poor adherence to oral medications present significant challenges in treating psychosis. Non-compliance can lead to worse outcomes and increased relapse risk. Long-acting injectable antipsychotics (LAAs), also known as depots, improve medication adherence and offer a therapeutic alternative for treating schizophrenia in patients with limited insight or poor adherence. These drugs are widely accepted as they enhance medication compliance and simplify treatment protocols. This study aimed to apply Quality by Design (QbD) to microspheres containing Asenapine maleate (AM) to identify critical process and formulation variables impacting product quality, such as particle size (PS) and entrapment efficiency (EE). A risk assessment using an Ishikawa diagram and preliminary investigation of critical variables were conducted. Two statistical designs were used to optimize critical variables affecting product quality attributes. The Plackett Burman Design (PBD) screened eight variables, showing that drug-polymer ratio, surfactant concentration, and sonication time significantly influenced PS and EE. These factors were optimized using Central Composite Design (CCD), a response surface methodology, to evaluate their effects on PS and EE. A design space was identified, and implementing a control strategy generated the desired product quality. Analysis of design space robustness predicted that formulation must be prepared within established parameters to minimize batch variations. Results demonstrated that applying QbD approach and formulation parameters successfully produced microspheres with appropriate particle size, morphology, enhanced drug content, entrapment efficiency, and desirable drug release profile for depot formulation.

**PC-939**

## FORMULATION DEVELOPMENT AND EVALUATION OF NOVEL DRUG DELIVERY SYSTEM

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Mouth dissolving films are an advanced oral drug delivery platform designed to rapidly disintegrate upon contact with saliva, offering ease of administration, improved patient compliance and potential for faster onset of action. They are particularly valuable for pediatric, geriatric and psychiatric patients with swallowing difficulties. In this study, mouth dissolving films were developed and optimized for psychosis management using a Quality by Design framework to ensure robust formulation performance. Key formulation variables polymer type, plasticizer concentration and solvent selection were systematically investigated using solvent casting techniques and statistically optimized with Design-Expert® software. The research incorporated a comprehensive literature review, highlighting the advantages of mouth dissolving films in delivering poorly soluble and sensitive drugs. Experimental evaluations included mechanical strength folding endurance, drug release profiles diffusion studies, disintegration time and organoleptic assessment. ANOVA results revealed plasticizer concentration as the most significant factor positively influencing folding endurance ($p = 0.0018$), while solvent concentration and polymer solvent interactions exerted significant negative effects on drug diffusion ($p = 0.0151$). Three factor interactions also played a notable role in mechanical property optimization. The optimized mouth dissolving films formulation demonstrated excellent flexibility, rapid disintegration within seconds, high drug release efficiency and acceptable taste masking attributes essential for psychiatric patient adherence. This work not only establishes a statistically validated formulation strategy for psychosis targeted mouth dissolving films but also provides a scalable manufacturing framework aligned with regulatory Quality by design principles.

**Keywords**: Mouth dissolving films, psychosis, Quality by Design, solvent casting, folding endurance, drug diffusion and patient compliance.

**PC-940**

## FACTORIAL DESIGN IN DEVELOPMENT & IN-VITRO EVALUATION OF DIPHENHYDRAMINE HCL TRANSDERMAL PATCH

AVNI PRAVINBHAI DESAI

The objective of this study was to develop a Diphenhydramine HCl transdermal patch using HPMC K100M as a polymer to overcome the limitations of conventional oral dosage forms. Transdermal delivery offers advantages such as controlled release, avoidance of first-pass metabolism, and improved patient compliance. A Quality by Design (QbD) approach was employed to establish a robust manufacturing process, ensuring consistent product quality within the defined Quality Target Product Profile (QTPP) and design space. This strategy emphasizes building quality into the formulation rather than relying solely on end-product testing. The pharmaceutical target profile was to obtain a safe,




ISBN: 978-81-980623-8-3

effective, and patient-friendly patch capable of delivering Diphenhydramine HCl in a controlled manner. Transdermal patches were prepared by solvent casting using HPMC K100M and PEG 400 as the polymer and plasticizer, respectively. Preliminary batches guided the selection of variables for a three-level factorial design to optimize formulation parameters. The prepared patches were evaluated for physical characteristics (thickness, weight variation, pH), drug content, in vitro diffusion, and stability under storage and packaging conditions. The optimized formulation demonstrated desirable physicochemical and release properties, indicating its potential as a promising alternative to conventional Diphenhydramine HCl dosage forms.

**PC-941**

**AN OVERVIEW OF NANOEMULSION**

SWAPNALI SURYVAVANSHI

A novel drug delivery system has been developed to address the limitations of conventional drug delivery methods. This comprehensive review explores the nanoemulsion system. The interest in nanoscale emulsions has considerably grown in recent decades as a consequence of their specific attributes such as high stability, attractive appearance, in addition to high performance and sensorial advantage. In fact, it nanoemulsions are one of the major popular formulations systems in the pharmaceutical and cosmeceutical fields.Nanoemulsions are colloidal dispersion systems that are thermodynamically stable, composed of two immiscible liquids mixed along with emulsifying agents.

**Keywords**: Nanoemulsion, novel drug delivery, emulsifying agents etc.

**PC-942**

**DEVELOPMENT AND OPTIMIZATION OF BACOSIDE A LOADED THERMOSENSITIVE IN-SITU HYDROGEL FOR ACUTE WOUND HEALING**

DATIR MAHENDRA BABAN

To develop and optimize a thermosensitive in-situ hydrogel containing Bacoside A for enhanced wound healing, focusing on optimal gelling characteristics, mucoadhesion, and antimicrobial efficacy. Thermosensitive hydrogels were formulated using Poloxamer 407 and xanthan gum through statistical optimization. Formulations were characterized for physicochemical properties, drug content, rheology, and mucoadhesion. Response surface methodology optimized gelling temperature and mucoadhesive strength. Ex-vivo permeation studies were conducted, followed by stability assessment and antimicrobial evaluation against E. coli and S. aureus. The optimized formulation (RF6) exhibited ideal gelling temperature (33.78±0.78°C), mucoadhesive strength (2989.5±0.284 dyne/cm$^2$), and viscosity (3185±0.923 cps). The statistical model showed high predictability ($R^2$>0.999) for both responses. Ex-vivo studies demonstrated sustained drug release with 96.67±0.88% permeation at 8 hours and flux of 11.59 µg/cm$^2$/h. The formulation showed significant antibacterial activity with zones of inhibition of 24.3±0.62 mm (E. coli) and 23.8±1.06 mm (S. aureus), comparable to the marketed standard. Stability studies confirmed product integrity over six months with minimal variation in critical parameters. The developed Bacoside A thermosensitive in-situ hydrogel demonstrates promising characteristics for wound healing applications, combining optimal gelling properties, sustained drug release, and significant antimicrobial activity, offering a potential alternative to conventional wound healing formulations.

**Keywords**: Bacoside A, Thermosensitive hydrogel, In-situ gelling, Wound healing, Response surface methodology, antimicrobial activity.

**PC-943**

**FORMULATION AND EVALUATION OF POLYHERBAL DISPERSIBLE TABLETS FOR ENHANCED BIOAVAILABILITY AND THERAPEUTIC EFFICACY**

SUVARNA GULABRAO BHOKARE

The aim of the present study was to transform Ayurvedic formulation into modern dosage form such as poly-herbal dispersible tablet for skin-enhancing and cosmetic properties. The goal is to offer a natural, stable, and effective oral supplement for beauty from within. Dispersible tablets were prepared using powder of the selected plant viz. Moringa Oliferia Lam., Catechin and Naringin with the help of Superdisintegrants addition technique using Sodium Bicarbonate, Citric acid, Magnesium stearate, Microcrystalline cellulose and Sodium saccharine in different percentage. Evaluation assessments such as the substantial test, weight variation, hardness, friability, content uniformity, disintegration, in vitro dispersion, stability study and IR compatibility were carried out. For every manufacturing process, the micromeritics of the extract powdered form were found to be good, indicating good flow characteristics. The drug content was about 100% in all compositions and an extensive investigation produced an outcome that complied with official requirements for the homogeneity test. All formulations had disintegration times, with the polyherbal formulation-5 (PHF-5) exhibiting 2.00±0.80. There is no chemical interaction between the extracts and excipients, according to the IR compatibility. The PHF-5 demonstrated an appropriate in vitro dispersion time and was deemed the best formulation. The PHF may be a novel, easily swallowed readily dispersed tablet that improves pharmaceutical permeability and advances their bioavailability according to the stability research and FTIR friendliness. Hence formulation maintains bioactivity while improving absorption and convenience.

**Keywords**: FTIR, compatibility study, Dispersion time, Superdisintegrants, Polyherbal dispersible tablet, Micromeritics.

**PC-944**

**IMPACT OF NANOTECHNOLOGY IN TARGETED DRUG DELIVERY SYSTEM**

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Nanotechnology has emerged as a revolutionary tool in targeted drug delivery systems, offering precise and controlled delivery of therapeutic agents to specific sites in the body. Nanoparticles such as liposomes, dendrimers, and polymeric carriers enhance drug stability, solubility, and bioavailability while minimizing side effects. These systems enable site-specific drug accumulation, especially in cancer therapy and chronic diseases, thus improving treatment efficacy and reducing systemic toxicity. Controlled drug release and the potential for personalized medicine make nanotechnology a promising approach in modern therapeutics. However, challenges such as toxicity, large-scale production, and regulatory issues need to be addressed for its widespread clinical application. Overall, nanotechnology-based drug delivery systems represent a paradigm shift in the pharmaceutical field with vast potential for future advancements.

**Keywords**: Nanotechnology, Drug Delivery, Targeted Therapy, Nanoparticles, Controlled Release

**PC-945**

**DEVELOPMENT OF FAST DISSOLVING TABLETS FOR ENHANCED DRUG DELIVERY**

Mohammad Hadi Zameer Shaikh

Fast dissolving tablets (FDTs) have emerged as a promising drug delivery system, particularly for patients who experience difficulty in swallowing conventional tablets or capsules. The present study focuses on the formulation and evaluation of FDTs to improve the onset of action, enhance bioavailability, and ensure better patient compliance. A model drug was selected and formulated using direct compression techniques, incorporating superdisintegrants such as sodium starch glycolate, croscarmellose sodium, and crospovidone in varying concentrations. Pre-compression parameters such as flow properties of the powder blend were assessed, followed by post-compression evaluations including hardness, friability, disintegration time, and in-vitro drug release. Among the formulations tested, the batch containing 4% crospovidone demonstrated the fastest disintegration time and highest drug release profile within 15 minutes, making it the most effective.

**Keywords**: Fast dissolving tablets, drug delivery system, disintegration time, bioavailability, pharmaceutical formulation, patient compliance

**PC-946**

**GELS, CREAMS AND LOTIONS: A WAR OF WHO GETS ABSORBED FASTER**

Rajat Sayyed, Rubab raza Mir

Welcome to the battlefield of topical drug delivery, where three legendary warriors gels, creams, and lotions — compete not for love, but for absorption supremacy. While patients just want quick relief and soft skin, these formulations have their own drama going on behind the scenes. This abstract takes you through their silent war, judged not by weapons, but by spreadability, viscosity, elegance, and of course, who




ISBN: 978-81-980623-8-3

gets absorbed the fastest without turning your skin into a greasy dosa. Gels walk in like cool kids — clear, quick-drying, and non-sticky. They don't just deliver the drug efficiently, they leave behind zero residue and 100% attitude. Creams are the grandmas of formulations slow, thick, but deeply nourishing. They take their time but heal like magic lotions? They try to please everyone light like water, but sometimes too gentle to be remembered. In this study, multiple formulations were evaluated for parameters like pH, viscosity, drug release profile, and user satisfaction. Results showed gels winning the absorption race, creams winning the hydration game, and lotions getting sympathy votes for effort. Every cream formulation is like a tragic love story — sometimes the oil phase overpowers, sometimes the water runs away, and the poor emulsifier is stuck in the middle trying to keep the relationship together. But when the balance is just right, the result is magical skin is happy, science wins, and even your pharmacist smiles a little. This topic is a reminder that behind every soft touch is some hard-core chemistry. But jokes apart, each formulation plays a vital role in delivering drugs transdermally. The ideal choice depends on the therapeutic need, patient type, and application area. Through this sarcastically serious exploration, we learned one thing — the fight to be the best isn't just in politics or Bollywood, it's alive and well in pharmacy labs too. So next time you pick a gel, cream, or lotion just know, a whole war was fought for that moment on your skin.

**PC-947**

## FORMULATION AND EVALUATION OF IBUPROFEN TABLETS: A COMPARATIVE STUDY OF DIRECT COMPRESSION AND WET GRANULATION TECHNIQUES

Rahima Shaikh, Rajat Sayyed

Ibuprofen, a widely used non-steroidal anti-inflammatory drug (NSAID), is commonly employed for its analgesic, antipyretic, and anti-inflammatory properties. Due to its poor aqueous solubility and potential gastric irritation, optimizing its oral dosage form is crucial to ensure better patient compliance and therapeutic efficacy. This research focuses on the formulation and evaluation of ibuprofen tablets using two different techniques—direct compression and wet granulation—to determine the most effective approach for enhancing tablet performance. The study involved preformulation analysis of ibuprofen, including drug-excipient compatibility using FTIR and thermal analysis. Tablets were prepared with various excipients such as microcrystalline cellulose, starch, and sodium starch glycolate. The formulated batches were evaluated for physicochemical parameters such as hardness, friability, disintegration time, weight variation, and drug content uniformity. In vitro dissolution studies were conducted to compare the release profiles of both formulations. The results indicated that tablets prepared by wet granulation exhibited superior mechanical strength and more consistent drug release compared to those prepared by direct compression. Dissolution efficiency was significantly higher in the wet granulated formulation, indicating better bioavailability potential. The study concludes that wet granulation is a more effective technique for ibuprofen tablet formulation, offering improved drug release and overall quality.

**Keywords**: Ibuprofen, NSAIDs, tablet formulation, wet granulation, direct compression, evaluation, dissolution profile

**PC-948**

## FORMULATION OF EVOLUTION OF SUSTAINABLE TABLET

Farhat Abdul Qadir Chamanshaikh

Now a days as very few antidiabetic drugs are coming out of research and development and some existing drugs are showing several side effects when administered orally, multiple times in a day, hence change in the operation is a suitable and optimized way to make some drug more effective by slight alteration in the drug delivery. Matrix type drug delivery systems of an antidiabetic drug like Metformin Hydrochloride, is an interesting and promising option when developing an oral sustained release system. An appropriately designed controlled release drug delivery system can be a major advance towards solving problems concerning the targeting of a drug to a specific organ or tissue and controlling the rate of drug delivery to the target sites. This research work is made in designing of sustained release dosage form of Metformin Hydrochloride by wet granulation method employing both Xanthan Gum and Hydroxy Propyl Methyl Cellulose (HPMC K4M) as a rate controlling polymer. The development of oral sustained release systems has been a challenge to formulation scientists due to their inability to restrain and localize the system at targeted areas of the gastrointestinal tract. From all the formulation trial batches, formulation F7 shows the best results. It has been observed that HPMC K4M alone cannot give satisfactory drug release profile but the blend of HPMC K4M and Xanthan gum together give the best drug release kinetics. Diabetes is one of the major causes of death and disability in the world. Diabetes is a long-lasting health condition that affects how our body turns food into energy. If you have diabetes your body does not make enough insulin that cause serious health problems, like heart disease, vision loss and kidney disease. Diabetes mellitus are be classified into two main types. First is type I or juvenile diabetes which is also called as insulin dependent diabetes and second type is type I or non-insulin dependent diabetes mellitus, this Type II diabetes is most common type of diabetes. Oral drug delivery is the most widely utilized route of administration among all the routes [nasal, ophthalmic, rectal, transdermal and parenteral routes] that have been explored for systemic delivery of drugs via pharmaceutical products of different dosage form. Oral route is considered most natural, uncomplicated, convenient and safe, due to its cease of administration, patient acceptance, and cost-effective manufacturing process [1-3].

**PC-949**

## IMPROVING BIOAVAILABILITY OF POORLY WATER-SOLUBLE DRUGS - ENHANCING THE EFFECTS OF MEDICATION

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Poorly water-soluble drugs pose a significant challenge in pharmaceutical development due to their low bioavailability, which can lead to reduced efficacy and increased side effects. This abstract proposes strategies to improve the bioavailability of poorly water-soluble drugs, thereby enhancing the effects of medication. Various techniques such as nanocrystal formulation, lipid-based delivery systems, and cyclodextrin complexation will be explored to increase the solubility and bioavailability of poorly water-soluble drugs. These techniques have shown promise in improving the bioavailability of poorly water-soluble drugs. Enhanced bioavailability, improved therapeutic efficacy, and reduced side effects are expected outcomes of this approach. This can lead to better patient outcomes and improved quality of life. Improving the bioavailability of poorly water-soluble drugs can lead to reduced healthcare costs and improved quality of life. This is a crucial area of research in the pharmacy industry, with potential applications in various therapeutic areas. The techniques mentioned above have shown promise in improving the bioavailability of poorly water-soluble drugs. For instance, nanocrystal formulation can increase the surface area of the drug, allowing for better dissolution and absorption. Lipid-based delivery systems can also enhance the bioavailability of poorly water-soluble drugs by solubilizing them in lipids. Cyclodextrin complexation is another technique that can improve the solubility and bioavailability of poorly water-soluble drugs. Overall, improving the bioavailability of poorly water-soluble drugs is a vital area of research that can have a significant impact on the pharmacy industry and patient outcomes. Further research is needed to explore the potential of these techniques and to develop new strategies for improving the bioavailability of poorly water-soluble drugs.

**Keywords**: Bioavailability, poorly water-soluble drugs, nanocrystal formulation, lipid-based delivery systems, cyclodextrin complexation.

**PC-950**

## FORMULATION AND CHARACTERIZATION OF METOPROLOL SUCCINATE EXTENDED RELEASE TABLETS USING POULTRY EGG SHELL POWDER AS A MATRIX BASE

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Advancements in dosage form technologies over the years led to many novel drug delivery systems such as osmotic pumps, matrix tablets, multi-layered coatings, expanding the potential of extended release tablets. Advanced analytical techniques made sure extended release




ISBN: 978-81-980623-8-3

formulations are now mostly employed for long-term therapeutic management of cardiovascular, neurological, and psychiatric disorders. Metoprolol succinate which is an antihypertensive, selectively blocks β1-adrenergic receptors in the heart, reducing heart rate, cardiac output, and blood pressure. The present study aimed at formulation of extended release tablets of Metoprolol succinate using processed poultry egg shell powder as a matrix base. Preformulation studies, micromeritics, high end instrumental analysis, microbiological studies performed on processed poultry egg shell powder suggested that it can be used as a matrix base for tablets. Metoprolol succinate tablets were formulated using processed poultry egg shell powder as matrix base and other standard pharmaceutical excipients via direct compression using 8 station rotary tablet press. The compressed tablets were then evaluated for various official and unofficial tests. Release studies performed on the prepared Metoprolol succinate tablets followed an extended-release profile, with an initial slow release followed by a steadier, consistent drug release over time. The release appeared to be linear over time, reaching 100% release by 4 hours. The gradual increase in cumulative drug release suggested that this formulation was an extended-release or sustained-release formulation. The study carried out till now suggested, processed poultry egg shell powder might be a potential matrix base for sustained release tablets.

**Keywords**: Extended release, matrix base, Processed

**PC-951**

**EXOSOMES: EMERGING NANOCARRIERS IN DIAGNOSIS AND THERAPY TINY MESSENGERS WITH BIG IMPACT**

PRAKRITI DIWAN UPADHYAY

Exosomes are nanoscale extracellular vesicles (30–150 nm) secreted by most cells, functioning as natural carriers of proteins, lipids, and nucleic acids. They play a pivotal role in intercellular communication and are increasingly recognized as promising tools in biomedical research. Owing to their unique biogenesis, lipid bilayer structure, and ability to cross biological barriers such as the blood–brain barrier, exosomes demonstrate superior stability and biocompatibility compared to synthetic nanocarriers. Recent advancements highlight their potential in diverse applications including targeted drug delivery, cancer immunotherapy, regenerative medicine, and disease diagnostics, particularly through exosomal biomarkers. Despite significant progress, challenges remain in large-scale standardized production, isolation techniques, and clinical translation. Future research is focused on engineering exosomes for personalized medicine and establishing regulatory frameworks for their therapeutic application. Overall, exosomes represent a transformative platform with immense potential to revolutionize diagnosis and treatment in modern healthcare.

**PC-952**

**CHALLENGES AND INNOVATION OF TRENDS IN BIOLOGICS PHARMACEUTICAL FORMULATION**

BIJAYA LAXMI KAND

Biopharmaceuticals, derived from biological sources, have revolutionized disease prevention and treatment. This comprehensive review explores the concept, definition, and classification of biopharmaceuticals, encompassing recombinant proteins, monoclonal antibodies, vaccines, and nucleic acids. The paper discusses various applications, including therapy, prevention, and diagnosis, highlighting their role in managing cancer, autoimmune diseases, and infectious disorders. Technological advances in formulation development, such as 3D printing and nanotechnology, are examined. Challenges in stability and regulatory frameworks are addressed. Future trends, including process analytical technology and continuous manufacturing, are discussed. This review provides a thorough understanding of biopharmaceuticals, their development, and their impact on modern medicine. The review also explores economic and social implications, highlighting potential cost savings. Collaboration between industry, academia, and regulatory agencies is emphasized to advance the field, facilitating further research and development in biopharmaceuticals. Overall, this review aims to provide a holistic understanding of biopharmaceuticals and their transformative potential in healthcare. Additionally, the review highlights the importance of personalized medicine and the role of biopharmaceuticals in tailoring treatments to individual patients' needs. Furthermore, the review discusses the potential of biopharmaceuticals in addressing emerging global health challenges, such as pandemics and antimicrobial resistance.

**PC-953**

**FORMULATION AND CHARACTERIZATION OF DSP-LOADED SLNS FOR TARGETED RHEUMATOID ARTHRITIS THERAPY**

AYUSHI SHARMA

An effective glucocorticoid anti-inflammatory, dexamethasone sodium phosphate (DSP) is used to treat inflammatory diseases such as rheumatoid arthritis (RA). Using the microemulsion process, DSP-loaded solid lipid nanoparticles (SLNs) are being developed and evaluated in this work to improve medication delivery in RA treatment. Utilizing the factorial design process, SLNs (SLNs-0 to SLNs-2) were optimized. When the SLNs' physicochemical characteristics were evaluated, they showed well-formed nanoparticles with mean particle sizes between 271 and 112 nm and polydispersity indices (PDI) between 0.34 and 0.14. Chitosan-coated SLNs (CN-SLNs) were chosen for additional investigation because they had a positive zeta potential (+28.4 mV), a PDI of 0.37, and an enhanced particle size of 330 nm. Because of its increased viscosity (875 cP), the CN-SLNs gel was more suitable for topical application. Compared to uncoated SLNs and the drug solution, in vitro drug release experiments showed that the gel formulation with chitosan coating produced slower, longer-lasting release profiles, with release kinetics facilitating regulated drug delivery. Ex vivo skin penetration tests revealed that CN-SLNs and CN-SLNs gel enhanced medication penetration. In vivo tests on rats with induced arthritis showed that topical treatment of the novel formulation significantly reduced inflammation, oedema, and joint diameter when compared to the commercial formulation. All things considered, chitosan-coated DSP-loaded SLNs provide a potent, long-lasting method for improving topical administration and rheumatoid arthritis therapy.

**PC-954**

**QUALITY BY DESIGN IN PHARMACEUTICAL FORMULATION: TOOLS, TRENDS, AND TECHNOLOGIES**

BATTULA VENKATA LAKSHMI

As pharmaceutical industries now a days concerns with the safety and continuously enhance the quality of the drug products. The development of pharmaceutical industries is based on the innovation of the product as well as the manufacturing process by keeping quality in the mind. In earlier times, the development of pharmaceutical products shows the failure in the quality and hence alters the therapeutic effect of the product. Quality by test (QbT) was the only way to maintain the quality of the drug product before the FDA launches the current Good Manufacturing Practices (cGMP), which was an approach without understanding the processes. So FDA decided to applied the several Design of Experiments (DoE) in the pharmaceutical fields. QbD (Quality by design) was one of the design experiment approved by the FDA to maintain the quality of the drug products before reaching to the market. In pharmaceutical industry, QbD brings cost-efficiency and simplicity of manufacturing process into reality. QbD is a systematic risk-based, proactive approach to pharmaceutical development that begins with predefined objectives and emphasizes product and process understanding and process control based on sound science and quality risk management. The main aim of this review is to discuss the concept of pharmaceutical Quality by Design and describe how it can be helpful to ensure pharmaceutical quality & drug development

**PC-955**

**FORMULATION AND EVALUATION OF HERBALS AND ANTIMICROBIAL OINTMENT FROM EXTRACTION OF PASSIFLORA EDULIS.**

M.HARISH.GOUD

This study aims to formulate and evaluate an herbal antimicrobial ointment derived from the leaf extract of Passiflora edulis. The extraction process was carried out using a Soxhlet apparatus with ethanol as the solvent. The ethanolic extract was subsequently formulated into three different ointment formulations. Each formulation was assessed for its physical parameters to ensure the ointments' consistency, stability, and suitability for topical application.The antimicrobial efficacy of the formulations was tested using the pour plate method against three different bacterial strains, including Escherichia coli, Bacillus subtilis, and Staphylococcus aureus. The




ISBN: 978-81-980623-8-3

antimicrobial activity was determined by measuring the zones of inhibition. These results were compared to the standard antibiotic ampicillin to evaluate the relative effectiveness of the herbal formulations.

**PC-956**

**FORMULATION, CHARACTERIZATION, AND EVALUATION OF MEFENAMIC ACID–LOADED B-CYCLODEXTRIN NANOSPONGES**

SHRADDHA ARAVIND TAMBE

Mefenamic acid (MFA), a widely prescribed nonsteroidal anti-inflammatory drug (NSAID), suffers from poor aqueous solubility and limited oral bioavailability, leading to variable therapeutic efficacy and gastrointestinal adverse effects. To address these limitations, β-cyclodextrin (β-CD)–based nanosponges were developed as a novel drug delivery system for MFA. Blank nanosponges were synthesized via the melt method using diphenyl carbonate as a crosslinker and optimized through Central Composite Design (CCD). MFA was incorporated using a freeze-drying approach, and the resulting formulations were characterized by FTIR, DSC, PXRD, TEM, particle size analysis, and zeta potential measurements. The optimized MFA-loaded nanosponges exhibited spherical morphology, nanoscale particle size, high entrapment efficiency, and improved amorphous dispersion of the drug. In vitro release studies revealed enhanced solubility and a sustained release profile extending up to 12 hours, with release kinetics best fitting a first-order model. The optimized nanosponges were encapsulated into hard gelatin capsules, which complied with pharmacopoeial standards. Stability studies under accelerated conditions confirmed the robustness of the system, with no significant changes in drug content, particle size, or dissolution profile. These results highlight β-CD nanosponges as a promising delivery platform for improving the solubility, bioavailability, and therapeutic potential of MFA.

**Keywords**: Mefenamic acid, β-cyclodextrin nanosponges, formulation, characterization, sustained release, solubility enhancement, drug delivery

**PC-957**

**ADVANCING THE TARGETED DELIVERY OF ANTI-CANCER DRUG USING NANOTECHNOLOGY TO IMPROVE TREATMENT OF BREAST CANCER**

PRAJAPATI KEVIN ASHWINKUMAR

One of the main causes of cancer-related morbidity and death globally continue to be breast cancer, which calls for novel treatment approaches. With an emphasis on the difficulties related to medication distribution, this review offers a thorough summary of novel approach for improving the effectiveness of chemotherapy drugs, with a focus on the fabrication of targeted drug delivery system using nanoparticles. We provide an overview of the design of nanoparticles and emphasize the importance of nanoparticles targeting, underlining particular ligand-receptor interactions that are essential to the efficient administration of pharmaceuticals. While this study is developing the benefits of optimizing the use targeted drug delivery systems, such as improved bioavailability, decreased systemic toxicity, and increased therapeutic clearance, effectiveness in the management of individualized treatments for breast cancer, this review seeks to synthesize findings and drive future insights into the search for targeted tailored therapies.

**PC-958**

**FORMULATION AND EVALUATION OF MELOXICAM LIQUISOLID COMPACTS**

K T SUNIL KUMAR

Meloxicam, a BCS Class II drug, suffers from poor aqueous solubility, resulting in limited dissolution and variable bioavailability. The present study aimed to enhance the dissolution of meloxicam using the liquisolid compact technique, which employs a non-volatile solvent system and porous carriers to convert liquid medication into a free-flowing, compressible powder. Meloxicam (5% w/w in PEG 400) was incorporated into microcrystalline cellulose (Avicel PH 102) as carrier and Aerosil as coating material in a 15:1 ratio. Sodium starch glycolate (1% w/w) was added as superdisintegrant. The prepared liquisolid systems were compressed into tablets and evaluated for pre- and post-compression parameters including flow properties, hardness, friability, weight variation, disintegration, and in vitro dissolution. The liquisolid powder blend exhibited good flow properties (angle of repose: 15.45°). However, the compressed tablets showed suboptimal mechanical properties (hardness: 2 kg/cm$^2$; friability: 7.14%). Weight variation also failed to comply with IP standards. The average disintegration time was 12.8 minutes. Dissolution studies revealed cumulative drug release of 1.46% for liquisolid tablets compared to 16.04% for pure meloxicam, indicating that extended disintegration limited drug release. Although liquisolid compacts are a promising approach for improving dissolution of poorly soluble drugs, in this study meloxicam formulations showed inferior dissolution compared to pure drug, primarily due to prolonged disintegration time and weak mechanical strength. Optimization of carrier–coating ratio, solvent selection, and superdisintegrant level is required to achieve improved performance.

**Keywords**: Meloxicam, Liquisolid compact, Dissolution enhancement, BCS Class II drugs, PEG 400.

**PC-959**

**COMPREHENSIVE CHARACTERIZATION OF BOVINE MILK-DERIVED EXTRACELLULAR VESICLES FOR DRUG DELIVERY NANOPLATFORMS**

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Milk-derived extracellular vesicles (MEVs) are nanoscale vesicles rich in bioactive proteins, lipids, and nucleic acids. Owing to their biocompatibility, stability, and ability to cross biological barriers, they hold great potential for drug delivery, nutraceutical, and therapeutic applications. Compared to EVs from other sources, MEVs are abundant, economical, and scalable. Isolation was carried out using PEG precipitation with size exclusion chromatography (SEC). Characterization included dynamic light scattering (Malvern Zetasizer), atomic force microscopy (AFM), nanoparticle tracking analysis (NTA), scanning electron microscopy (SEM), transmission electron microscopy (TEM), and Western blotting for the EV marker TSG101. The preparation yielded MEV with an average particle size of 186.8 nm (Zetasizer) and 184.6 nm (NTA), and a zeta potential of –26.9 mV, indicating good colloidal stability. AFM showed an average height of 101.9 nm. Western blot confirmed TSG101 expression, while SEM and TEM demonstrated spherical morphology with intact membranes. Among the tested methods, PEG coupled with SEC provided the highest purity and structural integrity. The results establish a robust isolation and characterisation workflow, supporting the application of milk Extracellular vesicles as versatile, naturally derived nanocarriers for bioactive molecule delivery.

**Keywords**: Milk Evs, PEG precipitation, Nanoparticle tracking analysis, Natural nanocarrier

**PC-960**

**FORMULATION OF ORO-DISPERSIBLE FILM COMPRISING BRAHMI (BACOPA MONNIERI) AND SHANKHPUSHPI (CONVOLVULUS PLURICAULIS) FOR NEUROCOGNITIVE ENHANCEMENT**

DOLLY ARUN BHENDE

Neurocognitive disorder is a general medical term for decreased mental function, mental fatigue and attention disorders. This disorder increasing prevalently in both young and elderly populations due to lifestyle stress, aging and neurodegenerative conditions. Although Brahmi and Shankhpushpi is well-documented Ayurvedic herb known for its memory enhancing and neuroprotective properties. Its traditional dosage form such as tablets and capsules faces several challenges including low bioavailability, delayed onset of action and poor patient compliance, particularly among children and geriatric patients. To address these limitations, this study explores the formulation of Oro-dispersible films (ODFs) containing standardized Brahmi and Shankhpushpi extract as a novel drug delivery system. The ODF of Brahmi and Shankhpushpi provides an effective solution to the limitations of conventional dosage forms, offering a rapid, convenient and patient-friendly method for neurocognitive enhancement. This study focused on the development and evaluation of Oro-dispersible films (ODFs) containing Brahmi and Shankhpushpi for improving memory and cognitive performance. Standardized extracts of Brahmi and Shankhpushpi were formulated into thin films using the solvent casting technique, with film-forming polymers along with suitable plasticizers, sweeteners and flavoring agents. The prepared films were evaluated for their physicochemical




ISBN: 978-81-980623-8-3

characteristics as well as functional parameters. This study concludes that Brahmi and Shankhpushpi loaded ODFs hold significant potential as a patient friendly herbal delivery system for memory boosting activity combining traditional Ayurvedic benefits with modern pharmaceutical technology.

**PC-961**

**DEVELOPMENT OF NOVEL CO-CRYSTAL OF IVERMECTIN FOR IMPROVED TOPICAL TREATMENT OF SKIN INFECTIONS**

SARBANI ROY

Ivermectin (IVM) is a broad-spectrum antiparasitic agent effective against ectoparasitic skin infections such as scabies, but its therapeutic potential is limited by poor aqueous solubility (~4 µg/mL) and high lipophilicity, the lipophilic stratum corneum, the outermost layer of the skin, favors the entry of lipid-soluble compounds, excessive lipophilicity can cause a drug to "stick" to this barrier rather than partitioning into and permeating through it, leading to reduced overall permeability which hinder dermal penetration and topical bioavailability. This study explores pharmaceutical cocrystallization as a novel strategy to enhance the solubility, stability, and topical delivery of IVM. Cocrystals of IVM with GRAS coformers—glycine, caffeine, and nicotinamide—were synthesized using solvent evaporation and co-grinding methods, and confirmed via powder X-ray diffraction, DSC, and FTIR. The optimized cocrystals demonstrated improved solubility and dissolution compared to pure IVM. Among them, the IVM–glycine cocrystal was incorporated into a hydroxyethylcellulose gel base (1% w/w) for topical application. The cocrystal gel exhibited desirable physicochemical characteristics, including suitable pH, viscosity, spreadability, and uniform drug loading. In vitro release and ex vivo Franz diffusion studies demonstrated significantly enhanced drug release and skin permeation from the cocrystal gel compared to conventional IVM gel. Animal skin irritation studies revealed no signs of erythema or edema, confirming its dermal safety. Overall, the development of IVM cocrystals and their incorporation into a topical gel formulation effectively addressed solubility and permeability challenges, offering a promising approach for improved topical therapy of skin infections such as scabies. This work highlights the potential of cocrystal engineering in designing stable, safe, and clinically relevant formulations for poorly soluble drugs.

**Keywords**: Ivermectin, Cocrystals, Glycine, Nicotinamide, Caffeine, Topical Gel, Skin Permeation, Franz Diffusion, Skin Irritation.

**PC-962**

**3D PRINTING OF MEDICINES**

Saba Mahara

The idea of patient-specific medicine has been around for a long, but it has gained a lot of attention lately. There is an increase in demand for 3D printing of medicines, which is also known as additive manufacturing, is an innovative technology that allows for creation of customized drug and dosage formulations. 3D printing of medicine involve sequential layering of formulation of 3D objects. Fused Deposition Modeling (FDM), Stereolithography (SLA), Selective Laser Sintering (SLS), INKJET Printing are the recent techniques used in 3D Printing. This technology helps in opening on-demand manufacturing, reducing depending on large scale production and supply chains. 3D Printing of medicine allows precise fabrication of customized drug dosages, complex release profiles and patient specific formulation, thus by producing accuracy in the dosage or drug formulations and also making drugs more precise, personalized and patient-friendly. Simultaneously, Artificial intelligence in the 3D printing helps in customizes the drug or dosage as per the data of patient (age, weight), creates a drug or tablet in such a way that it should be complex (has different types of drug present in it), the drug or formulation made from 3D Printing is precise accurate and dose adjustable and also control speed and temperature during production to not to get the material flow. AI also identifies the defects during printing of drug to maintain safety and efficacy standards. Some of the AI tools include M3DISEEN, FABRX etc. Therefore this make sures improved treatment, safety and better patient adherence. Personalised medicine, Patient approval, Improvement in pre visualization Cost effective, Drug development and production and many more. In this selection of right drug and plan its dose,shape and release profile and design is made according to patients need the drug and excipient are mixed with each other and forms a material which has to be printed (maybe powders,paste or liquid). The printed medicine is subjected to drying,its gets stabilized. Then the medicines are weight,their accuracy is checked and safety measures Now the printed medicine is packed and given to patient 3D Printing of medicines is approaching up a new cycle in healthcare by making therapies more effective and accurate With the help of AI this technology can create medicine that fit into patient necessity , while also secure safety and accuracy during creation. It decreases dependency on mass development of drugs and focuses on creating medicines that are easier to use , more potent and fit to each person..Therefore 3D Printing and AI have the power to alter how medicines are prepared and delivered,making treatments life –saving and patient adjustable and friendly

**Keywords**: Customized medicine, sequential layering, 3D Printing, Artificial intelligence

**PC-963**

**PHOSPHOLIPIDS FROM DAIRY WASTE FOR CARRIER SYSTEM IN PHARMACEUTICAL INDUSTRY**

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Phospholipids, a critical class of bioactive lipids, possess diverse applications in pharmaceuticals, food, and cosmetic industries due to their amphiphilic nature. This study focuses on the isolation and characterization of phospholipids from ghee residue, a by-product of dairy processing, offering an innovative approach for value addition to waste materials. The extraction process utilized a solvent-based method optimized to yield a high-purity phospholipid fraction. Thin-layer chromatography (TLC) and Total phospholipid content (TPC) analysis validated the purity and concentration of the isolated phospholipids. Fourier-transform infrared spectroscopy (FTIR) provided insights into the functional groups and chemical bonding patterns, confirming the characteristic phospholipid structure. Liquid chromatography-mass spectrometry (LC-MS) was employed to determine the molecular composition, revealing the presence of distinct phospholipid classes. Differential scanning calorimetry (DSC) assessed the thermal behavior, highlighting the stability and transition temperatures of the compounds. X-ray diffraction (XRD) further elucidated the crystalline properties and structural integrity. This study promotes sustainable practices by converting an underutilized by-product into a value-added resource, contributing to both environmental conservation and industrial innovation.

**PC-964**

**ADVANCE IN COSMETICS**

AKANKSHA

Cosmeceuticals, as the term indicates, is the integration of cos- metics and pharmaceuticals. These products are formulated with potent active pharmaceutical ingredients (APIs) that signifi- cantly enhance skin and hair aesthetics while addressing a range of concerns, including anti-aging, skin elasticity, pigmenta- tion, hair thinning, acne, and other specific dermatological chal- lenges, making them a vital component in achieving optimal skin and hair health. Recent advancements in skincare have been significantly influenced by the growing awareness of modern issues, such as skin damage caused by blue light from digital devices and the effects of increased pollution. Innovative drug delivery methods, including microneedles, hydrogels and skin patches, have emerged, enhancing the effectiveness of active ingredients. Through this review article we highlight the key breakthroughs including, the integration of Nano-carriers and liposomes for the targeted delivery of potent ingredient

**PC-965**

**CURRENT SCENARIO OF BONE-RELATED DISORDERS**

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Bone related disorders like osteoporosis, osteoarthritis, rheumatoid arthritis, fractures, and bone cancers are a growing worldwide health problem, particularly for the elderly, causing significant illness, physical limitations, and expensive healthcare. Osteoporosis affects more than 200 million people globally, particularly postmenopausal women and elderly men. Osteoarthritis, the most common joint disorder, affecting about 528 million people worldwide. This broad category of diseases leads to issues such as weakened or brittle bones, joint degeneration,




ISBN: 978-81-980623-8-3

and structural bone damage, resulting in widespread disability and a substantial economic burden on societies. These conditions contribute to widespread illness, chronic pain, and significant long-term disabilities, limiting individuals' ability to perform daily activities. The high rates of fractures and associated long-term complications result in considerable healthcare costs, placing a substantial economic strain on individuals and healthcare systems globally. Bone loss is a natural part of aging, making individuals more susceptible to disorders like osteoporosis. The increasing number of aging Indians, a group vulnerable to accelerated bone loss, is worsening the country's bone disease burden. Risk factors include poor diet, nutritional deficiencies (e.g., vitamin D, calcium), lack of sunlight, inactivity, being female, low BMI, and unawareness. To combat this, India needs urgent interventions like food fortification, Vitamin D and calcium supplementation, lifestyle changes, and better access to screening and treatment to address infrastructure and awareness gaps.

**Keywords**: Osteoporosis, Rheumatoid arthritis, Fractures, Vitamin D, Calcium

**PC-966**

## FORMULATION AND EVALUATION OF MELOXICAM LIQUISOLID COMPACTS

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Meloxicam, a BCS Class II drug, suffers from poor aqueous solubility, resulting in limited dissolution and variable bioavailability. The present study aimed to enhance the dissolution of meloxicam using the liquisolid compact technique, which employs a non-volatile solvent system and porous carriers to convert liquid medication into a free-flowing, compressible powder. Meloxicam (5% w/w in PEG 400) was incorporated into microcrystalline cellulose (Avicel PH 102) as carrier and Aerosil as coating material in a 15:1 ratio. Sodium starch glycolate (1% w/w) was added as superdisintegrant. The prepared liquisolid systems were compressed into tablets and evaluated for pre- and post-compression parameters including flow properties, hardness, friability, weight variation, disintegration, and in vitro dissolution. The liquisolid powder blend exhibited good flow properties (angle of repose: 15.45°). However, the compressed tablets showed suboptimal mechanical properties (hardness: 2 kg/cm$^2$; friability: 7.14%). Weight variation also failed to comply with IP standards. The average disintegration time was 12.8 minutes. Dissolution studies revealed cumulative drug release of 1.46% for liquisolid tablets compared to 16.04% for pure meloxicam, indicating that extended disintegration limited drug release. Although liquisolid compacts are a promising approach for improving dissolution of poorly soluble drugs, in this study meloxicam formulations showed inferior dissolution compared to pure drug, primarily due to prolonged disintegration time and weak mechanical strength. Optimization of carrier–coating ratio, solvent selection, and superdisintegrant level is required to achieve improved performance.

**Keywords**: Meloxicam, Liquisolid compact, Dissolution enhancement, BCS Class II drugs, PEG 400.

**PC-967**

## ENGINEERED 3D-PRINTED NIOSOMAL PILOCARPINE INSERTS FOR PROLONGED INTRAOCULAR PRESSURE REDUCTION IN GLAUCOMA

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Glaucoma management requires consistent and sustained reduction of intraocular pressure (IOP), yet conventional pilocarpine eye drops are limited by rapid precorneal elimination, brief ocular residence time, and the need for multiple daily administrations. These limitations often lead to poor adherence and suboptimal therapeutic outcomes. The present study focuses on the development of 3D-printed niosomal Pilocarpine HCl ocular inserts aimed at achieving prolonged and controlled drug release for enhanced glaucoma therapy. Pilocarpine-loaded niosomes were formulated using an optimized combination of surfactant and cholesterol, and evaluated for vesicle size, distribution, entrapment efficiency, zeta potential, and in-vitro release kinetics. The optimized niosomal system was incorporated into custom-designed 3D-printed biodegradable inserts, allowing precise control over insert geometry, drug loading, and mechanical characteristics. The fabricated inserts were assessed for surface morphology, mucoadhesion, swelling behavior, mechanical strength, and stability under accelerated conditions. In-vitro release studies demonstrated a markedly sustained and predictable release profile of Pilocarpine HCl from the 3D-printed matrix compared to conventional dosage forms. In vivo evaluation in experimental animal models further confirmed a significant and extended reduction in intraocular pressure, along with excellent ocular biocompatibility and absence of irritation or adverse effects. Overall, the findings highlight that 3D-printed niosomal Pilocarpine HCl ocular inserts represent an innovative, patient-friendly, and efficient ocular drug delivery platform. This approach offers improved bioavailability, reduced dosing frequency, enhanced patient compliance, and substantial potential for advancing long-term glaucoma therapy.

**Keywords**: 3D-Printed Ocular Inserts, Niosomes, Pilocarpine Hydrochloride, Sustained Ocular Drug Delivery, Intraocular Pressure Reduction

**PC-968**

## FORMULATION AND EVALUATION OF POLYHERBAL MEDICATED JELLY

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Medicated jellies are semi-solid dosage forms designed to deliver drug through theoral route with improved patient compliance, especially for pediatric and geriatric patients. The demand for natural immunity-boosting formulations has increased significantly due to growing health awareness. In this study, we selected medicinal plants such as Carica papaya, Piperbetel, Withania somnifera and Morinda citrifolia. The medicated jellies were formulated using decoctions of Carica papaya (papaya) leaves and Piper betel (betel) leaves both known for immune modulatory and antioxidant properties. The natural sweetening agents are used such as sugarcanemolasses, stevia & jaggery. The jellies were prepared by heating and congealing method using natural gelling agents such as agar, gelatin and pectin. The prepared formulations were evaluated for physicochemical parameters including appearance, colour, odour, texture, pH, viscosity, syneresis, spreadability, invitro drug release. The physicochemical evaluation of the developed formulation has shown reddish brown colour, sweet pungent aroma, good spreadability, viscosity, syneresis, and pH almost near to saliva. The maximum amounts of % drug releaseof the formulations shown are F5-95.64%, F2-92.84%, F6-91.75%. So, theformulated jellies possess excellent potential as natural immunity boosters, their palatable taste and ease of administration. Further support is required to extend future clinical and toxicological validation for market applications.

**Keywords**: Immunity, Polyherbal medicated jelly, Immunity booster, Caricapapaya, Piperbetel.

**PC-969**

## DEVELOPMENT AND EVALUATION OF VISMODEGIB LOADED TRANSFEROSOMAL GEL

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The research focused on the development and evaluation of a vismodegib-loaded transferosomal gel for the treatment of basal cell carcinoma. Preformulation studies were initially conducted to assess drug-excipient compatibility and optimize formulation conditions. The transferosomes were prepared using the thin-film hydration method and optimized based on two key parameters: particle size and entrapment efficiency. A design of experiments (DoE) approach was employed and the results indicated that the formulation followed a linear model with respect to the selected parameters. The optimized transferosomal formulation underwent comprehensive physicochemical characterization, including vesicle size, polydispersity index, zeta potential, and drug loading. The transferosomal gel was further evaluated for pH, viscosity, spreadability, and homogeneity. Skin irritation studies confirmed the biocompatibility of the formulation. The results collectively suggest that the vismodegib transferosomal gel is a




ISBN: 978-81-980623-8-3

promising topical delivery system for the effective management of basal cell carcinoma.

**Keywords**: Vismodegib, transferosomes, thin-film hydration method, basal cell carcinoma

**PC-970**

**APIGENIN LOADED PHYTOSOME FOR IMPROVED SOLUBILITY, DISSOLUTION AND ORAL BIOAVAILABILITY IN CANCER TREATMENT**

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Apigenin (APG) is a naturally occurring plant flavone (5, 7,-trihydroxyflavone) abundantly present in common fruits and vegetables including parsley, onions, oranges, tea, chamomile, wheat sprouts and some seasonings. APG has been shown to possess remarkable anti-inflammatory, antioxidant and anti-carcinogenic properties. Its clinical utility is limited by poor aqueous solubility, rapid, and low oral bioavailability, classifying it as a BCS Class II drug. In current research, formulation of apigenin-phospholipids complex (APLC) – loaded phytosome was developed with an aim of improving solubility and oral bioavailability of apigenin. The APLC was formulated using 1:1 – 1:5 ration of apigenin and Soybean phosphatidylcholin phospholipid using iono complex method followed by preparation of phytosome using lyophilization method. The APLC formation was supported by DSC, FTIR, 1H NMR, and PXRD analysis. The in vitro dissolution behavior of pure apigenin, and prepared APLC was analyzed using a dialysis method. The solubility of APLC in water increased as compared to pure apigenin. APLC also enhanced oral bioavailability of apigenin by demonstrating increased Cmax, Tmax, and AUC parameters as compared to apigenin. This study of optimized APLC formulation validates the value of employing phospholipids in preparing phytosome with phytoconstituents of low solubility to improve their solubility, oral bioavailability, and pharmacological properties.

**Keywords**: Apigenin, phospholipid, solubility, bioavailability, in vitro dissolution.

**PC-971**

**FORMULATION, OPTIMIZATION AND CHARACTERIZATION OF IRBESARTAN AND TRIAMTERENE-LOADED MOUTH DISSOLVING ORODISPERSIBLE FILMS (MDODFS)**

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Irbesartan, an angiotensin II receptor antagonist, and Triamterene, a potassium-sparing diuretic, were co-formulated to achieve synergistic antihypertensive effects and to minimize dose-related adverse effects. The films were prepared using the solvent casting method, employing pullulan as the film-forming polymer and polyethylene glycol 400 as the plasticizer, and suitable superdisintegrants agents to ensure rapid disintegration and palatability. The optimized was done by using Central Composite design by applying Design-Expert-13®. The prepared films were evaluated for physicochemical parameters such as thickness, weight uniformity, folding endurance, surface pH, tensile strength, and percentage elongation. Drug–polymer compatibility was confirmed using Fourier Transform Infrared Spectroscopy (FTIR) and Differential Scanning Calorimetry (DSC) analyses. Surface morphology was assessed by Scanning Electron Microscopy (SEM), indicating uniform distribution of both drugs without crystallization. The optimized film exhibited rapid disintegration within and a cumulative drug release of over 95% within 10 minutes, demonstrating its potential for fast onset of action. Stability studies conducted as per ICH guidelines confirmed the formulation's robustness with negligible changes in film characteristics and drug content over three months.

**Keywords**: Mouth Dissolving, Optimization, characterization

**PC-972**

**DEVELOPMENT AND EVALUATION OF CO-PROCESSED EXCIPIENT AS SUPER-DISINTEGRANT IN MONTELUKAST ORAL DISINTEGRATION TABLETS**

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The objective of the study is synthesis of MCC–PCL co-processed excipient and improves the water uptake capacity of MCC, so as to improve the bioavailability of drug. Co-processed excipient was synthesized by reacting MCC with PCL in the presence of catalyst at elevated temperature. The prepared co-processed excipient has shown excellent flowability characteristics. Oral dissolving tablets of Montelukast sodium were prepared employing MCC-PCL co-processed excipient as superdisintegrant and comparison with commercial superdisintegrants. Total nine batches of oral disintegrating tablets were prepared using superdisintegrants like Crosscarmellose sodium (CCS), Sodium Starch Glycolate (SSG) and MCC–PCL Co-processed excipient by direct compression method. The results of precompression parameters were in acceptable range as per the specifications given in IP. Prepared tablets were evaluated for thickness, uniformity of weight, hardness, friability and the results are well within IP limits. Out of nine formulations, the tablets which contain 40 mg of co-processed excipient (F9) had shown low in vitro disintegration time 8 sec and highest drug release profile i.e. 98.72% which releases the drug within 12 minutes. After comparing its results with that of commercial superdisintegrants, it can be concluded that co-processed excipient can prove to be a good superdisintegrant and the developed Oral dissolving tablet formulation of Montelukast sodium could release the drug faster compared to conventional immediate release tablets which is useful in paediatric, geriatric and psychiatric patients.

**Keywords**: Co-processed excipient, Montelukast sodium, Superdisntegrents, Oral disintegrating tablets and Bioavailability

**PC-973**

**DEVELOPMENT AND ASSESSMENT OF SUSTAINABLE PLA-BASED 3D-PRINTED MEDICAL DEVICES: AN INVESTIGATION INTO MECHANICAL INTEGRITY, BIOCOMPATIBILITY, AND BIODEGRADATION**

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Poly(lactic acid) (PLA) is a biobased and biodegradable polymer that is most notably used in additive manufacturing to create patient-specific medical devices, thereby providing high strength, precision, and an eco-friendly nature of degradation and thus a possible new application to replace petroleum-based materials in the medical field. This research project is focused on fabricating eco-friendly PLA-based 3D-printing medical devices and thereafter assessing their biomedical compatibility. The use of additive manufacturing processes has been leveraged in the creation of the design and PLA models and tensile strength measurements were conducted to verify the material performance under biologically relevant conditions. Moreover, the laboratory-based cytocompatibility experiments, animal testing, and biodegradation studies, which are all parts of the ongoing work, are aimed at establishing the material's safety, biological response, and environmental behaviour. The initial mechanical testing outcomes demonstrate that free-form fabricated PLA devices are strong enough and resilient to be used as medical devices while at the same time the material's renewable source and eco-friendly degradation further consolidate its adoption as a sustainable medical device solution. To sum up, PLA as a material could help medical devices to be more sustainable and thus has a strong potential to be the next-generation polymer in healthcare; however, long-term biocompatibility and degradation studies are still needed, and current results show that devices made of PLA can satisfy the functional clinical demands while being environmentally friendly.

**Keywords**: Poly(lactic acid), 3D printing, Biodegradation, Biocompatibility

**PC-974**

**DEVELOPMENT AND EVALUATION OF A NANOEMULGEL-BASED POLYHERBAL FORMULATION FOR ENHANCED ANTI-ARTHRITIC EFFICACY**




ISBN: 978-81-980623-8-3

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Rheumatoid arthritis (RA) is a chronic autoimmune disorder characterized by joint inflammation, pain, and progressive disability. Although synthetic non-steroidal anti-inflammatory drugs (NSAIDs) provide symptomatic relief, their long-term use is associated with gastrointestinal and systemic side effects. Previously, a polyherbal gel containing extracts of Zingiber officinale, Allium sativum, Syzygium aromaticum, and Eucalyptus globulus demonstrated significant anti-inflammatory activity. However, limited transdermal permeation may restrict its therapeutic efficacy. The present study aimed to develop a nanoemulgel-based polyherbal formulation to enhance dermal penetration, stability, and anti-inflammatory activity for topical management of RA. The optimized nanoemulsion, characterized for droplet size, polydispersity index (PDI), and zeta potential, was converted into a gel using Carbopol 934. The resulting nanoemulgel was evaluated for pH, viscosity, spreadability, homogeneity, and in vitro drug diffusion through rat skin using Franz diffusion cells. Its anti-inflammatory efficacy was assessed. The optimized nanoemulgel exhibited a mean droplet size of <200 nm, stable zeta potential, and superior spreadability. In vitro and In vivo studies were performed as well which revealed significantly reduced paw edema, comparable to diclofenac gel. The developed polyherbal nanoemulgel demonstrated enhanced transdermal delivery and potent anti-inflammatory effects, indicating its potential as a safer and more effective herbal alternative for managing rheumatoid arthritis.
**Keywords**: Nanoemulgel; Polyherbal formulation; Rheumatoid arthritis—drug therapy; Anti-inflammatory agents, herbal; Transdermal absorption; Plant extracts—pharmacology

**PC-975**

## GREEN TEA EFFERVESCENT GRANULES AS ANTIOXIDANT POTENTIAL REMEDY

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Taste is an important parameter in administering drugs orally. Undesirable taste is one of the important formulation problems that are encountered with many drugs. Administration of bitter drugs orally with acceptable level of palatability especially in children and the elderly is a key issue for health care providers. Proven methods for bitterness reduction and inhibition have resulted in improved palatability of oral formulations. Taste masking of obnoxious drugs has gained the importance in new era. This reason is an initiative for the development of various taste masking technologies by which the characteristics of the dosage form is improved and good patient compliance is achieved. Effervescent formulation is one of the taste masking solution. This formulation is a natural product containing a green tea plant extract in combination with other ingredients which create an effervescent liquid composition upon dispensing in a liquid. Certainly more interesting way of presentation is by dissolving in water and then will arise froth resulting from the release of CO2. This product is also relatively more stable in storage than in liquid form/ beverage in bottle. Carbonation produced can give freshness and cover unwanted taste. Green tea effervescent formulations are also more practical and easy to carry. Serving it also easy. Thus with this formulation, Polyphenols in green tea which are antioxidants bioflavonoids type that are 100 times more effective than vitamin C and 25 times more effective than vitamin E can be administered in accurate doses with ease.
**Keywords**: Effervescent formulation, Carbonation, Polyphenols, Vitamins.

**PC-976**

## DESIGN AND DEVELOPMENT OF CYCLOSPORIN BASED COLLOIDAL CARRIER DRUG DELIVERY SYSTEM FOR TOPICAL MANAGEMENT OF ATOPIC DERMATITIS

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One of the common malignancies is skin cancer, which requires effective topical chemotherapy that has high skin penetration and low local side effects but, in many cases, its application is hampered by poor penetration to the skin. 5-Fluorouracil (5-FU) is a proven chemotherapeutic agent in the treatment of superficial skin cancer but its use is restricted by low penetration into the skin. To address this drawback, a dual-drug nanovesicular liposomal system of 5-FU and avobenzone, an extensive ultraviolet filter, has been designed and optimized to deliver therapeutic and protective effects on UV radiation. This study aimed at developing and testing a nanovesicular liposomal gel, which could be used in achieving better drug delivery and effective treatment of skin cancer. A 2 2 factorial design was used to optimize the nanovesicles to form spherical vesicles with an average diameter of about 150200nm, low polydispersity index and stable zeta potential (c. -30mV). FTTIR, UV spectral, HPLC characterization showed drug encapsulation and no drug-excipient interactions and encapsulation efficiency was more than 80. The optimized liposomal gel exhibited good viscosity, homogeneity and pH which was desirable in the application of dermals. The in vitro diffusion and skin permeation experiments have shown sustained release and greatly increased drug permeation characteristics in comparison to traditional gel preparations. The kinetics of release conformed to a Higuchi diffusion model whilst skin irritation experiments indicated very high dermal tolerability without erythema or edema.Finally, the resulting dual-drug nanovesicular liposomal gel is a chemotherapeutic agent which incorporates the photoprotective effect of avobenzone with excellent stability, skin diffusion, and prolonged release of the drug. The innovative solution is very promising as a safe and effective topical treatment of skin cancer, and it can be applied to a wide range of other dermatological diseases that would be treated and provided with UV protection simultaneously.
**Keywords**: 5-Fluorouracil, Avobenzone, Nanovesicular Liposomes, Liposomal Gel, Skin Cancer

**PC-977**

## DEVELOPMENT AND EVALUATION OF TARGETED LIPOSOMAL SYSTEM(S) FOR ANTICANCER DRUG DELIVERY

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This research focuses on the development and evaluation of targeted liposomal drug delivery systems to enhance the therapeutic efficacy of anticancer agents while minimizing systemic toxicity. Doxorubicin (DOX), a widely used chemotherapeutic agent, suffers from limitations such as multidrug resistance (MDR) and off-target toxicity. To address these challenges, two advanced liposomal formulations were designed: (i) HA-DOX-TPGS-LIPO, incorporating D-alpha-tocopheryl polyethylene glycol 1000 succinate (TPGS) and hyaluronic acid (HA) for CD44 receptor-mediated targeting, and (ii) TmAb-DOX-QCT-LIPO, a Trastuzumab-conjugated co-delivery system of DOX and quercetin (QCT) for HER2-targeted therapy and P-glycoprotein inhibition. Liposomes were prepared using the thin-film hydration method and optimised using Quality by Design (QbD) and Box-Behnken Design. The optimised formulations exhibited nanoscale vesicle sizes (~150-200 nm), low PDI, and negative zeta potential (15 to 17 mV), ensuring high stability and efficient drug encapsulation (%EE ≈ 80-82%). In vitro release studies demonstrated sustained drug release for up to 72 h, with HA-DOX-TPGS-LIPO showing slower, more controlled release than free DOX. MTT assay results revealed enhanced cytotoxicity of HA-DOX-TPGS-LIPO in MDA-MB-231 and MCF-7 cells, and of TmAb-DOX-QCT-LIPO in MCF-7/ADR cells, confirming superior efficacy over free drugs and non-targeted liposomes. Cellular uptake studies (FACS) indicated greater internalization of targeted liposomes through receptor-mediated endocytosis. Additionally, HA-DOX-TPGS-LIPO induced higher ROS generation and reduced NF-κB protein expression, suggesting apoptosis activation and suppression of survival pathways. Overall, both formulations effectively combined active targeting and demonstrated




ISBN: 978-81-980623-8-3

significant potential as advanced nanocarrier systems for improved breast cancer therapy.

**Keywords**: Liposomes, doxorubicin, hyaluronic acid, trastuzumab, quercetin, targeting

**PC-978**

**DEVELOPMENT AND CHARACTERIZATION OF CHITOSAN BASED FLUTAMIDE NANOPARTICLES BY IONIC GELATION METHOD**

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The objective was to fabricate chitosan-based nanoparticles for better controlled and targeting action of drug, which also overcome the problems associated with conventional formulations like multidose therapy, poor patient compliance and high cost. Flutamide loaded chitosan nanoparticles (F1 to F6) were prepared by Ionotropic gelation method. The formulated nanoparticles were evaluated for external morphological characters, particle size analysis, zeta potential, drug content, entrapment efficiency and in-vitro release studies. The particle size varied from 148 to 317 nm and zeta potential was in negative and its value found to be - 46.4 mV. The drug content for the Flutamide loaded chitosan nanoparticles varied from 69.5 ± 7.2 % to 87.9 ± 1.2 %. The entrapment efficiencies were found to be minimum and maximum of 55.50 ± 2.4 % and 86.30 ± 3.6 %. The percentage yields of all formulations were in the range of 48.24 ± 1.24 to 86.13 ± 1.37 %. In-vitro release of drug showed sustained release behaviour for a period of 24 hr. The optimized formulation contains 3:1 ratio of chitosan & STTP and demonstrated successful sustained release. Flutamide loaded chitosan nanoparticle is a potential new delivery system for treatment of prostate cancer.

**Keywords**: Prostate Cancer, Chitosan nanoparticles and Ionic gelation method.

**PC-979**

**EVALUATION OF BERBERINE-LOADED POLYMERIC NANOPARTICLES FOR TARGETED MANAGEMENT OF NEUROINFLAMMATION IN NEURODEGENERATIVE DISEASES**

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Neuroinflammation is a central hallmark in the progression of numerous neurodegenerative disorders. Berberine, a bioactive isoquinoline alkaloid, exhibits remarkable neuroprotective and anti-inflammatory potential; however, its therapeutic application is hindered by poor solubility, low systemic bioavailability, and limited brain penetration. To overcome these pharmacokinetic barriers, a polymeric nanoparticle-based drug delivery system is being designed to enhance the stability, bioavailability, and targeted delivery of berberine to the central nervous system. Preliminary formulation studies have been undertaken using biocompatible and biodegradable polymers to encapsulate berberine through optimized nanoparticle fabrication techniques such as solvent evaporation and nanoprecipitation. The formulated berberine-loaded polymeric nanoparticles exhibited a mean particle size of 184 nm with a polydispersity index (PDI) of 0.343, confirming a narrow and uniform particle size distribution. The zeta potential was recorded as 24.2 mV, indicating good colloidal stability and surface charge properties. The encapsulation efficiency (EE%) was 86%, signifying efficient drug entrapment within the polymeric matrix. The in vitro release study revealed a cumulative drug release of 92%, demonstrating a sustained and controlled release profile over the evaluation period. These findings collectively suggest that the developed nanoformulation enhances drug stability, bioavailability, and release performance compared to free berberine. The preliminary outcomes highlight that polymeric nanoparticle encapsulation offers a promising and innovative approach to enhance berberine's therapeutic potential in combating neuroinflammation associated with neurodegenerative disorders. Ongoing studies aim to further optimize the formulation and evaluate its in vitro and in vivo neuroprotective efficacy to establish it as a viable nanotherapeutic strategy for neuroprotection.

**Keywords**: Berberine, Polymeric nanoparticles, Neuroinflammation, Neurodegenerative diseases, Targeted drug delivery, Nanocarrier system

**PC-980**

**DEVELOPMENT & EVALUATION OF A LONG ACTING INJECTABLES DEPOT FORMULATION OF RISPERIDONE USING PLGA MOCROSPHERES**

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Risperidone is a widely used antipsychotic medication for the treatment of schizophrenia and bipolar disorder. However, its short half-life and frequent dosing requirements can lead to poor patient compliance. To address this issue, a long-acting injectable depot formulation of risperidone was developed using poly(lactic-co-glycolic acid) (PLGA) microspheres. The microspheres were prepared using an oil-in-water emulsion solvent evaporation technique and optimized for particle size, encapsulation efficiency, and in vitro release profile. The optimized formulation exhibited a mean particle size of 50 µm, an encapsulation efficiency of 85%, and a sustained release of risperidone over 4 weeks. In vivo pharmacokinetic studies in rats showed that the depot formulation maintained therapeutic plasma concentrations of risperidone for 28 days, with a significant increase in bioavailability compared to the oral formulation. The formulation was also found to be stable and safe, with no signs of toxicity or inflammation at the injection site. These results suggest that the PLGA microsphere-based depot formulation of risperidone has the potential to improve patient compliance and treatment outcomes for schizophrenia and bipolar disorder.

**Keywords**: Risperidone, PLGA microspheres, Depot formulation, Long-acting injectable, Schizophrenia, Bipolar disorder.

**PC-981**

**FORMULATION AND EVALUATION OF RIZATRIPTAN BUCCAL FILMS**

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Mucoadhesive buccal films offer a promising, non-invasive drug delivery system aimed at enhancing the bioavailability of drugs that undergo extensive first-pass metabolism. This study focused on the formulation and evaluation of buccal films for drug Rizatriptan used in the management of migraine. Drugs that undergo extensive first-pass metabolism often exhibit reduced bioavailability, limiting their therapeutic effectiveness. Mucoadhesive buccal films provide a non-invasive and efficient drug delivery system that bypasses hepatic metabolism, offering faster onset of action, enhanced bioavailability, and improved patient compliance. Rizatriptan, a serotonin receptor agonist. Buccal films (F1–F4). were prepared using the solvent casting method with a blend of hydroxypropyl methylcellulose (HPMC), and Eudragit RS100. The prepared formulations were tested for various physicochemical properties viz., folding indurance, weight variation, assay, drug content. These films were also evaluated for mechanical strength, mucoadhesive properties, swelling behaviour, and drug release profile. Among the formulations, F1 demonstrated superior performance with a complete drug release profile along the semi-permeable membrane, using Franz-diffusion cell. In vitro studies indicated that F1 showed the highest drug release profile using semi-permeable membrane. It also exhibited excellent physicomechanical properties, consistent drug content, and drug release (95%in 24 hours). The results confirm that buccal film formulations of rizatriptan offer a patient-friendly and effective alternative to oral delivery, improving therapeutic outcomes and potentially increasing patient compliance for drugs with poor oral bioavailability.

**Keywords**: Mucoadhesive buccal films, Hydroxypropyl methylcellulose (HPMC), physicochemical properties, Eudragit RS100.

**PC-982**


ISBN: 978-81-980623-8-3

**FORMULATION AND EVALUATION OF BERBERINE LOADED CUBOSOMAL NANOFORMULATION FOR THE TOPICAL TREATMENT OF ACNE**

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This study aimed to formulate, optimize and evaluate a novel Berberine-loaded cubosomal gel (BC-Gel) for the topical treatment of acne vulgaris, leveraging the antimicrobial and anti-inflammatory potential of Berberine and the dermal delivery advantages of cubosomes. Cubosomes were prepared using a top-down homogenization approach and optimized via a $3^2$ factorial design, with glyceryl monooleate and Poloxamer 407 as critical variables. The optimized formulation (BC5) was characterized for particle size, entrapment efficiency, zeta potential, and morphology. BC5 formulation was incorporated into a Carbopol 934-based gel and assessed for pH, viscosity, drug content, in vitro diffusion, and ex vivo skin permeation. Antibacterial activity against Propionibacterium acnes (P. acnes) was evaluated using MIC and MBC assays. In vivo efficacy was assessed in a P. acnes-induced acne model in Wistar rats, supported by histopathological analysis and skin irritation studies. The optimized BC5 formulation demonstrated a particle size of 130 nm, Polydispersity index of 0.24, and 73.28% entrapment efficiency. The cubosomal gel showed controlled drug release (81.26% over 24 hours) and superior ex vivo skin permeation (76.10%) compared to plain Berberine gel. BC5-Gel exhibited potent antibacterial activity (MIC: 500 µg/mL; MBC: 1000 µg/mL) and significantly reduced ear inflammation in vivo. Histopathology confirmed reduced inflammatory infiltration, and the formulation was non-irritant in skin tolerability studies. BC5-Gel demonstrated enhanced topical delivery, antimicrobial efficacy, and safety, positioning it as a promising candidate for acne management. The cubosomal nanocarrier system significantly improved the bioavailability and therapeutic performance of Berberine for dermal applications.

**Keywords**: Berberine, cubosomes, acne vulgaris, topical delivery, antimicrobial, Propionibacterium acnes, skin permeation, cubosomal gel.

**PC-983**

**FORMULATION AND EVALUATION OF BILAYER FLOATING TABLETS OF PITAVASTATIN AS IMMEDIATE RELEASE LAYER AND PROPRANOLOL AS SUSTAINED RELEASE LAYER**

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The aim of the present research work is to design, formulate, and evaluate a bilayer tablet containing Pitavastatin calcium as an immediate release (IR) layer and Propranolol hydrochloride as a sustained release (SR) layer for the effective treatment of hyperlipidemia associated with hypertension. Pitavastatin, a lipid-lowering agent, provides a rapid onset of action, while Propranolol, a β-blocker, offers prolonged antihypertensive activity. The bilayer approach minimizes dosing frequency and enhances patient adherence by combining two drugs in a single dosage form. The IR layer was formulated using superdisintegrants (Crospovidone and Sodium Starch Glycolate) for rapid drug release, whereas the SR layer was developed using HPMC K100M and Carbopol 974P as matrix-forming polymers to achieve controlled drug release. Preformulation studies such as solubility analysis, drug–excipient compatibility (FTIR and DSC), and micromeritic evaluations were conducted to ensure formulation stability. The bilayer tablets were evaluated for hardness, friability, thickness, weight variation, drug content, buoyancy, and in-vitro dissolution profile. Results showed that the optimized formulation achieved rapid release of Pitavastatin within 30 minutes and sustained release of Propranolol up to 12 hours, following Higuchi kinetics. The developed bilayer system demonstrated excellent mechanical integrity, desired floating behavior, and controlled drug delivery, providing a novel and patient-friendly approach for the combined management of cardiovascular diseases.

**Keywords**: Bilayer tablet, Pitavastatin, Propranolol, Sustained release, HPMC, Cardiovascular therapy.

**PC-984**

**FORMULATION DEVELOPMENT AND CHARACTERIZATION OF LECARNIDIPINE HYDROCHLORIDE NIOSOMAL TRANSDERMAL PATCHES**

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The bioavailability of Lercanidipine Hydrochloride (LCP) is about 44% and half-life of the drug is about 4.6 hours. LCP due to its low therapeutic dose range of 2.5 to 20mg and substantial biotransformation in liver becomes it ideal molecule in development of transdermal therapeutic system. The primary objective of the present research work was to develop Niosomaltransdermal patch (NP)of Lecarnidipine. The LCP nanoparticles were prepared by solvent evaporation method and the optimized Nanoparticles formulation has shown 225nm particle size with a polydispersity index (PDI) of 0.120. LCP patches were prepared by incorporating nanoparticles dispersion, using varying concentrations of polymers HPMC E5, HPMC 5cps, HPMC 15cps, Carbopol 734 and Sodium alginate using solvent casting techniques and further optimized by central composite design(CCD) the effect of polymer on the various physico-chemical characteristics and in-vitro drug release studies, ex-vivo skin permeation studies is studied. On the basis of in-vitro drug release and ex-vivo skin permeation studies, the formulation containing (HPMC 15cps and HPMC 5cps) has shown sustained and extended drug release over a period of 24 hrs.

**Keywords**: Lecarnidipine; Niosomes; Transdermal patch; Central composite Design, Controlled release; Bioavailability etc.

**PC-985**

**DEVELOPMENT AND CHARACTERIZATION OF LIPOSOMAL FORMULATION OF CEREUS JAMACARU EXTRACT FOR ENHANCED BIOAVAILABILITY**

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Herbal medicines have gained increasing attention for their therapeutic potential, but their use is often limited by poor solubility, instability, and low bioavailability of active constituents. Cereus jamacaru, commonly known as the mandacaru cactus, is rich in flavonoids, alkaloids, and phenolic compounds that exhibit antioxidant, anti-inflammatory, and antimicrobial activities. However, its pharmacological efficacy is restricted due to rapid degradation and limited absorption. The present study focuses on the development and characterization of a liposomal formulation of Cereus jamacaru extract to enhance its stability and bioavailability. Liposomes were prepared using the thin film hydration technique with phosphatidylcholine and cholesterol as major components. The formulated liposomes were evaluated for particle size, zeta potential, encapsulation efficiency, morphology (using SEM/TEM), and in vitro release profile. The optimized formulation exhibited a mean particle size below 200 nm, zeta potential of -35 mV, and high encapsulation efficiency (>80%), indicating good stability and uniform vesicle formation. The in vitro release studies demonstrated a sustained and controlled release pattern compared to the free extract. Stability testing confirmed that the liposomal encapsulation protected the phytoconstituents from degradation under various storage conditions. The study concludes that liposomal encapsulation of Cereus jamacaru extract significantly improves its stability, solubility, and bioavailability, offering a promising strategy for developing effective herbal nanocarrier-based drug delivery systems with enhanced therapeutic potential.

**Keywords**: Cereus jamacaru, Mandacaru cactus, Liposomes, Phytoconstituents, Herbal drug delivery, Bioavailability enhancement, Thin film hydration, Encapsulation efficiency, Zeta potential, Nanocarrie, Stability studies, In vitro release, Flavonoids, Phosphatidylcholine, Cholesterol

**PC-986**

**FORMULATION AND EVALUATION OF SUBLINGUAL TABLETS OF MECLIZINE HYDROCHLORIDE**

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ISBN: 978-81-980623-8-3

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The present study aims to formulate and evaluate sublingual tablets of Meclizine Hydrochloride using direct compression method to enhance bioavailability and provide rapid therapeutic action. Meclizine Hydrochloride, a first-generation antihistamine (non-selective H1 antagonist), is widely used in the treatment of nausea, vomiting, and vertigo. However, its therapeutic efficacy is limited by poor water solubility and extensive first-pass hepatic metabolism via CYP2D6 enzymes, leading to reduced systemic availability.To overcome these limitations, a sublingual formulation was developed to enable direct absorption through the highly vascularized sublingual mucosa, bypassing hepatic metabolism and allowing for a faster onset of action. Drug solubility was enhanced by forming inclusion complexes with β-cyclodextrin using the kneading method. Meclizine Hydrochloride and β-cyclodextrin were triturated with a small volume of solvent, kneaded thoroughly, dried, and sieved to obtain a uniform complex. These complexes were then blended with suitable excipients and directly compressed into tablets. The sublingual tablets was tested for post compression parameters like weight variation, hardness, friability, rapid disintegration, improved solubility, and enhanced patient compliance, especially for those experiencing difficulty in swallowing or requiring immediate relief. The drug release profile showed that over 85% of Meclizine Hydrochloride was released within 15 minutes, indicating rapid onset of action This study concludes that sublingual Meclizine Hydrochloride tablets represent a promising alternative to conventional oral dosage forms for effective and rapid antiemetic therapy.

**Keywords**: Sublingual tablets, Vertigo, Antiemetic therapy.

**PC-987**

**FORMULATION, DEVELOPMENT AND INVITRO EVALUATION OF BUCCAL DISSOLVING TABLETS OF PIROXICAM**

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Buccal dissolving tablets of piroxicam were prepared by using HPMC K4M and carbopol 934 as mucoadhesive polymers. Ten formulations were developed with varying concentrations of polymers. H1 to H5 formulations were composed of HPMC K4M in ratios of 1:1 to 1:5 whereas in C1 to C5 formulations Carbopol 934 were used in ratios of 1:0.25 to 1:1.5. The formulations were tested for in-vitro drug release, bioadhesive strength, moisture absorption, residence time and drug permeation through porcine buccal mucosa. Optimized formulation H3 showed maximum release of the drug (97.67±0.41) with the peppas model release profile and permeated 26.52±0.19 of the drug through porcine buccal membrane. H3 formulation showed 12.5gm of mucoadhesive strength, the FTIR results showed no evidence of interaction between the drug and polymers. The results indicated that suitable bioadhesive buccal tablets with desired permeability could be prepared. Stability of piroxicam buccal tablets was determined in natural human saliva; it was found that both piroxicam and buccal tablets were stable in human saliva.

**Keywords**: Piroxicam, Buccal tablets, Formulation & Evaluation.

**PC-988**

**INTEGRATING MACHINE LEARNING WITH NANOTECHNOLOGY: A PATHWAY TO NEXT-GENERATION DRUG DELIVERY SYSTEMS**

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Bioelectronic medicine (also called, electroceuticals) use miniaturized electronic devices to therapeutically disrupt the nervous system—by targeting specific neural circuits (e.g. the inflammatory reflex, vagus nerve), electroceuticals can have fewer side effects than traditional systemic pharmacology. The classical family of stimulators (pacemakers, cochlear implants) are being surpassed by closed-loop systems that can provide real-time sensing of physiological alterations. In this paper we provide a summary of the existing clinical applications of electroceuticals (neurological, cardiac, pain, metabolic, and immune disorders), a survey of the history of electroceuticals, and a description of the possible technologies enabling bioelectronic medicine (both invasive and non-invasive therapeutics). We report some of the technical and translation issues (biocompatibility, reliability, power, and regulatory) and potential enabling technologies: wireless interfaces, flexible “soft” implants, intelligent closed-loop programming. We also briefly speculate on potential developments in materials science, machine learning, and systems medicine that may bring personalized neurotherapies and bioelectronic platforms.

**Keywords**: Bioelectronic medicine; Electroceuticals; Neuromodulation.

**PC-989**

**INTRANASAL ADMINISTRATION OF DOXEPIN: IMPROVING BRAIN TARGETING EFFECTIVENESS BY EMPLOYING NANOSTRUCTURED LIPID CARRIERS WITHIN A BIOPHARMACEUTICS DRUG DISPOSITION CLASSIFICATION SYSTEM, CLASS-I DRUG.**

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Doxepin, classified under Class I in the Biopharmaceutics Drug Disposition Classification System (BDDCS), has limited bioavailability due to significant first-pass metabolism. This study aims to improve the delivery of doxepin by developing nanostructured lipid carriers (NLCs) using the Box–Behnken Design method. These optimized NLCs are designed for administration via the nasal route, with the primary objective of enhancing drug delivery from the nose to the brain. The formulation of NLCs was carried out using a high-speed homogenization method. The optimized formulation exhibited a small particle size (75.80±5.48nm, PDI ¼ 0.286), a high entrapment efficiency (94.10 ±0.16%), and a sustained ex vivo release profile (82.25±4.61% at 24 hours). Characterization analyses indicated that doxepin was transformed from a crystalline form to an amorphous state, achieving a uniform distribution within the lipid matrix. In vivo pharmacokinetic assessments in rats revealed markedly higher concentrations of doxepin in brain tissue (C max intravenous administration (C ¼ 16.77mg/g, t max ¼ 2.53mg/g, t ¼ 30min) following intranasal administration relative to (C max ¼ 6h). The high drug targeting efficiency (DTE ¼ 284.3%) and the percentage of direct transport (DTP ¼ 64.8%) indicated effective penetration of NLCs into the brain through the olfactory and trigeminal pathways. In summary, the study demonstrates the promise of NLCs to enhance the bioavailability of doxepin via nose-to-brain delivery, potentially facilitating the management of neurological disorders.

**Keywords**: Doxepin; Box–Behnken design; nanostructured lipid carriers; nose-to-brain; bioavailability; pharmacokinetic study

**PC-990**

**BRIDGING INNOVATION AND INTEGRITY: A HOLISTIC APPROACH TO SUSTAINABILITY IN THE COSMETICS INDUSTRY**

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Sustainability within the cosmetic industry is naturally multidimensional: It ranges from environmental stewardship, through technological advancement and regulatory governance, to evolving consumer expectations. This review synthesizes insights from recent literature and case analyses to illustrate how genuine progress requires action coordinated across all parts of the product life cycle-from responsible ingredient sourcing and green formulation design through sustainable manufacturing, ethical distribution, to effective end-of-life management. Amongst these, technological innovations have proved to be key enablers of sustainability through the adoption of green chemistry, biotechnological development, and process optimization. These have enabled reduced reliance on petrochemical derivatives, minimized adverse environmental impacts, and ensured a high level of safety and effectiveness. Simultaneously, regulatory frameworks have provided




ISBN: 978-81-980623-8-3

strategic guidance to industry transformation through compliance, transparency, and accountability. Global environmental standards, voluntary certification, and life-cycle assessment methodologies furthered the need to integrate the principles of sustainability into corporate strategy and product development. Today's consumer seeks authenticity, traceability, and verifiable data that prove actual impact. Sustainability attributes, like the use of naturally derived or responsibly sourced ingredients, recyclable or refillable packaging, ethical labor practices, and measurable reductions in environmental footprint, have emerged as key drivers of consumer brand trust, loyalty, and purchasing behavior. The evidence, then, confirms that genuine sustainability in cosmetics needs to be science-driven, transparent, and inclusive of all stakeholders. They embed measurable goals on sustainability, adopt mechanisms for transparent reporting, and continuously innovate toward lower-impact products.

**Keywords**: Sustainability; Green Chemistry; Circular Economy; Brand Trust; Environmental Stewardship; Life-Cycle Assessment; Sustainable Packaging; Transparency; Innovation; Ethical Sourcing; Greenwashing.

**PC-991**

## FORMULATION AND EVALUATION OF CIPROFLOXACIN IN-SITU GEL

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The study aimed to formulate and evaluate a gastro-retentive in situ gel of ciprofloxacin for improved drug delivery. The in-situ gel was prepared using a combination of natural and synthetic polymers, and the effects of different concentrations of sodium alginate, HPMC K-100, and calcium carbonate on viscosity and drug release over 8 hours were examined. The prepared formulations were evaluated for various parameters, including appearance, pH, viscosity, buoyancy, gelling capacity, swelling index, drug content, and in vitro drug release. The in-situ gel exhibited desirable physicochemical properties and a prolonged drug release profile. All formulations demonstrated optimum viscosity, ensuring ease of administration and swallowing. The floating lag time of the formulations ranged from 43 to 75 seconds, and all floated for more than 12 hours. The in vitro gelling capacity increased with rising concentrations of sodium alginate and calcium carbonate. Formulation F6 showed a high swelling index, indicating its capability to absorb a large amount of fluid. The in vitro drug release from these in situ gels was slow, extended, and dependent on the concentration of sodium alginate and HPMC K-100. The formulation F6, containing 1.25% sodium alginate and 2% HPMC K-100, exhibited sustained in vitro drug release of 67.23% over 12 hours. The drug release from formulation F6 followed first-order kinetics. Therefore, the gastro-retentive in situ gel of F6 can be considered a promising drug delivery system for enhancing the bioavailability and therapeutic efficacy of ciprofloxacin, highlighting the potential of in situ gel-based drug delivery systems.

**Keywords**: Gastro retentive, In situ gel, Floating time, In-vitro drug release and Ciprofloxacin.

**PC-992**

## ENHANCING SOLUBILITY AND BIOAVAILABILITY OF A POORLY WATER-SOLUBLE DRUG USING AMORPHOUS SOLID DISPERSIONS: PREPARATION AND CHARECTERIZATION

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Amorphous solid dispersions (ASDs) are a promising approach to enhance the solubility and bioavailability of poorly water-soluble drugs. In this study, ASDs of itraconazole were prepared using hot melt extrusion (HME) and spray drying with Soluplus, Kollidon VA64, and Eudragit EPO. The formulations were characterized using differential scanning calorimetry (DSC), X-ray powder diffraction (XRPD), Fourier transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM). All ASDs showed significantly improved solubility and dissolution compared to crystalline itraconazole. Among them, Soluplus-based ASD exhibited the highest enhancement, achieving a 10-fold increase in solubility. Physical stability studies under accelerated conditions (40 °C/75% RH) for 6 months confirmed that all ASDs remained amorphous without recrystallization or degradation. In vitro dissolution studies further demonstrated rapid drug release, with ASDs releasing over 80% of the drug within 30 minutes, whereas the crystalline drug released less than 10% in the same period. Dissolution data fitted to kinetic models, including the Korsmeyer-Peppas model, indicated a predominantly diffusion-controlled drug release mechanism. In vivo pharmacokinetic evaluation in rats showed that the Soluplus ASD resulted in a 5-fold increase in oral bioavailability compared to the crystalline drug. This improvement was attributed to enhanced solubility and faster dissolution. Overall, the findings indicate that ASDs prepared by HME and spray drying, particularly with Soluplus, offer an effective strategy for improving solubility, dissolution rate, and bioavailability of poorly water-soluble drugs such as itraconazole.

**Keywords**: Amorphous solid dispersion, Soluplus, Hot melt extrusion, Spray drying, Itraconazole, Solubility, Bioavailability

**PC-993**

## FORMULATION, CHARACTERIZATION AND EVALUATION: MICELLAR LOADED COMPLEX OF CUMINUM CYMINUM TO TREAT CAUSING DISEASE OF RESPIRATORY INFECTION

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Respiratory infection (RTI) is a viral spreading disease and it transmits from individual to individual, particularly in youngsters and aged peoples. The treatments are available but have so many limitations. To overcome these issues, novel drug delivery (nanoparticle) based micellar loaded complex approach was adopted using cuminaldehyde (Cuminum Cyminum L.). In this study, the micellar (CM) was prepared by mixing of cuminaldehyde and soya lecithin using anti-solvent precipitation technique and further the micellar loaded complex (CMLC) was prepared by loading of micellar (CM) in aqueous solution of chitosan. The optimized CMLC and CM were irregular particle shapes and crystalline structures, with a mean particle size of 279.10±0.02 nm, 296.24±0.10 nm and zeta potential of -8.18 mV, -8.77 mV, respectively. The % entrapment efficiency and % drug loading of CMLC (72.13±0.26 %, 06.46±0.01 %) and CM (89.09±0.20%, 08.05±0.19 %) was found efficiently. The in vitro release rate of CM (88.09±0.41 %) was slower than CMLC (89.02±0.06 %) in pH 7.4 phosphate buffer up to 24 h by diffusion process (Korsmeyer Peppas model). Furthermore, CMLC has shown the potent in vitro antioxidant activity, susceptible antibacterial activity and significant anti-inflammatory activity as compared to CM against stress, microbial infection (S. aureus and E. coli) and inflammation which were causable reason for the respiratory infections. CLMC has shown the significant bioavailability and more efficient hematological parameters value on rabbit blood against the incubation of bacterial organism. CLMC may have the effective potential to treat causing disease of COVID 19 i.e. RTI.

**Keywords**: Respiratory infection (RTI), cuminaldehyde, Micellar, Evaluation Parameters.

**PC-994**

## CHARACTERIZATION OF MICROSPHERES FOR ENHANCED DRUG STABILITY AND BIOAVAILABILITY

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Microspheres have emerged as an efficient drug delivery system capable of improving the stability and bioavailability of therapeutic agents, particularly those with poor solubility or susceptibility to degradation. The present study focuses on the formulation and comprehensive characterization of drug-loaded microspheres designed to enhance drug stability and achieve sustained release. Microspheres were prepared using a polymer-based encapsulation technique, and their physicochemical properties were evaluated through particle size analysis, surface morphology, drug entrapment efficiency, and in vitro




ISBN: 978-81-980623-8-3

drug release studies. The optimized formulation exhibited spherical, uniformly dispersed particles with controlled size distribution and high encapsulation efficiency. Stability studies demonstrated significant protection of the drug against environmental degradation, while release kinetics revealed a sustained and predictable release profile. The results indicate that microsphere-based delivery offers a promising strategy to improve the therapeutic performance of unstable and poorly bioavailable drugs. This approach can be effectively utilized for oral, parenteral, and targeted drug delivery applications.

**Keywords**: Microspheres, sustained release, drug encapsulation, stability enhancement, controlled drug delivery.

**PC-995**

**DEVELOPMENT OF PH-SENSITIVE POLYMERIC MICROSPHERES FOR ORAL DELIVERY OF METFORMIN HYDROCHLORIDE**

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The present study focuses on the development and evaluation of pH-sensitive polymeric microspheres for the oral delivery of Metformin Hydrochloride, aiming to achieve controlled drug release and improved gastrointestinal retention. Metformin, a first-line antidiabetic agent, exhibits short half-life and poor gastrointestinal absorption, necessitating frequent administration. To overcome these limitations, pH-sensitive microspheres were formulated using Eudragit S100 and Eudragit L100 as enteric polymers through the emulsion solvent evaporation method. The prepared microspheres were evaluated for particle size, entrapment efficiency, surface morphology, swelling index, and in-vitro drug release at varying pH conditions. The optimized formulation exhibited a mean particle size of 150–200 µm and drug entrapment efficiency of 85.2 ± 1.6%. In-vitro release studies showed minimal drug release in acidic medium (pH 1.2) and a sustained release over 10 hours in phosphate buffer (pH 6.8), confirming the pH-responsive behaviour. The release kinetics followed the Korsmeyer–Peppas model, indicating non-Fickian diffusion. Stability studies revealed no significant changes in drug content or morphology. The study concludes that the pH-sensitive polymeric microspheres provide an effective oral delivery platform for Metformin Hydrochloride, enhancing therapeutic efficacy and patient compliance through sustained and site-specific release.

**Keywords**: pH-Sensitive Microspheres; Controlled Release; Eudragit Polymers; Oral Drug Delivery.

**PC-996**

**ENHANCING THE BIOAVAILABILITY AND THERAPEUTIC EFFICACY OF LINAGLIPTIN VIA NANOSUSPENSION DRUG DELIVERY SYSTEMS**

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Diabetes mellitus currently remains one of the significant burdens of global health, which often necessitates long-term pharmacotherapy in order to maintain optimum glycemic levels. Linagliptin is potent DPP-4 inhibitor that exhibits favorable pharmacodynamic properties but poor aqueous solubility, which may reduce its bioavailability. The present study aimed at the formulation and optimization of the linagliptin nanosuspension with a view to enhancing its dissolution rate and therapeutic efficacy. In this study, a high speed homogenization technique were used and stabilizing agent such as STPP were added to produce a stable nanosuspension with minimum particle aggregation. After preparing nanoparticles it was subjected for evaluation test in which Particle size, PDI, Zeta potential , Entrapment efficiency were carried out and it observed that all the parameter are in acceptable range. Physical characterization showed that the optimized formulation had a mean particle size in the nanometer range, with narrow polydispersity index and an improved zeta potential, indicating high physical stability. In-vitro dissolution studies revealed significantly higher drug release compared with the pure drug, thus confirming improved solubility. Preliminary in-vivo evaluation further established enhanced antihyperglycemic activity in diabetic models. Conclusively, the linagliptin nanosuspension is a promising nanotechnological approach toward enhancement of oral bioavailability and therapeutic outcomes in diabetes mellitus management.

**Keyword**: Nanosuspension, Diabetes mellitus, DPP-4 inhibitor, bioavailability; Drug delivery system.

**PC-997**

**DEVELOPMENT OF FLUCONAZOLE BUCCAL FILMS FOR ORAL CANDIDIASIS**

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Fluconazole is a broad-spectrum antifungal agent that has been extensively applied for the management of oral, pharyngeal and cutaneous candidiasis. In the present study, it was aim to prepare and evaluate buccal film as a controlled release carrier for fluconazole. The formulation was intended to provide localized delivery of fluconazole exclusively at the site of infection, thereby reducing its total dose and hence, dose related toxicities. Buccal films were prepared by solvent casting method using sodium alginate and HPMC K - 100 alone as well as in various combinations. Prepared films were evaluated for physical characteristics like, weight and content uniformity, film thickness, swelling index, microenvironment pH and folding endurance and in vitro drug release. The result showed that weights of formulations were ranging from 0.0220.031gm. to 0.042 0.051 gm. This indicates that there was no significant weight variation in all formulations. Thickness of the buccal films varied between 0.3150.07 mm to 0.4450.02 mm. The maximum moisture uptake from F7 films may be due to the high concentration of hydrophilic polymer HPMC, which readily absorbs moisture when exposed to atmosphere. Microenvironment pH was near to 7.0 for all of the formulations. In vitro drug release was tested and it provided controlled drug release up to 8 hr.

**Keywords**: Fluconzole, Buccal films, Controlled release and In vitro drug release.

**PC-998**

**DEVELOPMENT AND EVALUATION OF NIOSOMAL GEL FOR TREATMENT OF ARTHRITIS**

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The present study was designed to develop and characterize the Brucine loaded niosomal gel as a novel topical drug delivery system for arthritis therapy. Arthritis is painful joint inflammation that drastically affects quality of life; hence, there have been increasing attempts to develop therapeutic methods. Brucine, an anti-inflammatory and analgesic alkaloid is associated with poor solubility, low bioavailability, and systemic toxicity effects on oral route. Niosomes as non-ionic surfactant vesicles play a valuable role in improving the stability, permeability through skin and sustained release profile of drugs. Brucine niosomes were prepared by using Thin Film Hydration method and optimized by Box Behnken design through modification in cholesterol, Span 60 and sonication time. The optimized formula (75 mg cholesterol, 125 mg Span 60 and sonication time of 20 min) showed particle size of the 220nm. Niosomal gel was developed using Carbopol 934 and tested for pH (6.3–6.5), viscosity (6742 cp), spread-ability, extrudability revealing good topical application properties. In-vitro and ex-vivo diffusion studies with Franz diffusion cells demonstrated continued release of brucine from the niosomal gel over a period of 8 h when compared to that in control gels. The stability studies indicating both physical and chemical integrity of the formulation was confirmed under accelerated condition for one month. From the study it was concluded that Brucine niosomal loaded gel increases drug solubility, provides sustained release and improves local retention, which may decrease systemic side effects and repeated dosing. The targeted delivery represents a promising and useful non-invasive treatment and therapeutic approach for the management of arthritis.

**Keywords**: Brucine, niosomal gel, targeted drug delivery, arthritis treatment

**PC-999**




ISBN: 978-81-980623-8-3

**SORAFENIB TOSYLATE ENCAPSULATED CARRAGEENAN NANOPARTICLES FOR IMPROVE COLORECTAL CANCER TREATMENT VIA NETWORK PHARMACOLOGY, MOLECULAR DOCKING, AND IN VITRO AND IN VIVO INVESTIGATION.**

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This research introduces a new biomaterial system, Sorafenib tosylate-encapsulated carrageenan nanoparticles (SF-CRG-NPs), for precise treatment of colorectal cancer (CRC). Employing Box-Behnken design, the formulation was fine tuned to achieve a particle size of 160.8 nm, zeta potential of +5.77 mV and entrapment efficiency of 90.45%, indicating stability and effective tumor targeting through the enhanced permeability and retention (EPR) effect. Various analytical techniques such as Fourier-transform infrared spectroscopy (FTIR), X-Ray Diffraction (XRD), Raman Spextroscopy, NMR and DSC confirmed successful drug loading and transformation to an amorphous state thereby improving solubility and bioavailability. In-vitro experiments on HCT-116 colorectal cancer cells demonstrated superior cytotoxicity of SF-CRG-NPs ($IC_{50}$ = 15.07 µg/mL) compared to free Sorafenib ($IC_{50}$ = 96.79 µg/mL), inducing 68% late apoptosis, G2/M cell cycle arrest and a 3.2fold increase in cellular uptake through clathrin-mediated endocytosis. Scratch assays exhibited a 31.41% reduction in migration, indicating anti-metastatic properties. Network pharmacology analysis identified three key targets: mTOR, MAPK15 and AKT1. Molecular docking simulations revealed substantial binding affinity with ΔG values ranging from 8.5 to 9.8 kcal/mol. In DMH-induced Wistar rats, SF-CRG-NPs reduced tumor burden by 90 %, CEA levels by 47%, IL-6 by 39% and mitigated oxidative stress. Anti-angiogenic safety was confirmed through hemolysis tests (<1%), low platelet aggregation and HET-CAM assays. SF-CRG-NPs offer a targeted, low-toxicity multi pathway approach for CRC therapy, facilitating potential clinical applications.

**Keywords**: Drug Delivery; Nanoparticles; Colorectal Cancer; Sorafenib Tosylate; Network Pharmacology; Molecular Docking

**PC-1000**

**FORMULATION AND EVALUATION OF HPMC-BASED FLOATING TABLETS OF METFORMIN HCl PREPARED BY DIRECT COMPRESSION**

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This research investigates the formulation and assessment of floating tablets of Metformin HCl prepared using a direct compression method and Hydromellose (HPMC) as the primary polymer. Floating drug-delivery systems are designed to remain buoyant in the gastric environment, allowing the drug to stay in the stomach longer and ensuring a more controlled and consistent release. In this study, HPMC plays a crucial role in imparting buoyancy and regulating Metformin release, supporting the development of a sustained-release dosage form aimed at lowering dosing frequency and improving patient adherence. The work includes evaluation of both pre-compression properties, such as bulk density, angle of repose, and compressibility index, as well as post-compression parameters including hardness, friability, floating lag time, and in-vitro drug-release behavior. Stability testing was also performed to confirm the robustness of the formulation under different storage conditions. Overall, the optimized floating tablets provided extended gastric retention and a reliable release profile, indicating their suitability for effective diabetes management with Metformin.

**PC-1001**

**FORMULATION AND EVALUATION OF ANTIMICROBIAL CREAM USING CLEOME VISCOSA LINN SEEDS EXTRACT**

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Cleome viscosa Linn is a medicinal plant that belongs to the family Capparaceae. The study was carried out to evaluate the antimicrobial property of cream formulated using the hydroalcoholic seeds extract of Cleome viscosa Linn. The extraction of seed was done by maceration method using ethanol: water (70:30) as solvent. Then the extract was evaluated for phytochemical investigation, thin layer chromatography and antimicrobial study by stick plate method. The Herbal face cream was prepared using hydroalcoholic seeds extract of Cleome viscosa and further evaluated for physical properties, pH determination, spreadability, viscosity, washability, after feel test, greasiness, irritancy test. The prepared herbal cream was evaluated for antimicrobial activity using test organisms; Escherichia coli, and Staphylococcus aureus. The prepared herbal cream shows promising results within a standard range like pH (5-7), viscosity (7360-8500 cps), spread ability (7.5-9.5cm). The creams had good homogeneity and washability. The extract and herbal cream show promising antimicrobial activity by inhibiting Escherichia coli and Staphylococcus aureus with inhibition zone diameter (IZD) of 22 to 28mm. After feel test for the was found to be good, not show any irritation, greasiness and no separation. The hydroalcoholic seed extract of Cleome viscosa and its formulated herbal cream demonstrated significant antimicrobial activity against E. coli and S. aureus. This research work supports the potential of Cleome viscosa–based herbal cream as a safe and effective topical antimicrobial cosmetic preparation. Further studies can be required for isolating and characterizing the specific bioactive constituents responsible for the antimicrobial activity of extract.

**Keywords**: Cleome viscosa, antimicrobial, Escherichia coli, Staphylococcus aureus

**PC-1002**

**DEVELOPMENT AND EVALUATION OF THERMORESPONSIVE NANOLIPOSOMAL IN SITU NASAL GEL FOR ENHANCED VACCINE DELIVERY**

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Vaccines are essential tools for disease prevention, but conventional injectable routes often result in poor patient compliance and require cold chain maintenance. Nasal vaccination presents a non-invasive alternative that can stimulate both mucosal and systemic immunity. The present study aims to develop a thermoresponsive in situ nasal gel loaded with antigen-encapsulated nanoliposomes for improved vaccine delivery and stability. Nanoliposomes were prepared by the thin-film hydration technique using phosphatidylcholine and cholesterol, then incorporated into a chitosan–poloxamer 407 gel matrix. The formulation was evaluated for particle size, zeta potential, viscosity, gelation temperature, mucoadhesive strength, and in vitro antigen release. The optimized batch exhibited a mean particle size of 148 ± 9 nm and an entrapment efficiency of 83%. Gelation occurred at 33 ± 1 °C, indicating ideal thermoresponsive behavior for nasal application. In vitro release studies demonstrated sustained antigen release up to 24 hours, while ex vivo permeation through goat nasal mucosa confirmed enhanced antigen transport compared to plain antigen solution. These findings suggest that the developed thermoresponsive nanoliposomal in situ gel could serve as a promising, needle-free vaccine delivery platform offering improved stability, patient compliance, and immunogenic response potential.

**Keywords**: Thermoresponsive gel, Nanoliposomes, Nasal vaccine delivery, Chitosan, Controlled release

**PC-1003**

**BIODEGRADABLE NATURAL POLYMER-BASED MICROSPHERE PREPARATION AND CHARACTERIZATION OF MEBEVERINE HCL**

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An effective spasmolytic medication used to relieve irritable bowel syndrome is mebeverine hydrochloride. It requires regular administration for optimal therapeutic effect due to its relatively short biological half-life. Because of this, it is ideal for this medicine to have a controlled release. The regulated release of mebeverine from a matrix system is frequently challenging, despite the drug's great solubility. With




ISBN: 978-81-980623-8-3

the possibility of drug dumping in mind, it is critical and necessary to select the correct excipients while developing a matrix system. To regulate the dosage released by the matrix systems, various polymer combinations were tested. The primary objective of this research was to create and analyze Mebeverine HCl microspheres by combining various combinations of biodegradable natural polymers (e.g., pectin, guar gum, sodium alginate) with various extended release and enteric coated polymers (e.g., ethyl cellulose, EC N100). The produced microspheres were tested for in vitro drug release kinetics, particle size distribution, encapsulation efficiency, and assay. Researchers conducted in vitro drug release experiments in two different media: 0.1N HCl for two hours and pH 6.8 phosphate buffer for six to twelve hours. As the concentration of the enteric coating polymer increased, the dissolution data showed that the medication release rate reduced. Sodium alginate exhibited quicker release in the in vitro studies compared to pectin. Mebeverine hydrochloride did not interact with carriers in any way, according to the FT-IR and DSC investigations.

**Keywords**: Mebeverine HCl, microspheres, biodegradable natural polymers.

**PC-1004**

## FORMULATION AND IN-VITRO EVALUATION OF PHYTOSOMES CONTAINING SALICIN.

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Salicin is a alcoholic β-glucoside and is found in willow bark and leaves.it has been shown anti inflammatory, anti tumour activity. The aim of the present study is to prepare salicin phytosomes and its evaluation. UV spectroscopy method was developed for the molecule in , 0.1 N HCl and 6.8 phosphate buffer. The maximum absorbance was found at 268 nm. The phytosomes were prepared in the ratio of 1:05,1:1,1:1.5,1:2,0.5:1 and 2:1 ratio of salicin and soya lecithin were prepared by thin film hydration technique. The prepared phytosomes were characterized for invitro drug release, entrapment efficiency. there was no drug polymer interaction in prepared formulations. invitro dissolution showed that the prepared formulation showed extended release upto 24 hours,the entrapment efficiency was found around 54 %. Scanning electron microscopy(SEM) study showed irregular shaped particles of 340-430 nm sized particles

**Keywords**: Salicin, Phytosomes, Soya lecithin, Thin film hydration, DSC, FTIR, SEM.

**PC-1005**

## SOLUBILITY ENHANCEMENT OF CANDESARTAN CILEXETIL BY COMPLEXATION WITH CAVAMAX® W7 PHARMA (β -Cyclodextrin)

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Candesartan cilexetil (CC), a Biopharmaceutics Classification System (BCS) Class II drug, suffers from poor aqueous solubility and dissolution-rate limited absorption, resulting in low and variable bioavailability. The present study aimed to enhance the solubility and dissolution characteristics of CC through inclusion complexation with CAVAMAX® W7 Pharma (γ-cyclodextrin), a high-purity, pharmaceutical-grade excipient. Inclusion complexes were prepared by physical mixing, kneading, and solvent evaporation techniques at different drug:carrier ratios (1:1, 1:2, 1:3). The prepared complexes were evaluated for solubility, solid-state characterization, dissolution performance and stability. Phase-solubility studies revealed AL-type diagrams with 1:1 stoichiometry, increasing stability constants (K_s) with pH, and negative Gibbs free energy values confirming spontaneous complexation. Apparent solubility studies showed that all complexes improved solubility compared to pure CC, with the 1:2 ratio performing best across all methods. Among the formulations, solvent evaporation complex (F8) achieved the highest solubility (0.112 ± 0.007 mg/mL) and dissolution efficiency (91.4%), releasing ~99% of CC within 120 minutes. FTIR and PXRD analyses confirmed inclusion complex formation, with reduction or disappearance of characteristic crystalline peaks and evidence of hydrogen bonding. Accelerated stability studies of F8 under ICH conditions (40 °C/75% RH for 3 months) showed no significant changes in appearance, assay, or dissolution profile, with similarity factors ($f_2$) remaining above 50. These findings establish that γ-cyclodextrin complexation, particularly via solvent evaporation, significantly enhances the solubility, dissolution rate, and stability of CC, offering a simple and robust formulation strategy to overcome its biopharmaceutical limitations and improve oral bioavailability.

**Keywords**: Candesartan cilexetil; CAVAMAX® W7 Pharma; γ-cyclodextrin; inclusion complex; phase-solubility.

**PC-1006**

## DESIGN, FORMULATION AND EVALUATION OF LIPOSOMES FOR THE TREATMENT OF CERVICAL CANCER

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The present research was undertaken to design liposomes of 5-Fluorouracil for the effective treatment of cervical cancer. Localized delivery of 5-FU will give sustained drug exposure to tumor cells and increase its tumor penetration and decrease the rate of replication of tumor cells. The liposomes were developed by modified ethanol injection method; experiments were designed to determine the effect of the independent variables (factor) on the dependent variables (parameter/response) of a formulation. The 5-FU loaded liposomal formulation was optimised based on two parameters, entrapment efficiency (%EE) and percent in vitro drug release at 12 h (%DR). The response surface methodology i.e. 32 full factorial design was successfully employed for the optimization of 5-FU formulations. By using response surface methodology the estimated coefficient values obtained for independent variables in the regression equations, exhibited that the phospholipid (PL90H) and cholesterol (CH) concentration was observed to be highly influencing variables in optimizing percent entrapment efficiency (%EE; 94.01 ± 0.57) and percent drug release (%DR; 75.0 ± 2.28).The study demonstrated the successful formulation of 5-FU liposomes for the effective treatment of cervical cancer.

**Keywords**: 5-Fluorouracil, cervical cancer, liposomes, response surface methodology.

**PC-1007**

## EVALUATION AND PREPARATION OF RISPERIDONE NIOSOMES

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The study introduces a significant advancement in treating schizophrenia, a chronic condition affecting roughly 1% of the global population and associated with a high suicide risk. While the atypical antipsychotic risperidone effectively manages both positive and negative symptoms, its conventional oral administration is hindered by hepatic first-pass metabolism, substantially reducing its efficacy. To overcome this, researchers developed a novel formulation: risperidone niosomes. This technique, which yielded a stable complex (stability constant of aims to significantly improve the drug's bioavailability, provide a quick onset of action, and enhance patient compliance. Comprehensive analysis using IR, DSC, XRD, SEM, and in-vitro drug release confirmed the successful creation and favourable performance of the Niosomes, establishing them as a potentially valuable tool for more effective schizophrenia management.

**PC-1008**

## FORMULATION OF NANOPARTICLE BASED IN SITU GEL DRUG DELIVERY SYSTEM FOR HYPERTENSION

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ISBN: 978-81-980623-8-3

The present investigation deals with the formulation and optimization of a nanoparticle based in-situ gelling drug delivery system for management of hypertension using valsartan (VAL). Biodegradable polymers including gellan gum and HPMC K4M were selected to formulate a floating in situ gelling system containing valsartan-chitosan nanoparticles (VAL-CSNPs). In the initial tests, optimal polymer concentrations were found for gelation to occur immediately, to remain buoyant for extended periods of time and long enough for oral administration, while ion-gel dilutions were also ensured. A $3^2$ full factorial design was employed to optimize formulation variables i.e., gellan gum and HPMC K4M concentrations in order to achieve controlled drug release and good rheological characteristics. The optimized formula possessed rapid gelation, enhanced floating more than 12h and the drug was released in the manner of zero order of kinetics. Based on the FT-IR, DSC and XRD studies, drug polymer system was found to be compatible and stable. Stability testing showed the stability of formulation parameters up to one month. The resultant system offers a promising strategy for the long-term oral delivery of valsartan with improved mucoadhesion and controlled release, thereby improving therapeutic efficacy in the management of hypertension.

**Keywords**: Nanoparticles, In-situ gelling system, Gellan gum, Hypertension management, Valsartan delivery

**PC-1009**

**NANOSIZED LIPID BASED INTRANASAL IN-SITU GEL FOR BRAIN TARGETING OF SERTRALINE: STATISTICAL OPTIMIZATION, IN-VITRO, EX-VIVO AND IN-VIVO EVALUATION**

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Intranasal drug delivery is a great area of interest because olfactory region of the nasal mucosa has direct connection between nose and brain. Nasally applied drug directly reaches to the brain either by direct transport from olfactory region or from blood. Present research work is carried out with aim to develop Sertraline nanoparticles loaded In-situ nasal gel through brain targeted drug delivery system. The solid lipid nanoparticles were prepared by hot high shear homogenization coupled with ultrasonication method using 32 full factorial designs. For all formulation batches (F1-F9); particle size was found to be in the range of (57- 217nm) with Polydispersity index (0.115-0.713), zeta potential (-14.9 to -23.4 mV) and %entrapment efficiency (75.61-89.93%). A Sertraline nanoparticle loaded in nasal in-situ gel was prepared by cold method. Our findings strongly suggested that administration of sertraline nanoparticles loaded nasal in-situ gel contributes solubility enhancement and avoidance of hepatic first-pass metabolism. Thus, NPs further enhanced the delivery of sertraline to brain by reducing particle size below 200 nm which eventually enhances the diffusion and permeation of sertraline through blood brain barrier. This study evidently recognized that intranasal sertraline nanoparticles loaded in-situ gel is suitable for the treatment of depression.

**Keywords**: Depression, Sertraline hydrochloride, Nanoparticles, Intranasal drug delivery, Nasal in-situ gel.

**PC-1010**

**HPMC-BASED TRANSDERMAL PATCH INCORPORATING CISSUS QUADRANGULARIS AND MORINGA OLEIFERA FOR LOCAL ANTI-INFLAMMATORY THERAPY**

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A dual-herb transdermal delivery system containing Cissus quadrangularis and Moringa oleifera was developed using HPMC as a film-forming polymer to provide localized anti-inflammatory activity. The novelty of the formulation lies in combining two synergistic botanicals with proven antioxidant and anti-inflammatory potential into a sustained-release polymeric matrix suitable for topical application in joint and musculoskeletal discomfort. Five formulations (CM-F1 to CM-F5) were prepared and assessed for physicochemical properties, with CM-F5 selected as optimized due to superior tensile strength, elongation capacity, and maximum cumulative release (75 mg/g at 12 h). Release modeling confirmed anomalous diffusion. Antioxidant assays showed strong DPPH (89.00%) and nitric-oxide scavenging activity (89.50%), while biochemical anti-inflammatory tests demonstrated high proteinase inhibition (85.00%), protein-denaturation protection (80.50%), and LOX suppression (68.50%). RAW 264.7 macrophage studies confirmed good cytocompatibility and a 68.2% reduction in LPS-induced nitric oxide at 100 µg/mL, validating the patch's biological relevance. These results indicate that the Cissus–Moringa TDDS can serve as a natural alternative for managing localized inflammation and pain. Future perspectives include ex-vivo permeation studies, development of adhesive backing, and scaling the prototype toward clinical and commercial translation.

**Keywords**: Cissus quadrangularis, Moringa oleifera, Transdermal patch, Anti-inflammatory activity, RAW 264.7 macrophages, Sustained release

**PC-1011**

**COMPARATIVE DRUG RELEASE STUDIES OF TRANSDERMAL PATCHES OF GLICLAZIDE USING DIFFERENT PENETRATION ENHANCERS**

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The aim of the present work was to formulate and evaluate transdermal patches of Gliclazide by solvent evaporation method by using two different grades of polymers i.e., hydroxyl propyl methyl cellulose (HPMC K4M & EUDRAGIT RL 100) at different ratios almond oil, olive oil and castor oil were used as penetration enhancers and polyethylene glycol (PEG) was used as plasticizer. The physicochemical parameters like thickness, weight variation, and percentage moisture loss, percentage moisture uptake, folding endurance, flatness and drug content were evaluated. In vitro drug release study carried out by using Franz diffusion cell. Cumulative percentage of drug release in 24 hours from the 14 formulations was observed.

**Keywords**: Penetration enhancers, Transdermal patches, Plasticizer

**PC-1012**

**DEVELOPMENT AND EVALUATION OF MUCOADHESIVE BUCCAL FILMS**

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The present study focuses on the development and evaluation of mucoadhesive buccal films for controlled drug delivery through the buccal mucosa. Buccal films were formulated using various film-forming polymers such as hydroxypropyl methylcellulose (HPMC), sodium carboxymethyl cellulose (NaCMC), and polyvinyl alcohol (PVA), combined with suitable plasticizers to enhance flexibility and mucoadhesion. The prepared films were evaluated for physicochemical properties, including thickness, weight variation, surface pH, folding endurance, drug content uniformity, and moisture absorption. In vitro drug release and ex vivo mucoadhesion studies were conducted to evaluate the release profile and adhesive strength of the formulations. The optimized formulation exhibited satisfactory mechanical properties, prolonged adhesion time, and sustained drug release, indicating its potential for systemic delivery via the buccal route while avoiding hepatic first-pass metabolism. The results suggest that mucoadhesive buccal films can be an effective and patient-friendly alternative to conventional oral dosage forms for improved therapeutic efficacy.

**Keywords**: Mucoadhesive buccal films, controlled drug delivery, HPMC, NaCMC, PVA, plasticizers, sustained release.

**PC-1013**

**THERMOSENSITIVE CHITOSAN NANOPARTICLE NASAL GEL ENABLES RAPID NOSE-TO-BRAIN DELIVERY OF RIZATRIPTAN**

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ISBN: 978-81-980623-8-3

This research explores the creation and evaluation of a piroxicam matrix-based transdermal patch aimed at treating dysmenorrhea, a common condition that causes painful menstruation and impacts women's quality of life. Traditional treatments typically involve oral non-steroidal anti-inflammatory drugs (NSAIDs) like piroxicam, which can lead to adverse side effects. The study focuses on developing a transdermal drug delivery system (TDDS) to allow piroxicam to enter systemic circulation directly, enhancing its bioavailability and effects by avoiding first-pass metabolism. Various formulations were prepared using a solvent casting technique, incorporating HPMC E5LV as the polymer, PEG 400 as the plasticizer, and Capsicum oleoresin to enhance skin penetration. The formulations underwent several evaluations, including assessments of physical appearance, thickness, weight uniformity, folding endurance, moisture content, moisture uptake, and drug content. The optimized formulation, F3, contained 600 mg of HPMC E5LV, 0.7 ml of Capsicum oleoresin, and 1 ml of PEG 400, exhibiting excellent folding endurance, favorable moisture properties, and a high drug content of 99 ± 0.19%. In-vitro diffusion tests indicated that F3 achieved a cumulative drug release of 98.87% over 2 hours, while ex-vivo studies with goat skin confirmed 97.04% drug permeation within the same timeframe. The findings suggest that the piroxicam transdermal patch may serve as an effective, non-invasive alternative for the management of dysmenorrhea, providing sustained drug release.

**Keywords**: Dysmenorrhea, Transdermal drug delivery, Piroxicam, Transdermal patch Penetration enhancer

**PC-1014**

## DEVELOPMENT OF COLON TARGETED DRUG DELIVERY SYSTEM FOR MOLSIDOMINE

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The objective of the study was to develop colon systems for molsidomine using ethyl cellulose, Eudragit S100, Eudragit L100 as polymers. Matrix tablets were prepared by compression coating containing various proportions of polymers. These were prepared by half quantity of powder compressed as core tablet and it was placed exactly in the middle of die cavity and remaining quantity of powder was placed over the core tablet so that powder blend should cover all the sides of core tablet uniformly. The tablets were evaluated for drug content uniformity and were subjected to in vitro drug release studies. The precompression blend of all formulations was subjected to various flow property tests and all the formulations were passed the test. The amount of molsidomine released from the matrix tablets at different time intervals was estimated by a UV method at 270nm. Matrix tablets prepared with Eudragit S100 released less than 3% of the molsidomine in the physiological environment of stomach and small intestine depending on the proportion of polymer used in the formulation. When the dissolution study was continued in simulated colonic fluids the matrix tablets remaining amount was released within 12hr and showed 97.57% drug release.

**Keywords**: Colon targeted drug delivery, Eudragit, coating tablets.

**PC-1015**

## DEVELOPMENT AND IN VITRO EVALUATION OF FLUCONAZOLE GEL USING DIFFERENT GELLING AGENTS

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The present study was undertaken to develop and evaluate topical gel formulations of fluconazole using different gelling agents and their combinations, with emphasis on physicochemical characterization and in vitro drug release performance. Gels were prepared employing carbopol 940, hydroxypropyl methylcellulose (HPMC), carboxymethyl cellulose (CMC), sodium alginate, gelatin, and a carbopol–HPMC mixture at varying ratios. The formulations were evaluated for pH, viscosity, drug content, and in vitro release behavior. The pH of all formulations was within the range of 6.5–6.8, suitable for skin application. Viscosity was strongly influenced by the type of gelling agent, with carbopol 940 and carbopol–HPMC combination gels demonstrating the highest viscosity. Drug content analysis confirmed uniformity across formulations, ranging between 90% and 101%. In vitro diffusion studies indicated a controlled and gradual release of fluconazole up to 150 minutes, with carbopol 940 and its combination-based gels exhibiting the slowest release profile, suggesting potential for prolonged drug retention at the application site. Overall, the study demonstrated successful formulation of fluconazole gels with desirable physicochemical characteristics and sustained release potential. These findings support the feasibility of fluconazole gel as a promising topical drug delivery system for the effective treatment of fungal infections, although further in vivo studies are required to establish clinical efficacy and safety.

**Keywords**: Fluconazole, Topical gel, Gelling agents, In vitro drug release and Fungal infections.

**PC-1016**

## TO FORMULATE AND EVALUATE A HERBAL TOPICAL PREPARATION FOR THE EFFECTIVE TREATMENT OF VITILIGO.

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Vitiligois depigmentation disorder, and it causes loss of melanocytes. Denaturation of melanocytes caused by oxidative stress, genetics, auto immune response and then synthesis of inflammatory mediators. Vitiligo is classified into two types segmental and non-segmental. There is various treatment to cure vitiligo and some treatment causes side effects. So, through herbal plants we can cure the diseases the herbal plants are Ginkgo biloba, Nigella sativa, Psoralea corylifolia there are plants which has antioxidant properties, anti-inflammatory, these antioxidant helps to neutralizes free radicals and reduce oxidative damage in the skin. Psoralea corylifolia it has ability to stimulate melanin production in the skin through this repigmentaion occurs in the skin. In the pursuit of developing effective treatments for vitiligo, understanding the chemical composition and molecular structure of a topical formulation is essential. GC-MS analysis is used to identify the compound present in polyherbal lotion, FT-IR spectroscopy is used to analzye the functional group present in the lotion, HPLC quantitative analysis is used to determine exact amount of active ingredients present in the polyherbal lotion. The lotion formulation has enriched activity against occident stress and inflammation.

**Keywords**: Vitiligo, Antioxidant, Anti-inflammatory, Polyherbal lotion

**PC-1017**

## FORMULATION AND EVALUATION OF AN HERBAL GUTIKA OF CLITORIA TERNATEA FOR POLYCYSTIC OVARIAN DISEASE (PCOD)

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The present study focuses on the formulation and evaluation of an herbal Gutika containing Clitoria ternatea for the management of Polycystic Ovarian Disease (PCOD). The aim was to assess the therapeutic potential of the polyherbal formulation and to evaluate its physicochemical characteristics as per Ayurvedic and pharmacognostical standards. The Gutika was prepared using Clitoria ternatea, Ashwagandha, Shatavari, Ashoka, Liquorice, and Ginger, herbs traditionally known for supporting hormonal balance and reproductive health. The raw herbal ingredients were assessed for quality parameters. Total ash values ranged from 3.7% to 9.3% w/w, acid-insoluble ash from 0.23% to 2.1% w/w, and water-soluble ash from 1.13% to 35.7% w/w. Alcohol-soluble extractive values varied between 4% and 46.5% w/w, indicating the presence of active constituents. Loss on drying (1.6%–12.2%) confirmed acceptable moisture content. The prepared Gutika showed a hardness of 6 kg/cm², within the standard range, and negligible friability. The disintegration time was 10 minutes, meeting the requirement of not more than 15 minutes. pH, drug content, and organoleptic properties such as colour, taste, and odour were found to be uniform and acceptable. The developed Gutika showed satisfactory




ISBN: 978-81-980623-8-3

quality attributes and offers potential as a supportive Ayurvedic formulation for PCOD management.

Keywords: Clitoria ternatea, Gutika, PCOD, Ayurvedic formulation.

**PC-1018**

**PATCHES WITH DISSOLVABLE MICRONEEDLE CONTAINING HERBAL EXTRACT OF CALENDULA OFFICINALIS**

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Dissolvable microneedle (MN) technology represents a transformative advancement in transdermal drug delivery, overcoming the limitations of conventional topical and systemic routes by enabling precise, painless, and minimally invasive administration. In this study, we report the development of polymeric dissolvable microneedle patches encapsulating Calendula officinalis extract, a phytopharmaceutical rich in triterpenoids, flavonoids, and saponins with well-documented anti-inflammatory, antioxidant, and wound-healing activities. The microneedles were fabricated using biocompatible, water-soluble polymers via a micro-moulding technique, yielding arrays with optimal mechanical strength for efficient stratum corneum penetration while ensuring rapid dissolution upon insertion. Advanced characterization confirmed uniform distribution of phytoconstituents, structural integrity, and stability of the loaded extract. In vitro permeation studies demonstrated enhanced dermal delivery and sustained release kinetics compared to conventional topical formulations, suggesting superior bioavailability. Antimicrobial assays revealed significant inhibitory activity against Staphylococcus aureus and Candida albicans, validating the therapeutic potential in infected wounds. Furthermore, cytocompatibility evaluations confirmed the non-toxic nature of the formulation toward human dermal fibroblasts. The synergistic integration of phytotherapy with next-generation MN technology highlights a paradigm shift toward natural, patient-compliant, and sustainable dermatological therapeutics. The Calendula-loaded dissolvable microneedle platform demonstrates promise for clinical translation in the management of inflammatory skin conditions, chronic wounds, and post-surgical healing. Future investigations will focus on in vivo efficacy, pharmacokinetics, and large-scale manufacturability to establish its role as a viable alternative to conventional transdermal and oral herbal therapies.

**Keywords**: Dissolvable microneedles, Calendula officinalis, transdermal delivery, wound healing, phytopharmaceuticals, sustained release, dermal therapeutics.

**PC-1019**

**IMMEDIATE RELEASE OF LABETALOL HYDROCHLORIDE USING FAST-DISSOLVING SUBLINGUAL FILMS**

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Fast dissolving sublingual films are advanced oral drug delivery systems designed to rapidly disintegrate or dissolve upon contact with saliva. This dosage form offers improved bioavailability and a faster onset of action compared to conventional oral solid forms. Labetalol hydrochloride, a dual α- and β-adrenoceptor blocker used in the management of angina pectoris and hypertension, was selected for developing an immediate-release sublingual formulation. This study focused on the development and evaluation of fast dissolving sublingual films of Labetalol hydrochloride to enhance patient convenience and compliance, particularly among elderly and paediatric populations. The films were prepared by the solvent casting method using varying concentrations of HPMC K4M, HPMC, and NaCMC as film-forming polymers, with PEG 400 as a plasticizer. Six formulations were assessed for physicochemical properties, including weight variation, thickness, surface pH, tensile strength, swelling index, drug content, disintegration time, in vitro dissolution, and stability. All formulations complied with the required quality parameters. Among them, formulation F3 (3% w/v HPMC) exhibited optimal performance, showing a maximum drug release of 97.71±1.18% at the end of 300 seconds and a disintegration time of 19±1.24 seconds. These results confirm that fast dissolving sublingual films of Labetalol hydrochloride constitute a promising immediate-release dosage form for achieving rapid therapeutic action.

**Keywords**: Fast dissolving sublingual films, Labetalol hydrochloride, Immediate release, Solvent casting method.

**PC-1020**

**PERSONALIZED DRUG DELIVERY SYSTEM**

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Personalized medicine requires advanced drug delivery systems, and 3D printing (3DP) plays a crucial role in achieving this. 3DP enables the creation of complex drug combinations, personalized dosages, and flexible shapes and structures of dosage forms (DFs), offering an efficient alternative to traditional pharmaceutical manufacturing. These innovations may replace conventional drug administration approaches, leading to improved therapeutic outcomes. The technology allows production of dosage forms with intricate geometries tailored to individual patient needs. Personalized drug delivery systems (PDDS) are emerging, incorporating customized doses, dosage forms, drug release profiles, and timing of administration, supported by digital health platforms for diagnosis, treatment monitoring, adherence, and traceability. Integrating PDDS with digital tools creates a dynamic feedback loop between patient requirements and drug products. As a promising digitized technology, 3DP can advance personalized dosage forms, regenerative medicine, and implantable medical devices. Its unique capabilities address formulation challenges, especially for poorly soluble drugs. It also shows potential from pre-clinical testing to first-in-human studies and enables on-site production of customized formulations at the point of care, offering exceptional dose flexibility. Overall, 3D printing is a transformative technology that supports personalized, efficient solutions for drug delivery and future innovations in patient care.

**Keywords**: 3D Printing (3DP), Personalized Drug Delivery Systems (PDDS), Customized Dosage Forms, Digital Health Integration, Regenerative Medicine.

**PC-1021**

**FORMULATION, CHARACTERIZATION AND EVALUATION OF TRANSETHOSOMES WITH AZATHIOPRINE TO TREAT SYSTEMIC LUPUS ERYTHEMATOSUS (SLE)**

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Azathioprine, a purine analog immunosuppressant, has been widely used as a steroid-sparing agent in the management of SLE. The objective of the study was to formulate, characterize and evaluate transethosomes of azathioprine. Transethosomes are prepared by using mechanical dispersion method on basis of edge activator and ethanol concentration and responses like particle size, entrapment efficiency, and zeta potential were observed and also characterized by particle size analyzer, SEM analysis, zeta potential, drug-excipient compatibility by FTIR, XRD, and further evaluated by using in-vitro diffusion studies and drug release studies. AZA-TE formulation was observed particle size of 172.6 nm , Entrament efficiency 82.3% , and Zeta potential -29.0 mV, with poly dispersability index of 0.313. AZA-TE formulation was further characterized by SEM, XRD and FTIR. With SEM analysis were observed spherical, smooth, shiny and discrete vesicles were found. With XRD analysis gel was characterized as a amorphous nature. With FT-IR analysis observed that there is no interaction with polymer and excipient that indicates there is a compatibility between polymer and excipients. AZA-TE formulation subjected to drug release studies and 95.46% of drug was released. To conclude the study on Azathioprine transethosomes for SLE, positively conclude that the developed Azathioprine () transethosome formulation shows significant potential for improved transdermal delivery and treatment of SLE, emphasizing the increased efficacy due to deeper skin penetration.

**Keywords**: Azathioprine, Transethosomes, SLE, controlled release, and Entrapment efficiency.




ISBN: 978-81-980623-8-3

**PC-1022**

**DEVELOPMENT AND CHARACTERIZATION OF SESAMOL-LOADED SNEDDS FOR BREAST CANCER THERAPY**

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Globally breast cancer remains a leading cause of cancer-related mortality among women. Sesamol, a natural phenolic compound derived from Sesamum indicum seeds and sesame oil, has demonstrated potent antioxidant and anticancer properties, including induction of growth arrest and apoptosis in malignant cells. However, its clinical application is hindered by poor bioavailability. Hence, lipid-based drug delivery systems (LBDDS), particularly self-nanoemulsifying drug delivery systems (SNEDDS), offer a promising strategy to enhance solubility and absorption of lipophilic bioactives. In this study, Sesamol-loaded SNEDDS were formulated using oils (Isopropyl myristate, Isopropyl palmitate, Caprylic capric triglycerides, Sesame oil), surfactants (Span 80, Tween 80), and co-solvent (PEG-400) based on Sesamol's solubility profile. The formulations were prepared via aqueous titration method and characterized for thermodynamic stability, emulsification efficiency, droplet size, polydispersity index, zeta potential, surface morphology, refractive index, transmittance, and drug release profile. The optimized SNEDDS significantly improved the in-vitro dissolution rate of Sesamol compared to the pure drug. Furthermore, the anticancer efficacy of the optimized formulation was evaluated using MTT assay on MCF-7 human breast cancer cells, revealing superior cytotoxicity compared to the marketed preparation. These findings suggest that SNEDDS is a viable carrier for enhancing the therapeutic potential of Sesamol in breast cancer treatment.

**Keywords**: Seasamol, Breast cancer, Aqueous titration method, SNEDDS.

**PC-1023**

**DEVELOPMENT AND CHARACTERIZATION OF METHOTREXATE LOADED SPANLASTIC GEL FOR THE MANAGEMENT OF RHEUMATOID ARTHRITIS**

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Methotrexate is an Anti-rheumatic drug used to treat rheumatoid arthritis, suffers from limited skin permeability, solubility and significant systemic adverse effects upon administering orally or via injections. To overcome these challenges, a novel methotrexate loaded spanlastic gel was developed for enhanced transdermal delivery. Spanlastic was formulated by thin film hydration technique with five different formulation containing varied concentrations of Span 60 and Tween 80. The preparations were analyzed for different parameters including particle size, zeta potential, surface morphology, percentage entrapment efficiency and in vitro drug release study. The best formulation (F3) was chosen based on their highest percentage entrapment efficiency i.e., 88.01±0.36% and in vitro drug release i.e., 85.96±0.82% in 8 hours which was added into the carbopol 934 gel. The prepared gel was then evaluated for its parameters like physical appearance, pH, drug content, spreadability, viscosity, in vitro diffusion studies and kinetic studies. The in vitro drug release of the spanlastic gel was 81.29±0.23% in 8 hours and showed the zero order release kinetics. The developed spanlastic gel demonstrated was found to be stable and the obtained results showed that methotrexate loaded spanlastic gel could be an effective strategy in the management of rheumatoid arthritis.

**Keywords**: Methotrexate, Anti rheumatic, Rheumatoid arthritis, Spanlastic, Span 60, Tween 80, transdermal.

**PC-1024**

**THERAPEUTIC POTENTIAL AND PHARMACEUTICAL DEVELOPMENT OF MULTITARGETED POLYPHENOLIC COMPOUND ETHYL GALLATE**

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Ethyl gallate, a derivative of gallic acid, having significant characteristics including anti-inflammatory, antioxidant & antiviral, positioning it as potential candidate for therapeutic applications across several different illnesses, such as inflammatory condition, cancer, and viral illnesses like influenza, herpes simplex. Preclinical studies have shown that it has the capacity to modulate inflammation and oxidative stress, both of them plays significant roles in a variety of pathological diseases. The versatility of ethyl gallate in addressing a lot of disease pathways demonstrates its promise in integrated therapeutic methods. However, despite promising in vitro and animal model results, its clinical use remains unknown. The lack of human clinical studies leaves a significant vacuum in our findings, particularly of its safety, efficacy, and comprehensive pharmacological mechanisms. Future study is required to close this gap and establish the therapeutic value of ethyl gallate.

**Keywords**: Ethyl gallate, Anti-inflammatory, Cancer, Antiviral, Integrated therapeutic methods

**PC-1025**

**FORMULATION AND EVALUATION OF SERUM CONTAINING SALICYLIC ACID, CHITOSAN AND MARJORAM OIL FOR MANAGEMENT OF ACNE**

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The study aims to formulate a novel serum containing salicylic acid, chitosan, and marjoram oil for management of acne vulgaris. The formulation sought to utilize the synergistic antibacterial, anti-inflammatory, and wound-healing properties of these components to enhance skin penetration and efficacy. Methodology involved synthesizing salicylic acid–chitosan and marjoram oil–chitosan nanoparticles using the ionic gelation method. These nanoparticles were incorporated into a serum using sodium alginate as a gelling agent. The serum was evaluated for its physicochemical properties (pH, viscosity, spreadability), particle size, in vitro drug release profile, and antibacterial efficacy against Cutibacterium acnes. Additionally, cytocompatibility was assessed using MTT assay, and wound-healing potential was examined via scratch assay on human dermal fibroblast cell lines. The optimized formulation (M2) exhibited desirable particle size, stable pH, good spreadability and viscosity, and sustained drug release. It demonstrated significant antibacterial activity with clear zones of inhibition, high cell viability in MTT assay, and effective wound closure in scratch assays. FTIR spectra confirmed compatibility between the ingredients used in the serum preparation. Overall, the findings suggest that this serum holds strong potential as a topical treatment for acne, offering both antibacterial and skin-repairing benefits.

**Keywords**: Acne vulgaris, Cutibacterium acnes, Marjoram oil -chitosan nanoparticles, Salicylic acid-chitosan nanoparticles

**PC-1026**

**A NANOFORMULATION APPROACH TO ENHANCE THE THERAPEUTIC EFFICIENCY OF DPP-4 INHIBITORS**

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DPP-4 inhibitors play a vital role in the long-term management of Type 2 diabetes, yet many of these drugs face a fundamental challenge: poor oral bioavailability. This limitation often reduces their therapeutic efficiency and may contribute to inconsistent patient outcomes. To address this gap, the present study investigates a nanoformulations-based approach designed to enhance the delivery and performance of a selected DPP-4 inhibitor, with the broader aim of improving real-world glycemic control. A novel Nanoparticulate system was developed with an emphasis on improving solubility, shielding the drug from premature gastrointestinal degradation, and promoting a more predictable absorption profile. Then it subjected to evaluation parameters like particle size analysis, zeta potential measurements, entrapment efficiency, and in-vitro release kinetics—were performed to evaluate




ISBN: 978-81-980623-8-3

formulation performance. The optimized nanoparticle batches exhibited a narrow particle size distribution within the nanometer range, favorable surface charge for stability, and high encapsulation efficiency. In-vitro release data demonstrated a sustained and controlled release pattern, indicative of improved drug availability over an extended period. Overall, the findings suggest that nanoformulations can meaningfully enhance the therapeutic efficiency of DPP-4 inhibitors by ensuring better absorption and more stable plasma concentrations. Beyond the laboratory, this approach holds promise for reducing dose variability, improving patient adherence, and offering a more dependable therapeutic option for individuals living with Type 2 diabetes.

**Keywords**: DPP-4 Inhibitors, Nanoformulations, Bioavailability Enhancement, Nanoparticulate Drug Delivery.

**PC-1027**

**FORMULATION AND EVALUTIONOFHERBALEFFERVESSCENT TABLETTHATENHANCEPATIENT COMPLIENCE BYIMPROVINGNUTRITIONAL EFFECTIVNESS**

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The study focuses on the formulation and evaluation of a Moringa oleifera effervescent tablet aimed at enhancing patient compliance and improving nutritional effectiveness. Moringa oleifera leaves are known for their rich content of vitamins, minerals, and antioxidants, yet their traditional dosage forms often suffer from poor taste, limited solubility, and reduced bioavailability. To overcome these challenges, a palatable effervescent tablet was developed using standardized Moringa leaf extract as the primary active ingredient, with a balanced combination of citric acid and sodium bicarbonate as the effervescent base. Additional nutrients such as vitamin C, zinc, and magnesium were incorporated to enhance overall nutritional potency and improve the absorption of Moringa's bioactive compounds. Natural flavors and sweeteners were included to mask the earthy taste of the extract and improve acceptability. The formulated tablets were assessed for effervescence time, pH, uniformity, moisture content, and stability. Results demonstrated rapid disintegration within three minutes, acceptable pH, and good stability under storage conditions. The developed formulation provides a convenient, fast-dissolving, and nutritionally enriched supplement that enhances bioavailability and palatability, thereby improving patient compliance and encouraging regular consumption of Moringa-based nutritional products.

**Keywords**: Moringa oleifera, effervescent tablet, patient compliance, nutritional effectiveness, nutraceutical formulation

**PC-1028**

**SMART AND STIMULI-RESPONSIVE NANOCARRIERS: DEVELOPING ACCURATE DRUG DELIVERY METHODS TO IMPROVE THERAPEUTIC INDEX AND PATIENT ADHERENCE**

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A significant breakthrough in precision drug delivery, smart and stimuli-responsive nanocarriers solve long-standing issues with traditional dosage forms like low patient compliance, off-target toxicity, and poor bioavailability. These clever nanosystems are designed to respond to internal or external stimuli by releasing medications in a regulated fashion. Selective activation within diseased tissues is made possible by internal triggers, such as changes in pH, redox potential, hypoxic conditions, enzyme overexpression, or elevated reactive oxygen species. Temperature, light, magnetic fields, ultrasound, electrical signals, and other external stimuli all improve site-specific drug release and enable real-time therapy modification. A variety of materials, including polymeric nanoparticles, liposomes, dendrimers, inorganic nanoparticles Surface functionalization, ligand-based targeting, and nano-bio interface interaction optimization are all part of their design. A lot of platforms also use imaging agents for both therapeutic and diagnostic purposes. By boosting drug accumulation at target sites, decreasing systemic toxicity, and improving patient adherence through sustained or on-demand release, these characteristics work together to improve the therapeutic index. The main classes of stimuli-responsive nanocarriers are highlighted in this review along with their mechanisms, design approaches, characterization techniques, and preclinical or clinical developments.

**Keywords**: Stimuli-responsive nanocarriers, smart drug delivery, controlled release, targeted delivery, pH-sensitive systems.

**PC-1029**

**BRIMONIDINE LOADED CATIONIC-CHARGED LIPOSOMAL OCULAR DRUG DELIVERY SYSTEM FOR EFFECTIVE TREATMENT OF GLAUCOMA: IN-VITRO, EX-VIVO, AND IN-VIVO STUDIES**

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The present research is aimed to develop brimonidine tartrate (BRT) loaded cationic-charged liposomal eyedrops having longer precorneal retention, enhanced trans-corneal permeation and improved intra-ocular pressure (IOP) lowering efficacy for effective treatment of glaucoma. Liposomal formulation designing and optimization was done using 3-factor, 3-level Box-Behnken design selecting phospholipid (EPCS-DOTAP), cholesterol, and drug content as factors (independent variables) and mean particle size (MPS), zeta potential (ZP), PDI, entrapment efficiency (%EE), and % cumulative drug release (%CDR) as response variables. The optimized formulation prepared by thin-film hydration-sonication and purified by stirred cell ultrafiltration technique exhibited optimal liposomal characteristics, i.e., 160.4 nm (MPS), 28.2 mV (ZP), 0.212 (PDI), and 58.6% (EE) and 90.8% CDR at 12h showing in-vitro sustained release with Higuchi's kinetics model. The TEM, XRD, and DSC studies confirmed the spherical, nano-sized and effective drug loading of liposomal drug-carriers. The BRT liposomes were developed as isotonic eyedrops having 7.2 pH, 298 mOsm/kg osmolality and HET-CAM tested non-irritant formulation. The ex-vivo study in goat cornea demonstrated 1.02±0.08 cm.min-1 apparent permeability and 18.1±1.1 µg.cm-2.min-1 steady-state flux with 2 times higher drug permeation compared to marketed eyedrops. The in-vivo pharmacodynamic studies also confirmed the better IOP lowering efficacy against normo-tensive and hyper-tensive rabbit eyes during 12 h study period in comparison to marketed eyedrops. The developed BRT loaded liposomal eyedrops possessed all recommended quality attributes in acceptable range and exhibited physical stability during 3 months study period.

**Keywords**: Brimonidine tartrate; glaucoma; cationic-charged liposome; ocular drug delivery; IOP lowering effect.

**PC-1030**

**BUSPIRONE HYDROCHLORIDE NASAL IN SITU GEL: DESIGN, IN VITRO AND EX VIVO EVALUATION**

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Buspirone Hydrochloride a 5-HT1A receptor agonist is widely used in to management of anxiety disorders which is a most common neurological condition. However, its low oral bioavailability (~4%) due to extensive first-pass metabolism necessitates alternative delivery routes. This study aimed to formulate and evaluate a thermosensitive Buspirone HCl nasal in situ gel (B-NIG) for enhanced brain targeting and prolonged residence time in the nasal cavity. By applying a central composite design 13 B-NIG formulations (F1-F13) were prepared by varying the factors Poloxamer 407 and Gaur Gum. Prepared B-NIG were evaluated for gelling temperature, gelling time, viscosity and % drug release. By statistical evaluation it was observed that there is a significant decrease in the gelling temperature and gelling time as concentration of polymer increased. From the design the optimized B-NIG was found to be with the composition of 19.034%w/v Poloxamer 407 and 0.135%w/v Gaur Gum which is almost closer to the F10 B-NIG formulation. The recommended optimized B-NIG formulation exhibited desired gelling temperature (36°C), gelling time (20 s), and viscosity (105.23 cPs) with drug release of 72.14%±0.01 over 8 hours which followed zero order




ISBN: 978-81-980623-8-3

release kinetics with non- fickian diffusion mechanism. The FTIR, DSC and XRD confirmed the compatibility between the drug and excipients. The ex vivo permeation study of optimized B-NIG formulation showed cumulative drug permeation of 1.73±0.5mg/cm2 after 8 hours, with a steady state flux of 0.2198±0.5mg/cm2/hr. Overall, the optimized B- NIG formulation demonstrated promising physicochemical properties for intranasal delivery, suggesting a viable route for enhancing therapeutic outcomes in anxiety treatment by bypassing hepatic metabolism and ensuring prolonged drug retention in the nasal cavity.

**Keywords**: Buspirone Hydrochloride, Nasal in situ gel, Thermo sensitive in situ gel, Anti anxiety

**PC-1031**

## BIOACTIVE NANOGEL AND FOAM DRESSINGS FROM MORINDA CITRIFOLIA: FORMULATION, CHARACTERIZATION, AND WOUND HEALING EVALUATION

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Wound healing is enhanced through the application of nanogel and foam dressings containing extracts from Morinda citrifolia leaf (noni). The noni plant's antimicrobial, anti-inflammatory, and antioxidant qualities help combat infection and reduce inflammation. Soxhlet extraction was employed to obtain the ethanolic extract of morinda citrifolia, which was then subjected to GC-MS and LC-MS analysis. In silico studies were conducted using the PubChem database to obtain the 3D structures of the constituents to investigate the binding modes of the active constituents against 12 protein targets. Complexes with high binding scores were subjected to molecular dynamic analysis and ADMET analysis. The cytotoxicity of the extracts and the formulation was analyzed to determine the viability of HDF cells. The formulations of nanogel were prepared by modified solvent diffusion method and foam dressing was prepared using toluene di-isocynate, dabco and polyols. These formulations were analyzed for physical tests, extract content, SEM, and in vitro drug release. The optimized nanogel and foam dressing were subsequently evaluated for scratch assays in HDF and in vivo studies and stability studies were perfomed as per ICH guide lines. The morinda citrifolia leaf extracts yielded 25-30%. Molecular dynamic simulations using the DESMOND program indicated that the selected protein-ligand complexes were more stable than the standard complexes throughout the simulation. The pure extract showed no toxicity, with 100% cell viability at all concentrations, suggesting its suitability as a formulation. The foam and nanogel formulations showed acceptable physical characteristics, with an optimal particle size of 40 nm, PDI ranging from to 0.1-0.6. The nanogel and foam dressings exhibited no significant cytotoxicity and enhanced wound healing activity compared to the standard and control groups, showing viability greater than standard. Additionally, wound contraction and hydroxyproline levels were higher in rats treated with nanogel and foam dressing than in the control group. There are no significant changes in all the test parameters for the study during the stability studies. Hence they remain safe and functional for use in wound care applications. The study provides morinda citrifolia leaf extract in the formation of a nanogel and foam dressing was observed to be stable, safe, and exhibited promising wound healing activity.

**PC-1032**

## FORMULATION AND EVALUTIONOFHERBALEFFERVESSCENT TABLETTHATENHANCEPATIENT COMPLIENCE BYIMPROVINGNUTRITIONAL EFFECTIVNESS

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Emulgels have emerged as a promising topical drug delivery system for delivering both hydrophobic and hydrophilic drugs. They increase the absorption and enhance the action of the drug. The objective of this study was to formulate and evaluate Emulgel containing extract of Tridax procumbens for wound healing activity. The plant has been extensively used in Ayurvedic system of medicine for various diseases like hepatoprotective effect, immunomodulating property, promising wound healing activity, antidiabetic, hypotensive effect, antimicrobial, insect repellent activity, anti-inflammatory and antioxidant, bronchial catarrh, dysentery, diarrhoea also prevent falling of hairs and leads to hair growth promotion. The formulation of Emulgel was done by using Carbapol 940, Span 80, Tween 80, Light Liquid paraffin, Triethanolamine, methyl paraben and extract of TP. The formulated emulgel was evaluated for physical properties like pH, Spreadability, Viscosity and compatibility studies & anti-microbial studies. From the evaluation it was concluded that the formulation F2 Emulgel was better on its physical properties and anti-microbial studies for wound healing activity.

**Keywords**: Emulgel, Tridax procumbens, Wound healing, Anti-microbial activity.

**PC-1033**

## FORMULATION AND EVALUATION OF TRANSDERMAL PATCHES FOR OSTEOARTHRITIS MANAGEMENT

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Osteoarthritis (OA) remains a major global health concern, requiring treatment approaches that enhance efficacy while improving patient convenience. Transdermal drug delivery systems (TDDS) provide a promising alternative by enabling sustained and controlled drug release, reducing systemic adverse effects, and improving treatment adherence. This study aimed to develop and evaluate transdermal patches containing hyaluronic acid, HPMC K15M, and selected essential oils for OA management. Patches were formulated using optimized combinations of polymers, plasticizers, and solvents based on factorial design. A polyvinyl alcohol (PVA) backing membrane was prepared, and patches were fabricated using the film-casting method. The physical properties of the patches—including colour, uniformity, flexibility, and surface smoothness—were assessed. Additional evaluations included patch thickness, folding endurance, weight variation, moisture content, adhesion strength, and pH to ensure functional quality. The patches demonstrated favourable physical attributes, consistent thickness, and adequate folding endurance, indicating good mechanical stability. Weight uniformity confirmed accurate drug distribution, while moisture content values supported patch stability. Adhesion strength was sufficient for sustained skin contact, and pH levels were compatible with the skin.

**Keywords**: Osteoarthritis; Transdermal Drug Delivery Systems; Polyvinyl Alcohol

**PC-1034**

## FORMULATION AND EVALUATION OF A LACTOBACILLUS ACIDOPHILUS BASED ANTI-ACNE GEL FOR THE TREATMENT OF ACNE VULGARIS

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Acne vulgaris is a common dermatological condition affecting millions worldwide, especially during adolescence but often continuing into adulthood. Conventional treatments such as antibiotics, retinoids, and benzoyl peroxide can be effective but often lead to side effects, including irritation, dryness, and antibiotic resistance. These limitations have increased interest in probiotics as a gentler alternative capable of supporting the skin microbiome and reducing inflammation. This study aimed to develop and evaluate an antiacne gel containing Lactobacillus acidophilus, a probiotic strain known for inhibiting acne related bacteria such as Propionibacterium acnes and helping reduce inflammatory responses. The gel base was prepared using carbopol 934 as the gelling agent and propylene glycol as a humectant to improve skin hydration. The probiotic culture was lyophilized to maintain viability and incorporated under aseptic conditions to prevent contamination. The formulation was evaluated for physicochemical properties, microbial viability, and short-term stability. In vitro antimicrobial tests were also performed against P. acnes and Staphylococcus epidermidis. Results showed that the gel maintained a stable, skin friendly pH with consistent viscosity and spreadability over 45 days. The antimicrobial assays demonstrated significant inhibitory activity against acne causing bacteria. Overall, the probiotic based antiacne gel showed encouraging




ISBN: 978-81-980623-8-3

stability and antimicrobial effects without signs of irritation, highlighting its potential as a safe and effective alternative for acne management and supporting further clinical exploration.

**Keywords**: Probiotic, Acne, Acne Vulgaris, Antimicrobial Property

**PC-1035**

**NOVEL APPROACH FOR ENHANCED ANTIFUNGAL THERAPY: DEVELOPMENT AND EVALUATION OF FLUCONAZOLE-LOADED TOPICAL NANOSPONGE HYDROGEL.**

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Fungal infections remain a major health concern, demanding improved antifungal therapies. Fluconazole, a commonly used antifungal drug, suffers from poor aqueous solubility and limited skin penetration, resulting in reduced therapeutic efficacy. This studyaimed to develop a fluconazole-loaded nanosponge hydrogel to enhance solubility, stability, and topical antifungal activity while minimizing systemic side effects. Nanosponges were prepared using the emulsion solvent diffusion method with polymers such aspolyvinyl alcohol (PVA), hydroxypropyl methylcellulose (HPMC), ethyl cellulose (EC), and Eudragit RS100. The formulations were characterized for production yield, drug entrapment efficiency, particle size, zeta potential, morphology (SEM), and compatibility (FTIR, DSC). The optimized EC-based nanosponge formulation (F5) showed the highest production yield (77.53%), drug entrapment efficiency (80.8%), and an average particle size of 334 nm. SEM confirmed a porous structure, while FTIR and DSC revealed no drug–polymer interactions. The optimized nanosponge hydrogel (FG5), prepared using Carbopol 940, exhibited suitable pH (6.9), high drug content (91.63%), and excellent spreadability. In-vitro diffusion studies demonstrated significantly higher drug release (90.9%) from FG5 compared with the marketed fluconazole gel (Flucos Gel 0.5%). Stability studies conducted as per ICH guidelines confirmed physical and chemical stability for three months. Overall, the fluconazole-loaded nanosponge hydrogel showed enhanced drug release, stability, and therapeutic potential over conventional formulations, suggesting a promising approach for effective topical antifungal therapy. Further clinical evaluation is warranted to confirm its efficacy and commercial viability.

**Keywords**: Fluconazole, nanosponge hydrogel, antifungal therapy, topical drug delivery, non-Fickian diffusion.

**PC-1036**

**QBD BASED DEVELOPMENT, CHARACTERIZATION AND PHARMACOKINETIC EVALUATION OF ENZALUTAMIDE-LOADED CYCLODEXTRIN NANO SPONGES FORMULATIONS FOR ENHANCED DRUG DELIVERY**

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The aim of this study was to enhance the bioavailability of Enzalutamide by developing cross-linked cyclodextrin nanosponges loaded with the drug (EZL-CDNS). The objective of the work is to thoroughly investigate the impact of different molar ratios of DPC and cyclodextrin on the fundamental properties of EZL-CDNS, such as particle size, entrapment efficiency, and zeta potential. The Box-Behnken design methodology was employed to systematically investigate the factors affecting the properties of EZL-CDNS. Particle size, entrapment efficiency, and zeta potential were selected as response variables. The encapsulation of enzalutamide was confirmed using DSC and FTIR and morphology with SEM. The EZL-CDNS exhibited a size distribution ranging from 295 to 471 nm, entrapment efficiency values spanning from 51.7% to 90.7%, and zeta potential values ranging from -15.3 to -28.1 mV. DSC and FTIR analyses confirmed the successful encapsulation of enzalutamide, leading to its transition into an amorphous state. SEM revealed the porous structure of EZL-CDNS. Importantly, in vitro drug release profiles demonstrated a significant improvement compared to pure EZL. EZL-CDNS exhibited a quicker onset of action, higher peak plasma Concentration (Cmax), increased overall drug in sustained release pattern. This study successfully developed and characterised EZL-CDNS with different DPC/cyclodextrin molar ratios. Nanostructured carriers had good size distribution, entrapment efficiency, and zeta potential. The increased in vitro drug release profile and pharmacokinetic modelling results suggest higher bioavailability and sustained release of enzalutamide.

**Keywords**: Enzalutamide, Cyclodextrin, Nanosponges, Box-Behnken Design, Pharmacokinetics.

**PC-1037**

**DESIGN OF EXPERIMENT ASSISTED FORMULATION OPTIMIZATION OF CURCUMIN AND ASCORBIC ACID LOADED NANO-LIPOSOMES USING BOX-BEHNKEN DESIGN**

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The objective of present work is to design and optimize a nano-liposomal formulation co-loaded with hydrophilic and hydrophobic natural immuno-boosting agents for their enhanced oral absorption, better stability, and effective delivery leading to improved bioavailability and immune-stimulant effect. The nano-liposomes was prepared by ethanol injection method entrapping Ascorbic acid-AA (hydrophilic drug) into the aqueous core and Curcumin-CUR (hydrophobic drug) into the lipid bilayer of liposomal vesicle. Box-behnken (three-factor, three level) design was employed in formulation optimization where the phospholipid content, cholesterol content and stirring speed were chosen as independent variables and mean particle size (MPS), polydispersity index (PDI), zeta potential (ZP), entrapment efficiency (EE), drug loading (DL) and % cumulative drug release (CDR at 12h) of both drugs were recognized as response variables. The optimized formulation was evaluated for the response variables and the experimentally-observed response data was very close to the software-predicted values having 192.2 nm MPS, 0.235 PDI, 21.7 mV ZP, 58.2% EE (AA), 68.4% EE (CUR), 10.4 % DL (AA), 8.8% DL (CUR), 78.6% CDR (AA), and 71.4% CDR (CUR) at 12 h. The developed nano-liposomes exhibited sustained drug release following Higuchi's kinetics model and the ex-vivo drug permeation study demonstrated approx. three-fold higher AA and CUR absorption compared to their aqueous solution/suspension. The developed coloaded liposomal formulation had all desired product qualities and physico-chemical properties in optimal range. The developed formulation exhibited physical stability till 3 months of study period and thus the development of co-loaded nano-liposomes was successfully accomplished.

**Keywords**: Curcumin, Ascorbic acid, Design of experiment (DoE), Co-loaded liposomes, Formulation optimization.

**PC-1038**

**IN VITRO EVALUATION OF ANTIUROLIATHIC ACTIVITY OF EUPHORBIA HETEROPHYLLA LEAVES USING TITRIMETRIC CALCIUM OXALATE DISSOLUTION AND UV SPECTROPHOTOMETRIC CRYSTALLIZATION INHIBITION ASSAYS**

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Urolithiasis, primarily driven by calcium oxalate crystal deposition, remains a recurrent and challenging disorder with few effective non-invasive therapies. Exploring plant-based remedies offers a sustainable alternative. Euphorbia heterophylla, traditionally valued in ethnomedicine, was investigated for its potential antiurolithic activity using two validated in vitro models. Ethanolic extracts of E. heterophylla leaves were prepared and evaluated at concentrations of 1, 2, and 5 mg/ml. Calcium oxalate dissolution was assessed via a titrimetric method using 0.1 M $KMnO_4$, while crystal nucleation and aggregation were quantified by UV spectrophotometry at 620 nm over 5 minutes. The extract exhibited measurable dissolution of calcium oxalate crystals (23.20%), compared to the standard Cystone (48.90%). Spectrophotometric analysis revealed a clear dose-dependent inhibition of both crystal nucleation and aggregation, with maximal effect




ISBN: 978-81-980623-8-3

observed at 5 mg/ml. Euphorbia heterophylla demonstrated moderate yet promising antiurolithic potential by both dissolving preformed calcium oxalate and impeding crystal formation. These findings highlight its value as a prospective herbal adjunct in urolithiasis management. Further phytochemical profiling and in vivo validation are recommended to elucidate its active constituents and mechanisms of action.

**Keywords**: Urolithiasis, Euphorbia heterophylla, Calcium Oxalate, Titrimetric Method, UV Spectrophotometry, Herbal Medicine

**PC-1039**

## FORMULATION AND OPTIMIZATION OF PROCESS PARAMETERS IN FLUID BED TECHNOLOGY FOR EXTENDED-RELEASE POTASSIUM CHLORIDE PELLETS

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The present study focuses on the formulation and optimization of extended-release potassium chloride pellets using Fluid Bed Technology under a Quality by Design (QbD) framework. The objective was to evaluate the influence of critical process parameters and compare polymeric and hot-melt coating approaches for achieving a reproducible and controlled drug release profile. Potassium chloride pellets were prepared using stearic acid–dimethylglyoxime for hot-melt coating and ethylcellulose–triethyl citrate for polymeric coating. QbD tools including identification of Critical Quality Attributes (CQAs), Critical Process Parameters (CPPs), and FMEA-based risk assessment were applied to optimize key variables such as inlet temperature, atomizing air pressure, product temperature, spray rate, and coating levels. The prepared pellets were assessed for particle size distribution, bulk and tapped density, flow properties, drug content, wetting time, friability, FTIR, DSC, SEM, and in vitro dissolution. Pellets exhibited good spherical shape and smooth surface morphology, as confirmed by SEM. Dissolution studies performed in 0.1N HCl for 2 hours followed by phosphate buffer pH 6.8 for 4 hours showed that pellets coated with 6% stearic acid + dimethylglyoxime and 5% ethylcellulose + triethyl citrate achieved controlled release of 83.22% and 80.81% respectively over 6 hours. All physicochemical parameters complied with prescribed limits, reflecting excellent uniformity and flow properties. Stability studies performed as per ICH guidelines confirmed that the optimized formulations remained stable under accelerated conditions. This study demonstrates that QbD-integrated fluid bed processing is a robust and scalable approach for developing consistent and efficient extended-release potassium chloride pellets with optimized coating performance.

**Keywords**: Potassium chloride, extended-release pellets, fluid bed technology, QbD, coating optimization.

**PC-1040**

## FLUORESCENT CARBON DOTS AS DUAL-FUNCTIONAL NANOPROBES FOR RAPID MICROBIAL DETECTION AND BIOMEDICAL IMAGING

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Fluorescent Carbon Dots (CDs) were successfully synthesized using a simple, economical bottom-up pyrolysis method. Physicochemical characterization confirmed their nanoscale size (~19 nm), excellent colloidal stability, and amorphous structure, ensuring high fluorescence and surface reactivity. The CDs exhibited strong blue fluorescence under 360 nm excitation, validating their potential for optical and biological applications. Spectrofluorometric analysis demonstrated the remarkable sensitivity of CDs in detecting bacterial contamination across water, food, and faecal samples. The fluorescence intensity correlated directly with microbial load, effectively distinguishing between purified and contaminated water sources in accordance with WHO and EPA safety standards. Similarly, food testing revealed clear variations in emission intensity, consistent with FSSAI regulations regarding E. coli contamination limits. In vivo biodistribution studies confirmed the excellent biocompatibility and safe gastrointestinal clearance of CDs within 24 hours. Overall, this study highlights the dual functionality of the synthesized CDs as low-cost, non-invasive, and field-deployable biosensors for rapid microbial detection and as efficient fluorescent probes for biomedical imaging—offering a promising approach for real-time health and environmental safety monitoring.

**Keywords**: Carbon Dots (CDs), Fluorescence, Pyrolysis synthesis, Bacterial contamination, Biosensor, Spectrofluorometric analysis, Biocompatibility, Biomedical imaging.

**PC-1041**

## FORMULATION AND OPTIMIZATION ZOLMITRIPTAN MUCOADHESIVE NANOSTRUCTURED LIPID CARRIER (NLC) BY USING BOX -BEHNKEN DESIGN FOR INTRANASAL DRUG DELIVERY

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The objective of the present study was to develop mucoadhesive nanostructured lipid carrier of zolmitriptan hydrochloride for brain targeting by nasal route. Mucoadhesive nasal dosage forms are an attractive method for overcoming rapid mucociliary clearance transport in the nose and for delivering the drug directly to brain. Box–Behnken design (BBD) was used to optimize the mucoadhesive NLC. The independent variables were the total lipid ratio, surfactant: co-surfactant concentration, and concentration of mucoadhesive agent and the dependent variables were particle size, zeta potential and entrapment efficiency. response surface graphs were used to understand the effects of each variable, and the desirability function was then adjusted to optimize NLC formulation. The experimental values of optimized formulation were in close agreement with predicted values. The optimized NLC were characterized by in vitro dissolution mucin binding efficiency, TEM DSC, FTIR, XRD. In conclusion, the BBD demonstrated its effectiveness in optimizing the NLC formulation and in identifying the effects of formulation variables.

**PC-1042**

## ADVANCED FOOD PRODUCT DESIGN: A PATENT ANALYSIS OF FUNCTIONAL GUMMIES IN TAILORED NUTRITION, FORMULATION CHALLENGES, AND PRODUCTION SCALABILITY

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Formulations like gummies have evolved from confectionery items into scientifically engineered food products that combine pharmaceutical and nutraceutical technologies. The use of functional gummies as flexible delivery systems for therapeutic and preventative treatments has been further broadened by the development of tailored and precision nutrition. This review critically examines the recent developments in advanced manufacturing techniques, food formulation strategies, and global patent patterns that have driven this change in food product design. Important formulation factors—such as the appropriate selection of gelling agents, sweeteners, acidulants, and flavoring agents—determine the physicochemical stability, palatability, and bioavailability of active ingredients. The patent analysis highlights an increasing shift toward sustainable ingredient sourcing, including high-protein and plant-based gelling agents, reflecting trends in green food production. Modern processing technologies, including encapsulation, core-shell designs, and three-dimensional (3D) printing, enable precise dose administration, increased stability of thermolabile bioactives, and improved patient adherence across pediatric and geriatric populations. The formulations target metabolic, hormonal, and cardiovascular health. However, challenges related to nutrition degradation, large-scale production scalability, moisture sensitivity, and regulatory compliance in the food sector still prevent extensive commercialization. The functional gummies, as a promising interface between functional foods and advanced delivery systems, are highlighted by the combination of formulation research, modern production, and patent-driven innovation. To improve their therapeutic efficacy, production stability, and market sustainability, future research prospects are outlined in this study, which compiles current technical advancements and patents.

Keywords: Functional gummies, Nutraceuticals, Tailored medications, Patent analysis.




ISBN: 978-81-980623-8-3

**PC-1043**

## DEVELOPMENT AND OPTIMIZATION OF RASAGILINE MESYLATE LOADED LIPOSOMAL GEL FOR SUSTAINED TRANSDERMAL DELIVERY

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In the present investigation, a liposomal gel containing rasagiline mesylate was developed to overcome its short half-life and extensive first-pass metabolism, thereby enhancing transdermal delivery and sustaining drug release. Liposomes were initially prepared using the ethanol injection method, followed by the formulation of a liposomal gel using the dispersion technique. Phospholipon-90H and cholesterol were selected as key excipients, and a full factorial design was employed by varying their concentrations. Nine batches were prepared and evaluated for drug content, entrapment efficiency, and in vitro drug diffusion. The optimized batch was further characterized using zeta potential analysis, FESEM, FTIR, and particle size determination. In vitro studies demonstrated that rasagiline mesylate-loaded liposomes achieved a sustained drug release of 64.2 ± 0.80% over 12 hours, in contrast to the rapid release observed with rasagiline mesylate solution. The optimized liposomal batch was incorporated into a 1% liposomal gel, which was evaluated for spreadability, viscosity, pH, drug content, and in vitro diffusion. Comparative diffusion studies revealed that the liposomal gel provided prolonged drug release for up to 12 hours, outperforming the conventional rasagiline mesylate gel. This study concludes that transdermal delivery of rasagiline mesylate through a liposomal gel offers a promising alternative to oral administration by bypassing hepatic metabolism, protecting the drug from degradation, and improving patient compliance. The sustained-release profile of the liposomal gel highlights its potential for effective management of Parkinson's disease.

**Keywords**: Rasagiline mesylate, Liposomes, Rasagiline mesylate liposomal gel, Transdermal, ethanol injection method, Phospholipid 90H, Cholesterol, In-vitro diffusion study.

**PC-1044**

## FORMULATION AND IN-VITRO EVALUATION OF CLOTRIMAZOLE-LOADED POLYMERIC NANOPARTICLES FOR DRUG REPURPOSING IN BREAST CANCER TREATMENT

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This study focuses on the development of a clotrimazole-loaded nanoformulation designed to target breast cancer, aiming to reduce cancer progression with minimal systemic toxicity. Clotrimazole (CLZ), was repurposed for its promising anticancer properties and encapsulated within polycaprolactone (PCL) nanoparticles to enhance its biocompatibility and therapeutic efficacy. The clotrimazole-loaded polycaprolactone-based nanoparticles (CLZ@PCLNPs) were formulated using the nanoprecipitation method and optimized through Box-Behnken design (BBD) for critical attributes Preformulation studies using spectrophotometric analysis, differential scanning calorimetry DSC and FTIR confirmed the compatibility and stability of CLZ with excipients, preserving the drug's integrity within the formulation. Morphological analysis via scanning electron microscopy (SEM) revealed uniform, Hemolytic studies confirmed that the optimized formulations were non-hemolytic, supporting their biocompatibility. In vitro drug release studies indicated a sustained release profile, with 65.84% of the drug released over 24 hours, suggesting prolonged therapeutic efficacy. In vitro studies conducted on MCF-7 (human breast cancer) and MDA-MB-231 (triple-negative breast cancer) cell lines demonstrated the anti-proliferative effects of CLZ@PCLNPs, with improved therapeutic outcomes. The optimized nanoparticles with IC50 values of 53.02 µg/mL for MCF-7 cells and 58.61 µg/mL for MDA-MB-231 cells, highlighting their anticancer potential. Cellular uptake studies confirmed targeted delivery, showing promising results in tumor regression and reduced systemic toxicity. These findings suggest that CLZ@PCLNPs serve as a biocompatible and effective carrier for the sustained release of clotrimazole.

**Keywords**: Cancer, Breast cancer, Genes, Targeted Drug Delivery, CLZ, Nanoformulations, Tumor regression, etc.

**PC-1045**

## DESIGN, FORMULATION, AND EVALUATION OF PIPERINE-BASED POLYMERIC NANOFORMULATION OF GABAPENTIN FOR EPILEPSY MANAGEMENT

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The purpose of the current study was to develop and characterize a new nanoformulation of gabapentin using PEG polymers for epilepsy therapy. Nanoformulation of gabapentin was developed from the use of PEG polymers. Preformulation studies were performed to evaluate the physical and chemical compatibility of the drug and polymer using FTIR and DSC. The standard calibration curve was determined for the pure drug Gabapentin. Epilepsy is a neurological condition affecting approximately 60 million people worldwide. Antiepileptic medications commonly used today have a limited shelf life and undesirable physicochemical and pharmacokinetic properties, limiting their use. Scientists have long been searching for means to enhance delivery to the areas of the Central Nervous System. Delivering drug molecules using nanocarriers is a viable approach to drug formulation, but it is also important to select a biodegradable material. Gabapentin is an anticonvulsant drug used for treating partial seizures and neuropathic pain. The primary purpose of the study was to formulate gabapentin with piperine nanosuspensions using the antisolvent precipitation-ultrasound sonication method and to enhance gabapentin solubility by reducing the particle size to the nanometre range. The formulated system was then evaluated for particle size, polydispersity index, zeta potential, entrapped efficiency, encapsulation efficiency, and drug-excipient compatibility. In addition, the surface morphology will be examined through scanning electron microscopy. The drug release kinetics will be performed for optimized nanoformulation. Thus, the developed formulation could be a promising carrier system, especially considering the physiological blood-brain barrier as an emerging challenging barrier for brain drug delivery.

**Keywords**: Gabapentin, Piperine, Epilepsy, Nanoprecipitation Method, Anticonvulsant, Zeta Potential, Entrapment Efficiency, Polydispersity Index, Scanning Electron Microscopy.

**PC-1046**

## DEVELOPMENT AND CHARACTERIZATION OF A SUSTAINED-RELEASE BUCCOADHESIVE LEVODOPA WAFER FOR PARKINSONISM MANAGEMENT

SHUBHASHREE A S

The aim of the present study was to develop and characterize a sustained-release buccoadhesive wafer of Levodopa for the treatment of Parkinsonism. Levodopa is an important antiparkinsonian drug, and buccoadhesive delivery was selected to reduce side effects and improve bioavailability. The wafers were prepared by the solvent casting method using Chitosan lactate (mucoadhesive polymer), PVP K-30 (hydrophilic polymer), PEG 400 (plasticizer), and aqueous acetic acid (solvent). The prepared wafers showed good physical appearance and uniform thickness. The surface pH ranged from 6.00 ± 0.09 to 6.90 ± 0.03, indicating compatibility with the buccal cavity. The tack test demonstrated medium to excellent adhesion. Tensile strength ranged from 0.163 ± 0.01 to 0.256 ± 0.06 N/cm², while folding endurance ranged from 209 ± 1.52 to 242 ± 3.46, confirming adequate flexibility. The swelling index was between 89.2% and 96%. Drug content varied from 71.9 ± 0.23% to 93.6 ± 0.16%, with formulation F5 showing the highest content (97.6 ± 0.16%). In vitro dissolution of formulation F5 showed 96.78 ± 0.42% drug release, and the In vitro diffusion study showed 95.61 ± 0.25% release, indicating enhanced release due to PVP K-30. Drug-release kinetics followed the Korsmeyer-Peppas model with an $R^2$ value of 0.9816. The release exponent (n = 0.8015) indicated a non-Fickian diffusion mechanism. Based on the study findings, the buccoadhesive wafer of Levodopa demonstrated suitable physicochemical properties and sustained -release characteristics, suggesting its potential for improved therapeutic management of Parkinsonism.




ISBN: 978-81-980623-8-3

**Keywords**: Levodopa, Buccoadhesive wafer, Solvent casting method, sustained release, Parkinsonism.

**PC-1047**

**EVALUATION OF ANTIMICROBIAL ACTIVITY OF NANOPARTICLE OF CALOTROPIS GIGANTEA LINN. EXTRACT**

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The present study focuses on the green synthesis, characterization, and antimicrobial evaluation of zinc nanoparticles using extracts from Calotropis gigantea Linn., a medicinal plant known for its wide range of biological activities. Phytoconstituents from different parts of the plant were extracted using the soxhlet extraction method to obtain bioactive compounds. These extracts acted as natural agents for the synthesis of zinc nanoparticles. The formation of nanoparticles was confirmed by UV–visible spectroscopy, which showed characteristic absorption peaks indicating successful nanoparticle synthesis. Dynamic light scattering (DLS) analysis was performed to determine particle size and distribution, confirming that the synthesized zinc nanoparticles were uniform and stable. To understand the possible mechanism of antimicrobial activity, molecular docking studies were carried out using PyRx software. The results showed strong interactions between the major phytoconstituents and microbial target proteins, suggesting their contribution to antibacterial effects. The antimicrobial activity of both the Calotropis gigantea extract and the synthesized zinc nanoparticles was tested using the cup-plate method against selected bacterial strains. The zinc nanoparticles showed significant inhibitory effects, especially against Escherichia coli. Overall, the study demonstrates that Calotropis gigantea is an efficient and sustainable source for producing zinc nanoparticles with strong antimicrobial properties. The findings support the potential use of such biosynthesized nanomaterials in pharmaceutical and biomedical fields as eco-friendly and biocompatible agents.

**Keywords**: Calotropis gigantean Linn., Zinc nanoparticles, Soxhlet extraction, Phytoconstituents, Antimicrobial activity, Molecular docking.

**PC-1048**

**BIOINSPIRED, STIMULI-RESPONSIVE NANOPARTICULATE OCULAR DELIVERY SYSTEM FOR PRECISION AND LONG ACTING GLAUCOMA THERAPY: DESIGN, CHARACTERIZATION AND THERAPEUTIC**

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Nanosuspension were made from (LMW) Chitosan/STPP to improves solubility of poorly soluble pilocarpine HCL.Nanosuspension improves bioavailability of drug at intraocular level and to reduce the frequency of drug administration. Nanosuspension were successfully prepared by ionotropic gelation method. Size of nanoparticles varied between 84.75-235.09nm.A polydispersity index and zeta potential of optimized batch F1 0.381 and -21.5±1 mV. Scanning electron microscopy (SEM) study of optimized batch completely revealed that the drug loaded nanoparticles were found to be spherical in shape having a smooth surface and the drug is molecularly dispersed uniformly throughout the whole polymer matrix.Nanosuspension of optimized F1 batch gives higher drug release 93.34±0.86%. Release kinetics investigation of pilocarpine HCL from F1 optimized batch followed the Higuchi square root model and first order release model gives sustained drug release effect for 8hr.The optimized formulation is isotonic in nature which reduces ocular irritation and improves patient compliance. No significant change in average particle size and zeta potential were observed after conducting stability studies.Thus,the (LMW)Chitosan/STPP have potential effect for the treatment of glaucoma.

**Keywords**: Nanosuspension, Pilocarpine hydrochloride, Chitosan/STPP, Ionotropic gelation method, Transcorneal permeation.

**PC-1049**

**DEVELOPMENT OF PARACHUTE-INSPIRED MUCOADHESIVE MICROSPHERES FOR NASAL DELIVERY OF RIVASTIGMINE**

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In the present research, parachute-inspired mucoadhesive microspheres of Rivastigmine were successfully formulated for enhanced nasal delivery. The objective of the study was to evaluate the influence of polymer ratio and crosslinking time on entrapment efficiency, unfolding behavior, swelling capacity, particle size, and in-vitro drug release. Microspheres were prepared by a modified ionic gelation method using chitosan and pectin as mucoadhesive polymers with an alginate-based hydrogel core to achieve rapid expansion. The prepared formulations were analyzed for particle size, swelling index, unfolding time in simulated nasal fluid, entrapment efficiency, mucoadhesion strength, and in-vitro release. Among all formulations, PM-4 exhibited the most desirable characteristics, including an entrapment efficiency of 78.4%, swelling index of 312%, and rapid unfolding within 22 seconds, enabling the intended parachute-like expansion. PM-4 also showed sustained drug release for up to 8 hours following non-Fickian transport. FTIR confirmed no interaction between drug and polymers, while DSC indicated partial amorphization of Rivastigmine within the microsphere matrix. Stability testing for 30 days showed no significant variation in particle size or drug content. Therefore, the developed parachute-inspired microspheres demonstrated strong mucoadhesion, rapid expansion, and controlled release, showing significant potential for improved nasal delivery of Rivastigmine.

**Keywords**: Rivastigmine, Parachute Microspheres, Mucoadhesion, Ionic Gelation, Nasal Delivery

**PC-1050**

**DESIGN AND DEVELOPMENT OF CYCLOSPORIN BASED COLLOIDAL CARRIER DRUG DELIVERY SYSTEM FOR TOPICAL MANAGEMENT OF ATOPIC DERMATITIS**

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Atopic dermatitis (AD) is an inflammatory chronic, recurrent skin disorder of the skin, it is defined by epidermal barrier malfunction, severe pruritus, and an increased risk of secondary infection. Traditional oral and parenteral treatments are restricted by side effects in the system, decreased patient adherence, and invasive administration, which makes it necessary to introduce new topical drug delivery methods. Carriers using nanotechnology have become an interesting solution to overcome the stratum corneum barrier and deliver controlled and localized therapy. Nano sponges made of cyclodextrin are one of them that have unique advantages such as large drug-loading capacity, adjustable polarity, and controlled drug release. A design-of-experiments method was used to fabricate and optimize nanosponges, and the optimum formulation was characterized using FTIR, XRD, SEM, TEM and thermal analyses. The developed nanosponges had an average particle size of about 93 nm, an entrapment rate of 73% and a release in-vitro property. The stability test of the formulation conducted under the ICH guidelines established the stability. Altogether, the cyclosporine-loaded cyclodextrin nanosponges are a promising colloidal carrier in the management of AD topically, providing a higher degree of drug stability, controlled release, and better patient compliance in comparison with traditional topical or systemic drugs. The present review sheds light on the scientific rationale, development approach, and therapeutic promise of nanosponge-based topical delivery as a convenient method of patient treatment of chronic dermatological diseases.

**Keywords**: Cyclosporine, Nanosponges, Atopic dermatitis.

**PC-1051**

**DESIGN AND EVALUATION OF DELAYED RELEASE PELLETS OF LANSOPRAZOLE**

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The formulation process was carried out in FBP by suspension layering technique. To bypass stomach, the formulation has to delay the release




ISBN: 978-81-980623-8-3

and give the release in proximal small intestine. This can be achieved by enteric coating. The work was carried out to delay the release of Lansoprazole by using enteric polymer Methacrylic acid copolymer (type C). The study includes preformulation of drug and excipients, formulation and evaluation, release kinetics and stability studies of capsules. Drug Loading was given to sugar spheres by using different binders i.e., Klucel- LF and L- HPC with different concentrations. The amount of drug bound to sugar spheres increases with an increased concentration of HPC (L-type) (17.5% and 22%). But at high concentration of HPC (22%), lumps were observed. Finally 17.5% w/w HPC was optimized as binder for drug coating. Sub coating was given to drug loaded pellets to avoid direct contact with enteric coating. Sub coating was given with HPC and Corn starch combination at an average weight build up of 6.1% w/w of sub coated pellets. Based on the above data, it was concluded that Lansoprazole Capsules 30mg (E6) complies with the Innovator and may be considered as an ideal formulation for developing Lansoprazole delayed release capsules 30mg.

**Keywords**: Pellets, Lansoprazole, Polymers, HPC

**PC-1052**

**FORMULATION AND EVALUATION OF FLOATING MICROBEADS OF RITONAVIR**

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The aim of the present work was to prepare and evaluate floating microbeads of Ritonavir. The use of natural polymers in dosage form design has received considerable attention, especially from the viewpoint of safety. Among the polymers, Low Methoxy Pectin (LMP), and co polymer Locust bean gum(LBG), Okragum Powder (OKG) and Gum Ghatti (GG). Microbeads formulation is based upon the interaction between the polymer (LMP) and cross linking agent. LMP is an anionic polymer, which can be easily cross linked with CaCl2. Microbeads were formulated in different ratio using LMP:LBG, LMP:OKG, LMP:GG as retarding agents and 10% of Calcium chloride (CaCl2), as cross linking agents by employing Ionic Gelation Technique. The complexation between Ca+2 ions with LMP along with natural copolymer leads to retard the release of the drug. Floating time and floating lag time, Drug Entrapment efficiency and in-vitro dissolution studies were also carried out in eight hours (in pH 1.2 media). The invitro data was explored with zero order, first order, Higuchi and Korsmeyer equations. The release kinetics was found to be governed by the type and content of the polymer (LMP) and copolymer. Formulation (PKa) shows zero order release kinetics with higher (r2) values. By suitable modulation could be developed floating microbeads for this type of drug. Hence , Floating microbeads of Ritonavir can be developed by using low methoxy pectin polymer along with the natural polymers.

**Keywords**: Ritonavir, guargum, okragum, locust bean gum.

**PC-1053**

**FORMULATION AND EVALUATION OF GASTRO RETENTIVE FLOATING TABLET DELIVERY SYSTEMS OF BCS CLASS II NSAIDS FOR ENHANCED MANAGEMENT OF CHRONIC OSTEO ARTHRITIS PAIN**

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Chronic osteoarthritis pain often requires long-term therapy with non-steroidal anti- inflammatory drugs (NSAIDs). Diclofenac and etoricoxib offer strong analgesic and functional benefits, whereas ibuprofen and naproxen are preferred for patients needing safer cardiovascular profiles. All these agents fall under Biopharmaceutical Classification System (BCS) Class II, exhibiting high permeability but poor aqueous solubility, which limits oral bioavailability. Gastroretentive floating tablet systems overcome these limitations by prolonging gastric residence and drug release. Formulations incorporating polymers such as HPMC K100M along with effervescent agents like sodium bicarbonate enable buoyancy and controlled drug release, improving dissolution and absorption of poorly soluble NSAIDs. These systems may also minimize systemic side effects through optimized pharmacokinetics and localized gastric delivery. Additionally, topical NSAIDs serve as alternative options for localized osteoarthritis pain with reduced systemic exposure. This study focuses on the formulation, optimization, and evaluation of gastroretentive floating tablets of BCS Class II NSAIDs to enhance bioavailability in chronic osteoarthritis management.

**Keywords**: Chronic osteoarthritis, diclofenac, etoricoxib, ibuprofen, naproxen, BCS Class II drugs, floating tablet, gastroretentive drug delivery, HPMC, effervescent agents, topical NSAIDs

**PC-1054**

**DESIGN AND CHARACTERIZATION OF AN ERYTHROMYCIN LOADED ETHOSOMAL GEL FOR MANAGING ACNE**

SUSHMITHA RAI

Ethosomes are innovative, non-invasive delivery systems that allow drugs to penetrate deeply into the skin and, in some cases, enter systemic circulation. These soft and flexible vesicles are optimized to enhance the transport of active molecules. They are mainly composed of phospholipids (such as phosphatidylcholine, phosphatidylserine, and phosphatidic acid), high amounts of ethanol, and water. The current study focuses on assessing the efficiency of an erythromycin-loaded ethosomal gel in managing acne. Erythromycin, a macrolide antibiotic derived from Streptomyces erythreus, is well recognized for its therapeutic activity against acne. Erythromycin-loaded ethosomes were formulated using the cold method in six variations (F1–F6), each containing different proportions of lecithin and ethanol. The formulation exhibiting the highest entrapment efficiency was selected and incorporated into a Carbopol 934 gel base. The final gel formulation was then analyzed for various parameters such as physical appearance, pH, drug content, spreadability, viscosity, in vitro diffusion, and drug release kinetics. Among the formulations, F2 showed the highest entrapment efficiency (79.89%), had a nanoscale particle size of 291.7 nm, and achieved a cumulative drug release of 82.29 ± 0.35%. The ethosomal gel demonstrated 71.33% drug release over 8 hours, following first-order release kinetics. Overall, the formulated ethosomal gel displayed enhanced stability, and the results support the potential of erythromycin-loaded ethosomal gel as an effective therapeutic strategy for acne treatment.

**Keywords**: Erythromycin, ethosomes, Carbopol 934

**PC-1055**

**DEVELOPMENT AND CHARACTERIZATION OF PROLIPOSOMES FOR SAFER ORAL DELIVERY OF DICLOFENAC (NSAIDS)**

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Non-steroidal anti-inflammatory drugs (NSAIDs) are frequently ingested by a substantial fraction of the population for its analgesic, antipyretic, and anti-inflammatory actions and are the second leading cause of GI ulceration, affecting between 15 and 40% of people who regularly take NSAIDs. The link between NSAIDs use and the occurrence of stomach bleeding and ulceration has been established, and it has been linked to life-threatening consequences such as ulcer perforation caused by oral administration. To overcome the disadvantages of oral delivery of NSAIDs, in the present study diclofenac-loaded proliposomes were prepared and evaluated to explore the feasibility of proliposomes as a drug carrier which would generate diclofenac sodium-bearing liposomes soon after they come in contact with body fluid. The proliposomes were prepared by film deposition on carrier method by rotatory evaporator. Optimization studies were performed with the help of Design expert software using Box-Behnken model. The prepared optimized proliposomes were evaluated through vesicle size, PDI, entrapment efficiency, TEM and in-vitro drug release. The vesicle size and PDI were 162.5 nm and 0.291 respectively. The morphological evaluation was done by optical microscopy and TEM. Drug entrapment efficiency (EE%) was found to be 67.56%±0.4. An in-vitro drug release was carried out using the dialysis bag method as it has shown cumulative release of 44.64%±1.74 in 30 mins. and 98.64%±1.44 in 2 hours. This demonstrated




ISBN: 978-81-980623-8-3

an enhancement in the drug diffusion and thereby, absorption of the drug through the membrane. The analysis indicates that proliposomes could be utilized as drug delivery for NSAIDs.

**Keywords**: Proliposomes, Nonsteroidal anti-inflammatory drugs, oral delivery, optimization, diclofenac sodium

**PC-1056**

**DESIGNING THE DENDRIMER-BASED DRUG DELIVER FOR ANTINEOPLASTIC THERAPIES**

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Dendrimers, a sophisticated nanoscale concept, are transforming cancer treatment by tackling the critical challenges plaguing conventional therapies: poor drug solubility, systemic toxicity, oral bioavailability, side effects, and drug resistance therapy. These branched molecular frameworks serve as attractive drug delivery nanocarriers, with their engineered structure enabling controlled release and targeted delivery of chemotherapeutic agents. This breakthrough promises to enhance the therapeutic index of anticancer drugs dramatically. We explore how these systems optimize crucial parameters, such as release kinetics,hydrophobic drug encapsulation, reduced toxicity, and mimic protein. Engineering these molecular carriers necessitates careful consideration ofsurface chemistry and the role of the functional group, with each feature being carefully tweaked to maximize therapeutic effectiveness. The field has observed amazing advances through the application of innovative polymeric studies, particularly poly(amidoamine),poly[lactic-co-glycolic acid], and PEGylated dendrimers. These sophisticated designs have proven exceptional promise in enhancing biocompatibility and achieving accurate drug targeting at the site of action. Our research expands on the phenomenal versatility of dendrimer-based delivery systems across a wide range of new delivery strategies, including targeted delivery, gene therapy, photodynamic therapy, and photothermal treatment as well as immune response enhancement and stimuli-responsiveness. however, additional clinical validation will be required to realize their full potential in medical practice.

**Keywords**: dendrimer, designing methodologies, antineoplastic agents, controlled release dendrimer, macromolecules, cancer targeting, polymers

**PC-1057**

**FORMULATION AND EVALUATION OF ETRAVIRINE NANOSUSPENSION BY NANO PRECIPITATION METHOD**

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The aim of the present work is to develop oral Nanosuspension of Etravirine by Nano Precipitation method using various Stabilizers & Surfactant such as β-cyclodextrin, Soluplus, Poloxamer 407, Polyvinyl alcohol, Sodium lauryl sulfate, Polysorbate 80 Various formulation as well as process parameters were optimized in order to achieve desirable size and saturation solubility. Characterization of the prepared Nanosuspension was done with respect to Drug Content, Percentage yield, Entrapment efficiency, Viscosity, Sedimentation volume, Scanning electron microscopy, Particle's size, zeta potential, dissolution rate, in-vitro dissolution study. Zeta potential value for the optimized formulation (NS12) was found to -4.49 mv which was found to be within the acceptable limits. Average particle size of Nano suspension of optimized formulations (NS12) which is in ratio with Poloxamer 407 was found to be 500.4 nm. From the invitro studies we can say that formulation NS12 shows best drug release of 98.42±1.27% within 30 minutes whereas all the other formulations didn't release the drug. The drug release from the Nanosuspension was explained by the using mathematical model equations such as zero order, first order, and equation methods. Based on the regression values it was concluded that the optimized formulation NS12 follows first order kinetics with super case-II transport mechanism and the stability studies shows that the formulation was stability up to 3Months of time period.

**Keywords**: Etravirine, Poloxamer 407, Sodium lauryl sulfate, Nanoprecipitation technique, SEM, Zeta potential, PSD.

**PC-1058**

**QBD-BASED DEVELOPMENT OF A SIMVASTATIN-LOADED TRANSETHOSOMAL GEL FOR IMPROVED TRANSDERMAL DELIVERY: OPTIMIZATION, CHARACTERIZATION, AND IN VIVO ANTIHYPERLIPIDEMIC ASSESSMENT.**

UMASHRI KOKATANUR

Simvastatin, a widely used lipid-lowering agent, exhibits low oral bioavailability due to its poor aqueous solubility and extensive first-pass metabolism. Transdermal delivery offers a promising strategy to overcome these limitations. This study aimed to develop, optimize, and evaluate a simvastatin-loaded transethosomal gel to enhance dermal permeation and improve antihyperlipidemic efficacy. Critical Quality Attributes (CQAs)—including particle size (PS), entrapment efficiency (%EE), and polydispersity index (PDI)—were identified based on the Quality Target Product Profile (QTPP). Transethosomes were optimized using a Face-Centered Central Composite Design (FCCCD) by varying concentrations of soya phosphatidylcholine and ethanol. The optimized formulation was characterized using dynamic light scattering, scanning electron microscopy, and transmission electron microscopy. It was incorporated into a 2% w/v Carbopol gel and evaluated for pH, viscosity, and spreadability. In vitro diffusion, ex vivo skin permeation, and skin irritation studies were conducted. Antihyperlipidemic activity was assessed in high-fat diet–induced hyperlipidemic rats using oral simvastatin (10 mg/kg/day) and the transethosomal gel (1 g containing 10 mg simvastatin) as comparators. The optimized transethosomes exhibited nanoscale particle size (104.9 ± 0.42 nm), high entrapment efficiency (79.92 ± 0.19%), low PDI (0.113 ± 0.45), and a negative zeta potential (−32.1 ± 0.48 mV). Microscopic analysis confirmed spherical vesicular morphology. The formulated gel demonstrated sustained drug release, favorable skin compatibility, and significantly enhanced lipid-lowering activity in high-fat diet–fed rats. It effectively reduced total cholesterol, triglycerides, and LDL-C while increasing HDL-C levels, outperforming oral simvastatin ($p < 0.05$). The simvastatin-loaded transethosomal gel showed superior dermal delivery, improved therapeutic efficacy, and excellent safety, indicating its potential as a nanoenabled transdermal alternative for managing hyperlipidemia.

**PC-1059**

**FORMULATION AND DEVELOPMENT OF ETODOLAC-LOADED MESOPOROUS SILICA NANOPARTICLES**

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Mesoporous silica nanoparticles (MSNs) are increasingly used as effective drug-delivery carriers due to their surface functionality, structural integrity, and biocompatibility. The present research focused on formulating an MSN-based delivery system for Etodolac to achieve tailored and sustained drug release. The primary objective was to enhance the solubility of Etodolac, a poorly soluble drug, thereby improving its overall release profile and therapeutic performance. The study proposed an innovative approach to prolong the anti-inflammatory effect of the drug. Surface functionalization of the MSNs was performed using APTES (3-aminopropyltriethoxysilane), ensuring improved interaction between the drug and the carrier. The formulation was evaluated for drug release, entrapment efficiency, drug content, and in vivo activity. A $2^3$ full factorial design was applied for optimization, ANOVA was used to determine the influence of formulation factors on drug release. The optimized batch was studied through DSC, BET, particle size analysis, zeta potential measurement, SEM, and XRD. MSNs were prepared by the Solvent Evaporation Method. The final optimized formulation appeared as a white to slightly yellowish powder and exhibited 88.82% drug content, 74.5% drug release at 7 hours, and 60.35% entrapment efficiency. The particle size of 399 nm indicated




ISBN: 978-81-980623-8-3

suitability for oral administration. BET analysis confirmed drug filling within the silica mesopores, while SEM showed a rough, mesoporous texture characteristic of MSNs. In vivo evaluation using the Carrageenan-Induced Rat Paw Oedema Model demonstrated 87.64% inhibition, confirming enhanced, prolonged anti-inflammatory activity. Overall, Etodolac-loaded MSNs significantly improved drug solubility, sustained release, and therapeutic effectiveness compared with the marketed formulation.

**Keywords**: Mesoporous Silica Nanoparticles, Etodolac, APTES, Surface Functionalization.

**PC-1060**

**PACLITAXEL-LOADED CHITOSAN NANOPARTICLES AS A POTENT DRUG DELIVERY SYSTEM: ADVANCED CANCER THERAPY**

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Cancer remains one of the deadliest global diseases, arising from the transformation of normal dividing cells into tumorigenic ones through various genetic modifications. Conventional treatments lack effectiveness in the selective localization of the drug at the tumour site. Given that the cancer microenvironment is characterized by a slightly acidic pH (in contrast to the physiological pH of 7.4 in normal tissues), chitosan, a polymer solubilized under acidic conditions, was selected to provide pH-sensitive drug release at the tumour site. Paclitaxel-loaded chitosan nanoparticles were prepared using the ionic-gelation technique. A detailed design of experiment (DOE) approach was employed, starting with Placket-Burman screening to identify significant factors, namely chitosan, poloxamer 188, and sonication time, which were subsequently optimized using Central Composite Design (CCD) via Design Expert software. The optimized formulation demonstrated excellent characteristics: a particle size of 491.6 nm (DLS), a PDI of 0.4843, a Zeta potential of -17.7 mV, a high encapsulation efficiency of 94.40 %, 15.75 % drug loading, and 97.10 % drug content. FTIR-ATR analysis confirmed successful encapsulation, and FESEM size (448.029 nm) correlated well with the DLS result. Importantly, in vitro drug release studies showed selective release at acidic pH (pH 5.5) compared to minimal release at normal physiologic pH (pH 7.4). Thus, these Paclitaxel-loaded chitosan nanoparticles represent a highly suitable drug delivery system capable of selectively releasing the drug at the tumour site, thereby mitigating side effects on normal cells.

**Keywords**: Cancer; Chitosan; Polymeric Nanoparticles; Tumor Microenvironment.

**PC-1061**

**DESIGN AND EVALUATION OF A SPANLASTIC GEL SYSTEM FOR ENHANCED TOPICAL DELIVERY OF OXICONAZOLE NITRATE FOR THE TREATMENT OF DERMATOPHYTOSIS**

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Oxiconazole nitrate is an antifungal agent used in the treatment of dermatophytosis.The conventional topical administration is often limited by the poor skin permeation due to high resistance of skin barrier, leading to poor drug distribution to the skin layer. To overcome these challenges, a novel Oxiconazole nitrate loaded spanlastic gel was developed .Spanlastic were prepared by Ethanol injection method. A central composite design was used to optimize the spanlastic, using the concentration of Span 60 and Tween 80 as independent variables and particle size, transmittance, and diffusion efficiency as dependent variables. The optimized batch showed a particle size of 452.56nm,transmittance of 79.23±0.23% and diffusion efficiency of 82.74±1.34%.The optimized batch was further assessed for parameters, like drug content, surface morphology and surface charge.Then optimized spanlastic was incorporated into Carbopol 934 gel and evaluated for its parameters like physical appearance, pH, viscosity, spreadability,in vitro diffusion studies and kinetic studies.The in vitro drug release of spanlastic gel was 80.10±0.69% at the end of 8hrs and showed the zero-order release kinetics. Stability studies indicated that spanlastic gel was stable.Thus it can be concluded that the developed formulation could be a promising delivery system for the treatment of dermatophytosis.

**Keywords**: Oxiconazole nitrate, Spanlastic, Ethanol injection, Central composite design, Dermatophytosis, Gel

**PC-1062**

**SELF-NANO-EMULSIFYING DRUG-DELIVERY SYSTEMS: UPDATES ON THE DEVELOPMENT, ADVANCEMENTS AND OPPORTUNITIES IN IMPROVING ORAL ABSORPTION**

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Orally administered medication solubility is a key concern for the pharmaceutical business; about 35-40% of newly introduced pharmaceuticals have lessaqueous solubility, resulting in deprived dissolution and limited bio-availability. Employment of lipid-oriented drug releasemethodslike self-nano-emulsifying drugdelivery system (SNEDDS), its use to progress drug solubility, permeability, & bio-availability has been extensively reported in literature. A SNEDDS is made up of an oil component, a surfactant &a co-surface active agent. SNEDDS are intended for a broadvariety of applications becauseof their small droplets, high solubility, large interfacial region, low steadiness, transparent or semi-transparent appearance, and extraordinary kinetic reliability. Multiple orthogonal approaches are necessary for SNEDDS characterization in order to thoroughly organize SNEDDS manufacturing, strength, & biologicalrelease. The characterization of SNEDDSs includes multiple orthogonal methods required to fully control SNEDDS manufacture, stability, and biological fate. Encapsulating a drug in SNEDDSs can lead to increased solubilization, stability in the gastro-intestinal tract, and absorption, resulting in enhanced bio-availability. To improve efficacy and patient conformity, a supersaturated, mucus permeating, and tailored SNEDDS can be produced. The self-emulsification method has proven effective in oral medication delivery.

**Keywords**: Bioavailability, SNEDDS, oral delivery, solubilization, formulation.

**PC-1063**

**THERMOSENSITIVE CHITOSAN NANO-GEL ENABLING ACCELERATED ANTI-MIGRAINE DELIVERY OF RIZATRIPTAN**

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This study deals with the development and evaluation of a nanoparticulate in situ nasal gel of Rizatriptan benzoate for the management of acute migraine. Rizatriptan, a 5-$HT_1$ receptor agonist, exhibits low oral bioavailability (~45 %) resulting from first-pass metabolism and interactions with food. To overcome this, chitosan nanoparticles were formulated by an ionotropic gelation method and eight formulations were designed applying a $3^2$ full factorial design for optimising the chitosan and sodium tripolyphosphate (TPP) concentrations. The optimised nanoparticles exhibited a particle size of 150.86 nm, zeta potential of –6.97 mV, and encapsulation efficiency of 81.23%, suggesting good stability and drug-loading capacity. They were formulated in a thermosensitive in situ nasal gel with Poloxamer 407 as a gelling agent through the cold method. The gel showed properties like gelation temperature (32-34°C), pH (5.5-6.5), preferably viscosity for nasal delivery, and drug content of~ 85%. Cumulative per cent of drug release studies revealed more than 97% in vitro release over 8 h, which was much higher compared to that from market gel products. The




ISBN: 978-81-980623-8-3

release kinetics fitted the Higuchi model, pointing diffusion-controlled process of the drug. Results of stability study up to 30 days at 4°C and 25°C revealed insignificant changes in viscosity, pH and drug content, which confirmed the formulation's stability. This formulated in-situ nose-to-brain nanoparticles gel provides better bioavailability, rapid onset of action and increased nasal resident time. This renders it a good candidate for direct treatment of migraine with a promising therapeutic effect, despite local irritation at both injection time points. nose-to-brain delivery via olfactory and trigeminal pathways.

**Keywords**: Chitosan, Nanoparticle, Nasal Gel, Migraine, Intranasal.

**PC-1064**

**SOLUBILITY ENHANCEMENT OF ACECLOFENAC USING ANTISOLVENT CRYSTALLIZATION TECHNIQUE FOR IMPROVED TOPICAL DRUG DELIVERY**

HARSHA O INDORIYA

Aceclofenac, a widely used NSAID, has low water solubility, which reduces its bioavailability and therapeutic efficiency. In the present work, an antisolvent crystallization technique was utilized to enhance the solubility of aceclofenac for topical delivery. The drug was initially dissolved in a suitable solvent and then precipitated using an antisolvent, resulting in the formation of fine crystals with improved solubility characteristics. These optimized crystals were incorporated into a gel base and assessed for parameters such as viscosity, spreadability, and potential skin irritation. Solubility and dissolution studies demonstrated a notable improvement in solubility and a faster dissolution rate compared to pure aceclofenac. UV spectrophotometric analysis supported the enhanced dissolution, and characterization techniques confirmed the successful formation of fine, high-solubility crystals. Additionally, bath sonication contributed to better crystal formation and improved drug release.The enhanced physicochemical properties of the final formulation indicate that antisolvent crystallization is a reliable approach for increasing the solubility of aceclofenac. Overall, the results suggest considerable potential for developing improved topical gel formulations with better drug delivery and therapeutic outcomes.

**Keywords**: Aceclofenac, Solubility enhancement, Antisolvent crystallization, Topical drug delivery

**PC-1065**

**FORMULATION, OPTIMIZATION AND EVALUATION OF PROCHLORPERAZINE SOLID LIPID NANOPARTICLES IN A MUCOADHESIVE THERMOREVERSIBLE IN SITU GEL FOR INTRANASAL DELIVERY**

DEEPA CHERIAN

Prochlorperazine maleate is an antiemetic and antipsychotic agent widely used in the treatment of nausea, vomiting, psychosis, and the manic phase of bipolar disorder. Although well absorbed orally, it undergoes extensive hepatic first-pass metabolism, leading to poor bioavailability. Conventional dosage forms such as tablets, injections, and suppositories have limitations including invasiveness or poor patient compliance. Intranasal delivery offers a promising alternative route for rapid absorption and avoidance of first-pass metabolism. Prochlorperazine solid lipid nanoparticles (SLNs) were prepared using the melt emulsion ultrasonication method followed by low temperature solidification. Formulation optimization was performed using Design Expert® software, considering the effects of three formulation variables on particle size and entrapment efficiency. The optimized SLN formulation was characterized for particle size, PDI, zeta potential, entrapment efficiency, morphology, FTIR spectra, and in vitro drug release. SLNs were incorporated into a mucoadhesive thermoreversible in situ gel prepared by the cold method and evaluated for pH, viscosity, gelling temperature and time, gel strength, mucoadhesive strength, drug content, in vitro release, ex vivo permeation, histopathology, and stability. The optimized formulation showed uniform particle size with a low PDI, high entrapment efficiency, and satisfactory zeta potential indicating good stability. The in situ gel exhibited suitable gelling characteristics, viscosity, pH, and mucoadhesive strength. In vitro and ex vivo studies demonstrated sustained drug release and improved permeation through nasal mucosa without any histopathological irritation. The developed mucoadhesive thermoreversible in situ gel containing Prochlorperazine SLNs presents a promising strategy for intranasal delivery, potentially enhancing bioavailability and patient compliance.

**Keywords**: Prochlorperazine maleate, solid lipid nanoparticles, mucoadhesive in situ gel, intranasal drug delivery, thermoreversible gel

**PC-1066**

**A COMPREHENSIVE STUDY ON ORAL DISSOLVING FILMS: FORMULATION APPROACHES AND MANUFACTURING BARRIERS**

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Oral route Medicine delivery system is still considered as the most accessible and patient friendly medicine delivery route. Odf's are an innovative lozenge form that breaks down and dissolves within the oral depression. Specially, presto- dissolving oral thin flicks offer a practical result for a cases similar as those in pediatric, as well as senior population who struggle with a tablet or hard gelatin capsule ingestion. These rapid-fire- dissolving flicks are better than fast- disintegrating tablets since the ultimate have choking and frangibility issues. This medicine delivery technology offers several benefits over traditional fast-disintegrating tablets, including the capability to be used for dysphasic and schizophrenic cases and the capacity to be taken without water due to their quick decomposition and rapid-fire release of drug in the mouth. This present paper provides a brief summary of challenges, composition, expression styles and evaluation parameters employed for oral disintegrating.

**PC-1067**

**PREPARATION AND EVALUATION OF AN HERBAL GEL CONTAINING RHYNCHOSIA MINIMA (L.) DC LEAF EXTRACT**

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Medicinal plants have long contributed to traditional and modern therapeutics. In this study, Rhynchosia minima (Fabaceae) was used to develop a topical antibacterial gel with potential applications in treating skin disorders such as psoriasis, eczema, impetigo, and acne vulgaris through a cell membrane disruption mechanism. Phytochemical screening, antimicrobial and antimitotic assays, and formulation development were carried out to evaluate the extract and gel. Soxhlet extraction followed by GC–MS analysis identified 35 compounds in the leaves, with hexadecenoic acid as the marker compound responsible for antibacterial activity. The gel and extract showed inhibition zones of 18 mm and 15 mm against E. coli, respectively, compared with 20 mm for tetracycline. Maceration yielded 40 additional compounds, which were tested for in vitro antimitotic activity using the Allium assay with methotrexate as a standard. UV spectroscopy confirmed quantification of the extract in pure and gel formulations ($R^2$ = 0.9979). FTIR analysis revealed functional groups including lipids, proteins, carboxylic acids, alcohols, phenols, halogens, and phosphates (3570–610 $cm^{-1}$). DSC studies indicated molecular dispersion of the extract, with onset temperatures of 122.05 °C (leaves) and 106.66 °C (gel). Antioxidant activity using hydrogen peroxide assay showed $IC_{50}$ values of 242.217 µg/ml for the extract and 55.789 µg/ml for ascorbic acid. In vitro anti-inflammatory studies revealed protein denaturation $IC_{50}$ values of 396.898 µg/ml for the extract and 66.986 µg/ml for diclofenac sodium, while anti-proteinase activity showed $IC_{50}$ values of 394.556 µg/ml and 295.719 µg/ml, respectively. Franz diffusion studies confirmed efficient drug release, with the gel achieving 92.68% cumulative release over 9 hours. These results suggest that Rhynchosia minima-based gels are promising topical formulations with antimicrobial, antioxidant, and anti-inflammatory properties.

**Keywords**: Rhynchosia minima, Herbal gel, Antimicrobial activity, Antioxidant, Anti-inflammatory, Topical formulation

**PC-1068**

**ARTIFICIAL IN-VITRO BLOOD-BRAIN BARRIER MODEL FOR PRECLINICAL SCREENING**




ISBN: 978-81-980623-8-3

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The blood brain barrier (BBB) is an essential anatomical feature which is required to maintain the homeostasis between the blood and the brain. The BBB's regular function is required for exchange of biological molecules, balance of ions, delivery of nutrients, and to prevent the transport of toxic molecules. The difficulty of molecules passing the BBB is a significant obstacle in drug development. A simple monolayer culture of appropriate cells is a reliable drug permeation model for drug discovery studies. Xyloglucan is a polysaccharide known to upregulate tight junctions. Hence a xyloglucan film was formulated and optimized for the development of an in vitro BBB using immortalized cells. The films formed were in the range of 0.1-0.6mm. Swelling studies showed that the films absorbed and swelled in water readily with a swelling index of ~200%. Crosslinking was confirmed using FT-IR. SEM analysis determined the porosity of the film to be around 2-5µm. Cells were able to grow and adhere to the surface of the film. An in vitro model was established using normal Caco-2 cell, Caco-2 cells overexpressing P-glycoprotein and hCMEC/D3 with Trans-endothelial electric resistance values consistently above 200Ω.cm2. Drug permeability studies were carried out with model drugs and the log Papp (apparent permeability) values were calculated as a function of the slope of the graph of cumulative drug permeate vs time. These values are contrasted against the intrinsic properties of the drugs. A simple, cost-efficient in vitro artificial BBB model was developed, as a cheaper and ethical alternative for animal models.

**Keywords**: Blood-brain barrier, xyloglucan, Caco-2, P-glycoprotein, Transendothelial electrical resistance


ISBN: 978-81-980623-8-3

**PL-01**

## PROTECTIVE EFFECT OF HYLOCEREUS POLYRHIZUS FRUIT EXTRACT AGAINST ACETIC ACID-INDUCED ULCERATIVE COLITIS VIA MODULATION OF TNF-A AND OXIDATIVE STRESS

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Ulcerative colitis (UC) is a relapsing form of inflammatory bowel disease (IBD) that affects millions worldwide and typically requires long-term therapeutic management. Hylocereus polyrhizus (dragon fruit) is recognized for its medicinal properties and has been traditionally employed in the treatment of various ailments. The present study evaluated the protective effects of a hydroethanolic fruit extract of H. polyrhizus (HPFE) against acetic acid (AA)-induced UC in rats. Male Wistar rats (n=6/group) were divided into five groups. Apart from the normal control (Group I), UC was induced in all groups via a single intrarectal administration of AA (2 mL, 4% v/v in 0.9% saline) on day 6. Groups III, IV, and V received sulfasalazine (SS, 100 mg/kg, p.o.) or HPFE at doses of 200 and 400 mg/kg (p.o.), respectively, for 8 consecutive days. Following the final treatment on day 8, colonic tissues were collected for assessment of colon weight/length ratio, oxidative stress markers, tumor necrosis factor-alpha (TNF-α), and histopathological changes. HPFE treatment significantly and dose-dependently prevented body weight loss, reduced colon weight gain, and attenuated oxidative stress by normalizing levels of myeloperoxidase (MPO), malondialdehyde (MDA), catalase (CAT), glutathione (GSH), and TNF-α. Histological evaluation further confirmed protection of the mucosal and epithelial architecture, demonstrating notable ulcer healing activity. Overall, HPFE exhibited strong antioxidant and anti-inflammatory effects, effectively ameliorating experimental UC in rats. Current efforts are directed toward isolating the bioactive constituents responsible for its therapeutic potential.

**Keywords:** Hylocereus polyrhizus, Ulcerative Colitis, TNF-α, Oxidative Stress

**PL-02**

## AGMATINE INTERACTION WITH IMIDAZOLINE RECEPTOR ATTENUATES HUNTINGTON'S DISEASE ASSOCIATED DEPRESSION AND STRIATAL ASTROGLIOSIS IN RATS

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Huntington's Disease (HD) is a fatal inherited progressive neurodegenerative disorder characterized by a triad of motor incoordination, cognitive decline, and neuropsychiatric complications with subsequent loss of neurons in the striatum. Despite the knowledge of the exact cause and significant efforts of the multidisciplinary scientific community, a definitive cure for this devastating disorder remains elusive. Agmatine, a biogenic amine, has demonstrated promising pharmacological actions in neurological disorders through its interaction with imidazoline receptors. The present study was designed to investigate the influence of agmatine on striatal astrogliosis and depressive-like behaviors via its interaction with imidazoline receptors in a 3-Nitropropionic Acid (3-NP) rat model of HD. 3-NP is a selective mitochondrial toxin known to induce bilateral striatal lesions by inhibiting succinate dehydrogenase, thereby contributing to the development and progression of psychiatric comorbidities associated with HD. Rats were pre-treated with 3-NP (10 mg/kg, i.p.) on every alternate day, and from the 10th day, they continued on agmatine treatment (5 - 20 mg/kg, i.p.) up to the 32nd day of the treatment protocol. The findings of the current investigation revealed that repeated agmatine administration significantly attenuated astrogliosis, as evidenced by reduced glial fibrillary acidic protein (GFAP) expression in the striatum. Additionally, behavioral assessments demonstrated that agmatine treatment alleviated depressive-like phenotypes, suggesting a restoration of neurochemical balance. These beneficial effects of agmatine were abolished upon the injection of I1/I2 receptor antagonists, signifying its receptor-mediated mechanism. Collectively, these outcomes highlight the protective role of agmatine in mitigating glial immunoreactivity and depression-like effects through imidazoline receptor modulation.

**Keywords**: Huntington's disease, Agmatine, Astrogliosis, Depressive-like behavior, Imidazoline receptors.

**PL-03**

## EVIDENCE FOR AGMATINE AS A MOLECULAR LINK BETWEEN THE GUT-BRAIN-AXIS AND AUTISM SPECTRUM DISORDER

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Clinical evidence indicates profound disruption of the gut-brain axis (GBA) in autism spectrum disorder (ASD), encompassing dysbiotic gut microbiota, increased intestinal permeability, immune dysregulation, and neurotransmitter as well as metabolic imbalances. Importantly, ASD patients exhibit reduced systemic agmatine, a polyamine with established neuroprotective and neuromodulatory properties. Parallel preclinical findings in propionic acid (PPA) models of ASD confirm diminished agmatine levels, with exogenous supplementation alleviating behavioral abnormalities and restoring brain agmatine and BDNF in PPA and valproic acid models. Notably, agmatine has also been shown to modulate GBA in depression. Based on this, we hypothesized that exogenous agmatine administration could ameliorate ASD-associated behavioral and neurochemical impairments through GBA regulation. To test this, rats received oral PPA (250 mg/kg, PND 21-23) followed by oral agmatine (5, 10, or 20 mg/kg, PND 24-48). PPA administration induced profound GBA dysregulation, as reflected by a reduction in Lactobacillus and an increase in E. coli, a decrease in ZO-1 and occludin, and an elevated cecal index. Histopathology revealed a reduced goblet cell count and a decreased villus-to-crypt ratio. Agmatine treatment reversed these alterations, restoring microbial balance, barrier proteins, and intestinal morphology, thus affirming its role as a gut regulator. Behaviorally, agmatine rescued PPA-induced sociability deficits, cognitive impairments, and anxiety-like responses. Neurochemically, agmatine normalized elevated glutamate, restored GABA, and replenished brain agmatine depleted by PPA. Furthermore, histological alterations in hippocampus and prefrontal cortex were attenuated. These findings provide compelling preclinical evidence that agmatine reverses ASD-like phenotypes induced by PPA via modulation of the GBA, highlighting its therapeutic potential in ASD.

**Keywords:** Autism Spectrum Disorder; Gut Dysbiosis; Propionic acid; Agmatine.

**PL-04**

## AGMATINE ATTENUATES SLEEP DEPRIVATION-INDUCED MATERNAL AND OFFSPRING BEHAVIOURAL AND BIOCHEMICAL ALTERATIONS IN RATS

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Sleep deprivation (SD) is a major stressor that disrupts physiological homeostasis, impairs immune and metabolic function, and is strongly associated with anxiety, depression, and cognitive dysfunction. During pregnancy, sleep deprivation can further exacerbate neurodevelopmental vulnerabilities in offspring. Agmatine has been identified to modify sleep architecture via modulation of various neurotransmitter systems, including glutamate, GABA, noradrenaline, and serotonin. The present study investigated the role of the agmatinergic system in attenuating SD-induced behavioural and biochemical alterations in both mother and the offspring using the multiple platform model, a well-established paradigm for inducing SD in rodents. Pregnant female rats were subjected to 18 hours of SD during gestational days (GD) 12-14, a critical neurodevelopmental window. Agmatine (20, 40, and 80 mg/kg) was administered orally to mother from GD 7-21 and offspring from postnatal day (PND) 21-31. Agmatine significantly ameliorated maternal neurobehavioral complications




ISBN: 978-81-980623-8-3

induced by SD, including heightened anxiety-like behaviour, depression-like responses, impaired cognition, and altered maternal care. Offspring of SD-exposed mothers similarly exhibited behavioural impairments, accompanied by neurochemical dysregulation. Agmatine treatment also significantly improved the neurodevelopmental facets in SD-induced pups. Neurochemically, agmatine was able to reduce neuroinflammation by reducing the levels of TNF-α and IL-6 and restoring the levels of IL-10. Agmatine also significantly improved SD-induced impaired neuroplasticity by increasing brain BDNF levels. Histopathologically, agmatine restored hippocampal architecture distorted after SD. These findings collectively underscore the therapeutic potential of agmatine in mitigating SD-induced neurobehavioral and neurochemical perturbations in mother and offsprings, thereby highlighting its promise as a modulatory agent for preserving neurodevelopmental integrity.

**Keywords:** Sleep Deprivation, Maternal Behaviour, Multiple Platform Model, Agmatine.

**PL-05**

## EVALUATING CONTRIBUTING FACTORS AND ASSESSING DIABETES DISTRESS IN DIABETIC PATIENTS

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Diabetes distress (DD) is a common psychological condition in diabetic patients, resulting from the ongoing emotional and physical demands of managing diabetes. This study aims to understand the prevalence and distribution pattern of diabetic distress and its contributing factors. The study was conducted over six months duration and the data was collected with ICF from the subjects. All the data was collected by interacting with the subjects by using data collection form in the Warangal region. A total of 407 diabetic patients were evaluated using the Diabetes Distress Scale (DDS). Among them, 46% reported diabetes distress, with females (113) predominantly affected compared to males (77). All four DDS domains - Emotional Burden, Physician-Related Distress, Regimen -Related Distress, and Interpersonal Distress — were found to be statistically significant ($p<0.0001$). The present study suggests that Emotional burden (2.860 ± 0.04691) was the highest distress domain and was more prevalent among diabetic patients, followed by regimen-related distress (2.713 ± 0.04902), interpersonal distress (2.495 ± 0.06342), and physician-related distress (1.442 ± 0.03385) respectively. Physical inactivity showed a significant impact on diabetes distress, with higher mean distress scores in inactive patients (2.446 ± 0.03477) compared to active patients (2.366 ± 0.05040). A statistically significant correlation was observed between all four DDS subscales. A majority of patients experienced mild to moderate levels of distress. Our study underscores the importance of routine screening for DD in clinical practice and highlights the need for effective interventions, such as psychological support, self – management education, and a personalized care approach, that are essential for mitigating the effects of diabetic distress and promoting better health outcomes in diabetic patients.

**KEY WORDS:** Diabetic distress, Emotional burden, DDS scale, Physical inactivity, psychological health.

**PL-06**

## ENHANCED CENTRAL CHOLINERGIC TRANSMISSION AMELIORATES HEPATIC ENCEPHALOPATHY INDUCED SPATIAL MEMORY ALTERATIONS

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Hepatic Encephalopathy (HE) is associated with marked cognitive deficits along with changes in central cholinergic transmission. Therefore, the present study aimed to investigate the role of cholinergic neurotransmission in HE-induced spatial memory dysfunction using the Radial Arm Maze (RAM) and changes in brain oxidative stress markers (MDA), antioxidant defenses (SOD, CAT, GSH), expression of neurotrophic markers (BDNF, CREB, CORT) and pro-inflammatory mediators (IL-6, TNF-α) and anti-inflammatory IL-10 levels. HE was induced in rats, which were subsequently intracerebroventricularly treated with cholinergic modulators, including acetylcholine, an AChEI, physostigmine, a muscarinic receptor agonist, oxotremorine, a nicotinic receptor agonist, nicotine, an antagonist, atropine, or mecamylamine. Behavioral findings revealed that HE rats elicit more working memory errors (WME) and reference memory errors (RME), indicating spatial memory impairments with a marked increase in brain AChE activity, elevated MDA, CORT, depleted SOD, CAT, and GSH, reduced expression of BDNF and CREB, increased IL-6, TNF-α, and decreased IL-10 levels. Treatment with acetylcholine, physostigmine, oxotremorine and nicotine significantly reduced both WME and RME. Similarly, these agents significantly reduced brain AChE activity and restored SOD, CAT, and GSH, and reduced MDA levels, lowered CORT, enhanced BDNF and CREB expression, reduced the IL-6/TNF-α and increased IL-10 in HE animals, while antagonist, mecamylamine, and atropine, further exacerbated WME and RME, and deteriorated all brain biochemical changes seen in HE rats. Overall, the study demonstrates that HE-induced memory deficits can be regulated by central enhancement of cholinergic signaling via restoring AChE activity, oxidative stress balance, neurotrophic activity, and cytokine homeostasis.

**Keywords:** Hepatic Encephalopathy; Spatial Memory; Acetylcholine; Acetylcholinesterase; Radial Arm Maze; Working Memory Error; Reference Memory Error.

**PL-07**

## INVESTIGATING THE ANTI-INFLAMMATORY POTENTIAL OF PIMENTA DIOICA LEAVES USING THE CARRAGEENAN-INDUCED RAT PAW EDEMA MODEL

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Inflammation is a major pathological process underlying several acute and chronic diseases. Plant-derived bioactive compounds are being increasingly investigated as safer alternatives to synthetic drugs. Pimenta dioica (allspice) has traditional medicinal uses, yet its anti-inflammatory activity remains underexplored. To investigate the anti-inflammatory activity of aqueous and methanolic extracts of Pimenta dioica leaves using the carrageenan-induced rat paw edema model. Male Wistar rats (200–300 g) were divided into five groups. Test groups received aqueous and methanolic extracts of P. dioica leaves (400 mg/kg, p.o.), while the standard group received Ibuprofen I.P. (10 mg/kg, p.o.). Paw edema was induced by sub-plantar carrageenan injection. Paw volume was measured at 0, 1, 3, 5, and 24 hours using a digital plethysmometer. Blood samples were analyzed for C-reactive protein (CRP) as a systemic inflammatory marker. Both extracts produced a significant reduction in paw edema compared with the control. The methanolic extract exhibited the most pronounced anti-inflammatory effect, particularly at the 24th hour. The aqueous extract and Ibuprofen showed moderate activity, while the control group demonstrated persistent inflammation. CRP levels were lowest in the methanolic extract group, indicating marked systemic anti-inflammatory action. The findings suggest that Pimenta dioica leaves, particularly the methanolic extract, possess potent anti-inflammatory properties, potentially surpassing Ibuprofen under the studied conditions. These results warrant further phytochemical and mechanistic studies to establish P. dioica as a promising natural anti-inflammatory agent.

**Keywords:** Pimenta dioica, Carrageenan, Ibuprofen, C-reactive protein

**PL-08**

## SAFETY AND EFFICACY OF IPX203 IN PARKINSON'S DISEASE: THE RISE-PD OPEN-LABEL EXTENSION STUDY

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IPX203 is a novel oral extended-release formulation of carbidopa/levodopa (CD/LD) developed to address the short half-life of immediate-release CD/LD. In the phase 3 RISE-PD trial, IPX203 significantly improved "Good On" time in patients with Parkinson's disease compared with immediate-release CD/LD. To evaluate the safety and efficacy of IPX203 in an open-label extension of the pivotal phase 3 study. This 9-month extension enrolled patients who completed the randomized, double-blind trial. Key efficacy endpoints included Movement Disorder Society-Unified Parkinson's Disease Rating Scale and Patient and Clinical Global Impression scores. Adverse events (AEs) were recorded. Improvements in efficacy were maintained and dosing




ISBN: 978-81-980623-8-3

frequency and total daily dose remained stable through the trial. A total of 52.7% of patients experienced ≥1 treatment-emergent AE, mostly mild or moderate and occurred within the first 90 days of treatment. In this phase 3 open-label extension, IPX203 exhibited a favorable safety and tolerability profile and sustained efficacy of comparable magnitude to the end of the double-blind study.

**KEYWORDS:** extended release; levodopa; motor fluctuations; parkinson's diseases.

**PL-09**

## EVALUATION OF HERBAL EXTRACT IN RATS FOR MANAGEMENT OF HEMORRHOID

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In the current research, ethanolic extract of Phyllanthus niruri (EPN) was prepared and evaluated in rats for treatment of hemorrhoid. The objective of the research was to develop and evaluate herbal extract-based formulation for the management of hemorrhoid. EPN was investigated for the treatment of croton oil induced hemorrhoid in rats. Croton oil was applied into the rectum of rats through a specially designed device and development of edema within 8 hours was considered as a sign of hemorrhoid. Forty male Wistar rats weighing 250-350 g were divided in 4 test groups containing 8 rats each and a control group of 8 rats. Twenty-four hours after the induction of hemorrhoid, rats were treated for 5 days with test or standard formulation. At the end of the study, Recto-Anal coefficient (RAC) and Evans-Blue extravasation (EBE) were measured as curing parameters. The EPN (100 mg/kg) was found very effective in reducing the symptoms of hemorrhoid (RAC- 1.830, EBE- 0.082) when compared with the disease control group (RAC- 2.300, EBE- 0.156) with a significant difference ($p<0.05$). The EPN exhibited insignificant difference when compared with a standard formulation (400 mg/kg) (RAC-1.740, EBE- 0.071). It was concluded from the research that the EPN was equally effective in treating the hemorrhoid when compared with standard formulation containing extracts of seven different herbs. The marker components from the extract are identified and will be further quantified for standardization with a scope of approval from regulatory authority for marketing single extract product for management and treatment of haemorrhoidal disease.

**Keywords:** Herbal extract, haemorrhoid, Animal model, Phyllanthus niruri.

**PL-10**

## NEUROPROTECTIVE ACTIVITY OF CLEOME CHELIDONII MACERATED EXTRACT AGAINST B-AMYLOID INDUCED MEMORY IMPAIRMENT IN WISTAR RATS

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Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by memory loss, oxidative stress, cholinergic dysfunction, and accumulation of β-amyloid plaques. Plant-based neuroprotective agents represent a promising therapeutic approach. The present study aimed to investigate the neuroprotective potential of macerated extract of Cleome chelidonii leaves (CCLE) against β-Amyloid (25–35)-induced memory impairment in Wistar rats. Male Wistar rats were orally administered CCLE at doses of 100 and 200 mg/kg. Cognitive function was assessed using Morris Water Maze and Radial Arm Maze tests. Following behavioral studies, brain tissues were isolated for biochemical analysis, including estimation of oxidative stress markers, brain monoamines, and acetylcholinesterase (AChE) activity. Histopathological examinations were also performed to evaluate neuronal integrity. CCLE administration significantly ($P < 0.05$) improved behavioral performance, reversing β-amyloid-induced memory impairment. Antioxidant parameters were elevated, with a significant reduction ($P < 0.01$) in malondialdehyde levels compared with the diseased control group. A dose-dependent inhibition of AChE activity was observed, along with significant ($P < 0.05$) increases in brain monoamine levels. Histopathological analysis further confirmed neuroprotective effects, showing reduced neuronal degeneration in CCLE-treated groups. The findings demonstrate that CCLE exhibits significant neuroprotective activity against β-amyloid (25–35)-induced cognitive impairment through multiple mechanisms, including enhancement of antioxidant defence, modulation of monoamines, and inhibition of AChE activity. These results suggest the potential of Cleome chelidonii as a therapeutic candidate for AD management. Further fractionation and biological screening studies are ongoing to isolate active constituents.

**Keywords:** Cleome chelidonii, Alzheimer's disease, Neuroprotective activity, Acetylcholinesterase, Oxidative stress

**PL-11**

## "CRAB ASH EXTRACT'S CYTOTOXIC EFFECTS ON A549 LUNG CANCER CELLS"

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Lung cancer remains a leading cause of cancer mortality, necessitating the discovery of novel therapeutic agents. This study investigates the anticancer activity of crab ash extracts from the freshwater crab Barytelphusa cunicularis against the A549 human lung cancer cell line, a widely accepted model for in vitro studies. The crab specimens were collected from their native freshwater habitats and authenticated by the Zoological Survey of India. The ash was prepared through a dry ashing method and sequentially extracted with a series of solvents, including water, methanol, and ethanol, to isolate compounds with varying polarities. The cytotoxic effects of each extract were then rigorously evaluated on the A549 cells using both the MTT and trypan blue assays to comprehensively assess cell viability and proliferation. The results consistently demonstrated that the crab ash extracts exhibited significant and dose-dependent inhibition of A549 cell growth. Notably, the water extract was particularly effective, showcasing a reduction in cell viability from 45.68% at a concentration of 10 µg/ml down to a notable 30.74% at 100 µg/ml. Further instrumental analysis using UV-Visible Spectrophotometry, FTIR, and HRMS provided crucial insights into the chemical composition. These analyses suggested that the observed anticancer activity is likely attributable to bioactive components such as trace elements, minerals, and thermally stable organic compounds with antioxidant properties. These findings highlight the potential of Barytelphusa cunicularis crab ash as a natural source for developing new and effective anticancer treatments and provide a strong scientific foundation for future research aimed at isolating and characterizing the specific compounds responsible for the observed biological activity.

**Keywords:** Barytelphusa cunicularis, Crab ash, Lung cancer, A549 cells, Anticancer activity, Cytotoxicity, MTT assay.

**PL-12**

## EVALUATION OF ANTI-HYPOTHYROID ACTIVITY OF HYDROALCOHOLIC EXTRACT OF EICHHORNIA CRASSIPES IN ALBINO WISTAR RATS

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Hypothyroidism, a common endocrine disorder characterized by insufficient production of thyroid hormones, remains a global health concern with a higher prevalence among women and elderly individuals.The present study investigates the anti-hypothyroid potential of the hydroalcoholic extract of Eichhornia crassipes (water hyacinth) in albino Wistar rats. Hypothyroidism was experimentally induced in female rats using propylthiouracil (PTU), and the therapeutic efficacy of the plant extract was assessed in comparison with the standard drug levothyroxine. Serum biochemical parameters including triiodothyronine (T3), thyroxine (T4), and thyroid-stimulating hormone (TSH) levels were measured using ELISA. The results demonstrated that treatment with Eichhornia crassipes extract modulated thyroid hormone levels towards normal, suggesting a promising therapeutic role in the management of hypothyroid conditions. Further investigations are warranted to elucidate the underlying mechanisms and to validate its clinical potential.




ISBN: 978-81-980623-8-3

**Keywords**: Hypothyroidism, Eichhorniacrassipes, Levothyroxine, Propylthiouracil, Thyroid hormones.

**PL-13**

## NETWORK PHARMACOLOGY-BASED IN SILICO EVALUATION OF PHYTOCHEMICALS FROM ZIZIPHUS NUMMULARIA AS ANTI-ALZHEIMER'S AGENTS

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Alzheimer's disease accounts for 60–80% of dementia cases, making it the most prevalent form of dementia. Ziziphus nummularia is a medicinal plant with hepatoprotective, anti-inflammatory, immunostimulant, antioxidant, antibacterial, sedative, anthelmintic and anti-fertility qualities. In this study, we examined the potential of phytochemicals from Ziziphus nummularia using a network pharmacology technique. IMPPAT, the Coconut database, Phytohub version 1.4, the Medicinal Plants database, The Natural Products Atlas, Dr. Duke's Phytochemical and Ethnobotanical database and the KNApSAcK Core system databases were the sources from which the phytochemicals were obtained. SwissADME, ProTox 3.0 and CardioTOXCSM webservers were used to estimate the phytochemical's physicochemical, pharmacokinetic and toxicological profiles. Using OSIRIS Property Explorer, the drug score was predicted, and the results demonstrated the compound's druggable nature. Network modelling and enrichment analysis predicted the phytochemical's appropriate targets, which clearly indicated that they would be quite effective against Alzheimer's disease. The correlation analysis was carried out using the Gepia2 website. Molecular docking against the chosen targets (HIF1A, AKT1, and BCL2) using Autodock tools was carried out and compared with the co-crystallized ligand and standard. Nummularogenin, 5-(Tetrahydro-2–furanylmethyl)-2-heptanol and 4-(1E)-3-Hydroxy-1-propenyl)-2-Methoxyphenol were all very active against the selected targets with good binding energies and interactions, according to various in silico studies and drug scores. Therefore, Alzheimer's disease can be fought using these substances. However, further in vitro and in vivo research is required.

**Keywords:** Alzheimer's disease, Ziziphus nummularia, In silico studies, Network Pharmacology, Molecular docking

**PL-14**

## PRECLINICAL ASSESSMENT AND TISSUE DISTRIBUTION OF VODOBATINIB, A THIRD GENERATION BCR-ABL 1 INHIBITOR

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Vodobatinib (K0706) is a novel, orally bioavailable Bcr-Abl1 tyrosine kinase inhibitor designed to overcome resistance mutations, including T315I, in chronic myeloid leukemia (CML). While its clinical efficacy and safety are under evaluation, limited information is available on its preclinical ADME (absorption, distribution, metabolism, and excretion) properties and tissue distribution. To support pharmacokinetic understanding and guide clinical development, in vitro ADME studies and in vivo tissue distribution in rats were conducted. Vodobatinib exhibited low solubility in phosphate buffer (2.5 µM) but improved solubility in biorelevant media. It showed high metabolic stability in liver microsomes and hepatocytes from rats and dogs, with moderate stability in humans. Permeability assessment using MDCK-MDR1 cells indicated low efflux liability. Plasma protein binding was extensive (>99.8%) across species. Metabolism was primarily mediated by CYP3A4 (~70%), with minor contributions from CYP2C19 and CYP2D6. CYP inhibition was weak to moderate, suggesting low drug–drug interaction potential. In tissue distribution studies following oral administration (2.0 mg/kg) to male Sprague Dawley rats, vodobatinib demonstrated preferential accumulation in the liver, intestines, and kidney, with limited brain penetration. Overall, vodobatinib displays a favorable preclinical ADME profile characterized by high metabolic stability, minimal efflux liability, and selective tissue distribution. These findings provide important insight into its pharmacokinetics and support its further clinical development for CML and potentially other Bcr-Abl1–driven malignancies.

**Keywords**: Vodobatinib, ADME, tissue distribution, pharmacokinetics

**PL-15**

## RENOPROTECTION AND ANTIOXIDANT POTENTIALS OF LITSEA GLUTINOSA (LOUR) BARK AGAINST ALUMINIUM FLUORIDE INDUCED OXIDATIVE STRESS AND NEUROPATHY IN SWISS ALBINO MICE

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Litsea glutinosa (Lour) has been traditionally used for managing various ailments, including antifertility, wound healing, and antibacterial purposes. The present study aimed to investigate the nephroprotective effects of Litsea glutinosa (Lour) bark against aluminium fluoride-induced oxidative stress in Swiss albino mice.Nephrotoxicity was induced by aluminium fluoride administration in Swiss albino mice. Ethanolic and aqueous extracts of Litsea glutinosa bark were evaluated for nephroprotective potential. Biochemical parameters such as serum total protein (TP), albumin, creatinine, phosphorus, urea, and blood urea nitrogen (BUN) were estimated along with antioxidant markers, including superoxide dismutase (SOD), catalase (CAT), glutathione (GSH), total thiols, and lipid peroxidation (LPO). Histopathological analysis of kidney tissues was also performed to confirm protective effects. Treatment with both ethanolic and aqueous extracts of Litsea glutinosa bark exhibited dose-dependent nephroprotection. The extracts significantly increased serum TP and albumin levels while reducing creatinine, urea, BUN, and phosphorus levels compared to the aluminium fluoride group. Antioxidant defense was enhanced, as indicated by increased SOD, CAT, GSH, and total thiol levels, along with a marked reduction in LPO. Histopathological findings further supported these biochemical improvements. The study demonstrates that Litsea glutinosa bark extracts possess significant antioxidant and nephroprotective potential, effectively mitigating aluminium fluoride-induced oxidative stress in Swiss albino mice. These findings validate its traditional use and highlight its therapeutic relevance in kidney protection.

**PL-16**

## IMPACT OF PHARMACIST-PHYSICIAN COLLABORATIVE CARE ON BLOOD PRESSURE CONTROL IN DIABETIC PATIENTS: A PROSPECTIVE RANDOMIZED STUDY

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This study aimed to evaluate the effectiveness of a pharmacist-physician collaborative care (PPCC) model in managing blood pressure (BP) among diabetic patients, compared to standard physician-led care (PUC). Secondary objectives included assessment of cardiovascular (CV) risk, medication adherence, quality of life (QOL), hypertension-related knowledge, and self-monitoring behaviors. A 42-month prospective, randomized, open-label interventional study was conducted at a private clinic in Gandhinagar, India. A total of 206 adult patients with diabetes and uncontrolled hypertension (without target organ damage) were randomized equally into two groups: the intervention group (PPCC, n=105) and the control group (PUC, n=101). Baseline and follow-up data were collected on systolic and diastolic BP (SBP, DBP), CV risk scores, medication adherence (MMAS-4), QOL (EQ-5D-5L), and hypertension knowledge (HKLS). The PPCC group received structured education on disease management and home BP monitoring. Statistical significance was set at $p < 0.05$. The PPCC group demonstrated significantly greater improvements compared to the PUC group in multiple domains: reduction in SBP (-10.5 ± 3.2 mmHg) and DBP (-7.2 ± 2.8 mmHg), improved medication adherence (+15%), enhanced QOL scores (+20%), and increased hypertension knowledge (+25%). Additionally, self-




ISBN: 978-81-980623-8-3

monitoring practices were significantly more prevalent in the PPCC group, contributing to lower CV risk scores.
Pharmacist-physician collaborative care significantly improved blood pressure control, medication adherence, patient knowledge, QOL, and self-monitoring among diabetic patients with hypertension. These findings support the integration of collaborative care models in chronic disease management, especially for high-risk populations. Further research is warranted to assess long-term outcomes and the feasibility of broader implementation.
**Key words:** Physician Pharmacist Collaborative Care (PPCC), Blood Pressure, Diabetes, Hypertension

**PL-17**

## DRUG USE EVALUATION USING WHO CORE PRESCRIBING INDICATORS IN OUT PATIENTS AT TERTIARY CARE HOSPITAL, BHIMAVARAM

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Prescribing practices significantly influence patient compliance and the success or failure of treatment. This study examined prescriptions from various specialties to evaluate prescribing indicators based on World Health Organization (WHO) guidelines. We looked at aspects like polypharmacy, generic drug use, prescribing of antibiotics and injections, and adherence to the Essential Drug List (EDL 2013). Most departments exceeded the WHO reference value (≤3) for the average number of drugs per encounter. Nephrology had the highest average at 8.37, followed by cardiology at 5.35. This indicates a considerable level of polypharmacy and associated risks, including drug interactions, side effects, higher costs, and lower compliance. Generic prescribing was low across all specialties, ranging from just 2.91% in endocrinology to 13.55% in pulmonology, which is far below the WHO target of 100%. The use of antibiotics was mostly within the WHO limit (≤30%) except in urology (68.18%), gastroenterology (36.36%), general medicine (36%), and obstetrics & gynecology (31.14%). This suggests irrational use in those fields. Injection usage also surpassed the reference value (≤10%) in nephrology (55.40%), psychiatry (26.92%), endocrinology (18.91%), and general medicine (12%). Prescribing from the EDL was highest in psychiatry (90.34%) and pediatrics (86.11%) but fell short in orthopedics (52.70%). Overall, the study identified issues with irrational prescribing, such as polypharmacy, low rates of generic prescribing, excessive use of antibiotics and injections, and insufficient adherence to the EDL. These results highlight the need for awareness programs and rational prescribing strategies to improve drug therapy, cut costs, and enhance patient outcomes.
**Keywords:** Dug utilization pattern, CORE prescribing indicators, tertiary care hospital.

**PL-18**

## REPURPOSING OF ANTIBIOTIC AS AN MMP-2 INHIBITOR CONJUGATED WITH V7T1 APTAMER FOR ACTIVE TARGETING OF COLON CARCINOMA CELLS

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By considering parameter, of targeted drug delivery through specific proteins or genes, which may decrease the drug development timeline we have chosen MMP-2 inhibitor i.e.doxycycline hyclate as drug and V7t1 aptamer as targeting agent for anti-cancer activity. Initially, the drug was selected based on docking studies. Chemical conjugation process was used to prepare a drug and Aptamer conjugate and confirmation studies like TLC (Thin layer chromatography), Nitroprusside test, Gel electrophoresis and auto fluorescence assay also FTIR timeline studies for stability confirmation were performed. Then the conjugate was coated with pectin for achieving site specific delivery. Later the formulation was divided into 3 different forms were prepared in order to differentiate the effect between the Pure drug (Doxycycline Hyclate), Conjugate without Pectin and Conjugate pectin coated and all 3 formulations were compared with standard 5-Flurouracil. All the 4 samples were subjected to MTT assay, Apoptosis assay, Nuclear danage detection assay, Cell cycle analysis, Scratch assay, ROS assay, CAM assay and ELISA for MMP-2 and VEGF expression. All assays included positive and negative controls, and the data were compared statistically. The pectin-coated conjugate exhibited good anti-cancer activity, as the pectin coating facilitated release in the colonic region. From these findings, it can be said that this type of formulation can exhibit anti-cancer activity by incorporating an MMP-2 inhibitor. The combination of doxycycline hyclate and V7t1 aptamer exhibited synergistic activity on colon cancer cells. Thus, we can say that this type of formulation may be further considered for management of colon cancer.
**Key Words:** Doxycycline hyclate, Colon cancer, drug aptamer conjugation

**PL-19**

## OPTIMIZING MATERNAL CARE: A PROSPECTIVE STUDY ON DIABETES MELLITUS THERAPIES IN PREGNANCY

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Glycaemic control is essential in diabetes management to prevent long-term complications. Standard treatment options include insulin therapy, oral hypoglycaemic agents (OHA) and lifestyle modifications, though their comparative efficacy remains unclear. This study evaluated the effectiveness of Insulin + Lifestyle, OHA + Lifestyle, and Lifestyle Modifications alone in improving FBG and RBS levels, while also assessing complications in patients with diabetes, including subgroups of GDM and Pre-DM. A total of 60 patients were divided into three groups: Insulin + Lifestyle (n = 14), OHA + Lifestyle (n = 40), and Lifestyle Modifications alone (n = 6). Descriptive statistics were applied to determine mean, standard deviation, and range of FBG and RBS, and the Kruskal–Wallis test was used to compare treatment arms and glucose reductions from baseline. Results showed similar mean FBG levels across groups (127.43 mg/dL in Insulin + Lifestyle, 128.96 mg/dL in OHA + Lifestyle, and 126.29 mg/dL in Lifestyle Modifications). However, mean RBS was significantly higher in the Lifestyle Modifications group (203.63 mg/dL) compared to Insulin + Lifestyle (174.74 mg/dL) and OHA + Lifestyle (172.39 mg/dL) ($p = 0.040$). The Insulin + Lifestyle group showed the greatest reduction (FBG −20.93 mg/dL; RBS −47.00 mg/dL). Overall, combining insulin therapy with lifestyle modification demonstrated superior glycaemic control compared to OHA or lifestyle changes alone, supporting the need for tailored therapeutic strategies.
**Keywords:** - Gestational Diabetes Mellitus; Glycaemic Control; Insulin Therapy; Oral Hypoglycaemic Agents; Lifestyle Modification

**PL-20**

## A FIVE-YEAR PROSPECTIVE, RANDOMIZED, OPEN-LABEL STUDY OF STANDARD-DOSE VERSUS LOW-DOSE PROLONGED-RELEASE TACROLIMUS WITH OR WITHOUT ANGIOTENSIN-CONVERTING ENZYME INHIBITOR OR ANGIOTENSIN II RECEPTOR BLOCKER POST KIDNEY TRANSPLANTATION

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Novel approaches to improve long-term outcomes in kidney transplant recipients are required. Here, we present the 5-year data from a multicenter, prospective, Phase 3b trial evaluating treatment outcomes with standard (STD) or low (LOW) dose prolonged-release tacrolimus (TAC) combined with ACEi/ARB or other antihypertensive therapy (OAHT) in Canadian kidney transplant recipients. Adult de novo kidney transplant recipients were randomized 2 × 2 to STD or LOW dose TAC and ACEi/ARB or OAHT. Patients had received a first or second transplant from a living or deceased donor and had ≥ 1 human leukocyte antigen mismatch with their donor. There were 281 patients from 13 sites across Canada. Overall patient survival was 95.7% and was comparable between groups. Graft survival at study end was 89.7% in the LOW+OAHT group and 94.4%-97.1% in the other groups and BPAR, and Class II de novo donor-specific antibodies (dnDSA) were higher in the LOW+OAHT group than in the other groups. However, these differences were not statistically significant. Graft function, blood pressure (BP), and




ISBN: 978-81-980623-8-3

proteinuria were similar between the groups; however, between 2 and 5 years there was a 2-fold or greater increase in the use of ACEi/ARB in patients randomized initially to OAHT, mostly because of hypertension and proteinuria. There were no unexpected safety findings. Patients randomized to LOW TAC with renin-angiotensin system (RAS) blockade had similar outcomes at 5 years as patients treated with STD TAC with or without RAS blockade, whereas those randomized to LOW TAC without RAS blockade showed a non-significant trend towards more rejections and dnDSA TRIAL REGISTRATION: ClinicalTrials.gov identifier:

**Keywords:** clinical research/practice; graft survival; hypertension/antihypertensive treatment; immunosuppressant-calcineurin inhibitor: tacrolimus; immunosuppression /immune modulation; interstitial fibrosis and tubular atrophy; kidney transplantation/nephrology; patient survival.

**PL-21**

**OPTIMIZATION AND APPROACHES FOR THE TREATMENT OF GASTROESOPHAGEAL REFLUX DISEASE**

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Gastroesophageal Reflux Disease (GERD) is one of the most prevalent gastrointestinal disorders worldwide, caused by the reflux of gastric contents into the oesophagus due to dysfunction of the lower oesophageal sphincter. It is associated with symptoms such as heartburn, regurgitation, chest discomfort, and, in severe cases, mucosal damage. Although proton pump inhibitors (PPIs) and surgical interventions such as fundoplication are widely used, they are often limited by incomplete symptom control, high recurrence rates, long-term side effects, and complications, highlighting the need for improved therapeutic strategies. The present study focuses on the optimization of a novel method for the treatment of GERD that combines design innovation and targeted therapeutic mechanisms to restore physiological function and reduce reflux episodes. The approach emphasizes minimally invasive techniques aimed at enhancing oesophageal sphincter competency, reducing oesophageal acid exposure, and improving patient compliance. Preliminary evaluations demonstrate significant reduction in symptom severity, decreased reliance on chronic pharmacological therapy, and improved quality of life. Importantly, the optimized method offers advantages such as reduced risk of adverse events, faster recovery, and sustainability in long-term management compared to conventional options**.** These promising results suggest that this optimized therapeutic method may provide a safe, effective, and patient-friendly alternative for GERD management.

**Keywords**: Gastroesophageal reflux disease, novel, optimization, invasive therapy, reflux management.

**PL-22**

**INTEGRATIVE HERBAL FORMULATION FOR RHEUMATOID ARTHRITIS: IN VIVO, NETWORK PHARMACOLOGY, AND DOCKING INSIGHTS.**

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To formulate and evaluate an herbal bioactive preparation for the management of Rheumatoid Arthritis (RA), with emphasis on identifying molecular targets and mechanisms through network pharmacology and molecular docking approaches. An integrative methodology was adopted wherein network pharmacology was utilized to systematically identify the putative targets and pathways modulated by selected phytoconstituents. The involvement of these compounds in key signaling cascades such as NF-κB, MAPK, and JAK/STAT was analyzed. Furthermore, molecular docking studies were performed to validate binding affinities of major bioactives with pro-inflammatory mediators and cytokine receptors. Network pharmacology revealed that the bioactive compounds interact with multiple targets central to inflammation and immune regulation. Docking studies demonstrated strong binding affinities of phytoconstituents with cytokine receptors and inflammatory mediators, supporting their potential inhibitory roles. These findings provide computational evidence for the therapeutic promise of the formulation. The integrative approach combining in vivo evaluation with network pharmacology and molecular docking provides a mechanistic rationale for the therapeutic efficacy of herbal formulations in RA management. This strengthens the translational relevance of herbal bioactive compounds as safe and effective alternatives for RA treatment.

**PL-23**

**EFFECT OF WITHANIA SOMNIFERA ON ETHANOL AND NICOTINE CROSS-TOLERANCE.**

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Adaptogens are phyto medicines that can be used as a potential therapeutic target for drug addiction. Withania somnifera (Ashwagandha) have shown significant adaptogenic effects in anxiety and stress, also in many clinically proven neuronal conditions. Thus, in the present study, we investigated the effects of Withania somnifera extract on alcohol and nicotine cross-tolerance in the Swiss albino mice model. Exposure of mice to 4-days daily treatment with ethanol or nicotine and on the 5th day, assessment of tolerance with the same dose of alcohol or nicotine followed by a withdrawal period of 30 days and then assessment of cross-tolerance with a single dose of nicotine to ethanol treated mice and ethanol to nicotine treated mice. It was assessed by testing behavioral paradigms including EPM, OFT, and body temperature measurement. Furthermore, assessment of ACTH, corticosterone and CRF was evaluated in the brain homogenates. We observed that a group of animals receiving 4 days of daily alcohol, on the 5th day showed development of tolerance to anxiety-like behavior, but locomotor parameters were not affected significantly. The development of cross-tolerance was observed in a group of mice receiving a single anxiogenic dose of nicotine followed by ethanol consumption and withdrawal in EPM. The pre-treatment of WSE and its phytoconstituents before the nicotine challenge was also found to attenuates the anxiogenic effect of nicotine as revealed by an increase in OA entries in EPM. Also, a significant decrease in ACTH, CORT and CRF level was observed in the brain homogenate of mice with WSE pre-treatments. These results suggest that WSE may serve as an effective adaptogen in arresting ethanol and nicotine mediated tolerance to cross-tolerance effects and attenuating anxiety and stress levels.

**Keywords:** Withania Somnifera, Adaptogens, Phyto medicines, Nicotine Cross tolerance.

**PL-24**

**EVALUATION OF IN-VITRO SYNERGISTIC ANTIDIABETIC ACTIVITY OF DALFAMPRIDINE AND NESIRITIDE.**

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The present study investigates the in-vitro synergistic antidiabetic activity of two synthetic compounds, Dalfampridine and Nesiritide, through assessment of glucose uptake, enzymatic inhibition, and cell viability. Both agents were evaluated for their ability to inhibit key carbohydrate-metabolizing enzymes, including α-amylase, α-glucosidase, and dipeptidyl peptidase-IV (DPP-IV), as well as pancreatic lipase. Results demonstrated a concentration-dependent inhibition of α-amylase and α-glucosidase by both drugs, suggesting their potential to attenuate postprandial hyperglycemia. Mild inhibition of DPP-IV was observed, although the effect was markedly lower than that of the reference inhibitor diprotin A. Pancreatic lipase inhibition was minimal in both test compounds, with PP-4 showing moderate activity at higher concentrations, though less effective than the standard drug Orlistat. Importantly, both Dalfampridine and Nesiritide significantly enhanced glucose uptake in HPG-2 cells, with the most pronounced effect observed at 100 mg/mL. At this concentration, glucose utilization was comparable to that of the standard antidiabetic drug metformin and substantially greater than baseline activity. These findings indicate that Dalfampridine and Nesiritide exhibit promising synergistic antidiabetic potential, primarily via enhancement of cellular glucose uptake and inhibition of carbohydrate-hydrolyzing enzymes. Although their DPP-IV and lipase inhibitory effects were less pronounced, the combined pharmacological profile supports further exploration of these




ISBN: 978-81-980623-8-3

compounds as potential adjuncts in the management of type 2 diabetes mellitus.

**Keywords:** Dalfampridine, Nesiritide, antidiabetic activity, α-amylase, α-glucosidase, glucose.

**PL-25**

## STUDY OF IN VIVO IMMUNOMODULATORY AND IN VITRO ANTICANCER EFFECTS IN CONVOLVULUS PLURICAULIS, MICHELIA CHAMPACA AND CHROMOLAENA ODORATA AND IN VIVO NEPHROPROTECTIVE ACTIVITY IN PITHECELLOBIUM DULCE

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Background: Evaluation of preclinical immunomodulatory anticancer models are very crucial in the process of drug discovery and development. Dysfunctional immune system is linked with disorders like autoimmune diseases, inflammatory diseases, cancer and as a treatment immunosuppressive or immunostimulant drugs are prescribed aiming at immune system disease. Synthetic drug treatments can lead to drug induced kidney failure or nephrotoxicity which is a widespread issue and its prevalence is around 66% among older adults. Globally nephrotoxicity has become a major concern due to frequent use of drugs that are nephrotoxic and continuous intake/exposure to such drugs can cause acute and chronic kidney disease. Objective: 1. To screen the ethanolic extracts of selected three medicinal plants – CP, MC, CO and combination (COMB) of above three plants (CP+MC+CO) for in-vivo and in-vitro immunomodulatory anticancer activity to cause a total effect of extracts (combination) higher than the sum of single effect of each extract. 2. To evaluate nephroprotective activity of phytocompounds which were isolated from the methanol fractions of the bark of Pithecellobium dulce in rat model. Methodology: The extracts of CO, MC and CO were subjected for 1. In-vivo immunomodulatory models - Carbon clearance test, Delayed Type Hypersensitivity test and Haemagglutination antibody titre in albino wistar rats based on acute oral toxicity tests. 2. In-vitro anticancer potential using Sulforhodamine B (SRB) assay against breast and colon cancer cell lines at concentrations of 10, 20, 40 and 80 µg/ml. 3. Methanolic fractions of PD were subjected for cisplatin induced nephrotoxicity, gentamicin induced nephrotoxicity, and paracetamol induced nephrotoxicity. Results: The extracts of CP, MC and CO have shown effects on cellular and humoral mediated immunity thus confirming its immunomodulatory potential and inhibited percent control growth in dose dependent manner for both breast and colon cancer cell line. Pithecellobium dulce was found to exhibit nephroprotective activity. Conclusion: Considering the positive outcome in all selected models, the selected medicinal plants could be further explored for future studies. Optimization in experimental conditions or turning extracts into novel drug delivery systems can enhance the medicinal effects of the plants.

**Keywords:** Preclinical, Immunomodulatory (DTH, HAT, carbon clearance), Breast and Colon Cancer cell line, Nephrotoxicity (cisplatin, gentamicin, paracetamol)

**PL-26**

## ANTI-ARTHRITIC POTENTIAL OF SONCHUS ARVENESIS L. ETHANOLIC EXTRACT ON COMPLETE FREUND'S ADJUVANT INDUCED ARTHRITIS IN WISTAR RAT

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Rheumatoid arthritis (RA) is a chronic autoimmune disorder characterized by joint inflammation, with limited treatment options for complete recovery. This study evaluated the anti-arthritic potential of ethanolic extract of Sonchus arvenesis L. (EESA) in Complete Freund's Adjuvant (CFA)-induced arthritis in Wistar rats. Animals were divided into control, disorder control, standard (Indomethacin 2.5 mg/kg), and test groups (EESA 50 and 100 mg/kg, p.o.). Treatments were given from day 1–29. Behavioral assessments (body weight, arthritic index, rotarod, hot plate, actophotometer, plethysmometer), hematological parameters (RF, CRP, ESR, CBC), and histopathology of tibiotarsal joints were performed. EESA significantly improved locomotor activity, body weight, fall-off time, and paw withdrawal latency while reducing paw volume and arthritic score. Hematological findings showed reduced RF, ESR, CRP, WBC and increased Hb, RBC, and platelet count. Histology confirmed reduced joint damage. Findings suggest that Sonchus arvenesis L. possesses promising anti-arthritic activity, supporting its potential as a complementary therapeutic approach in RA.

**Keyword-** Rheumatoid arthritis, Complete freunds adjuvant, EESA, Plethsmometer, ESR, CRP level, RF.

**PL-27**

## ANTIBIOGRAM: STUDY TO IMPROVE DRUG RESISTANCE, INFECTION CONTROL AND THE RATIONAL ANTIBIOTIC PRESCRIPTION AT TERTIARY CARE HOSPITAL, NAMAKKAL

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Antimicrobial resistance (AMR) poses a serious threat to effective treatment of infections, largely due to irrational antibiotic use and inadequate infection control. This study at a Tertiary Care Hospital, Namakkal, aimed to develop an antibiogram to identify local resistance patterns and guide rational prescribing. A total of 1,775 clinical specimens collected over one year were processed using standard microbiological methods, and antibiotic susceptibility testing was performed according to CLSI guidelines. The results showed that Escherichia coli was the predominant isolate (about 38%), followed by Klebsiella species (27%), Staphylococcus aureus (15%), and Pseudomonas aeruginosa (8%). Among Gram-negative isolates, E. coli and Klebsiella exhibited high resistance to third-generation cephalosporins (65% and 72%, respectively) and fluoroquinolones (58% and 63%), whereas carbapenems retained better sensitivity (82% and 79%). For Gram-positive organisms, methicillin-resistant Staphylococcus aureus (MRSA) accounted for 41% of S. aureus isolates, though most remained susceptible to vancomycin and linezolid. The findings also revealed frequent empirical use of broad-spectrum antibiotics, contributing to rising resistance rates. The study concludes that establishing an antibiogram is an effective tool to monitor resistance trends, improve rational antibiotic selection, and strengthen infection control practices. Regular updates and integration with hospital antibiotic stewardship programs are strongly recommended to slow the spread of resistance and ensure optimal patient care.

**Keywords:** Antimicrobial resistance, Escherichia coli, Klebsiella, Cephalosporins.

**PL-28**

## INTEGRATIVE THERAPEUTIC APPROACHES IN PARKINSON'S DISEASE: PROTEIN AGGREGATION, IMMUNE PATHWAYS, AND FERROPTOTIC CELL DEATH

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Parkinson's disease (PD) is a complex neurodegenerative disorder characterized by progressive dopaminergic neuronal loss and pathological alpha-synuclein (α-syn) aggregation. Current therapies, such as levodopa and dopamine agonists, provide symptomatic relief but fail to modify disease progression. Thus, novel therapeutic strategies are urgently needed. Targeting α-syn aggregation remains a major focus, with monoclonal antibodies (prasinezumab, cinpanemab) and small molecules (anle138b) demonstrating potential to reduce aggregates and slow progression, though challenges such as blood–brain barrier penetration and patient heterogeneity persist. Beyond α-syn, dysregulation of leucine-rich repeat kinase 2 (LRRK2) and triggering receptor expressed on myeloid cells 2 (TREM2) implicates neuroinflammation and innate immunity in PD pathogenesis, offering additional therapeutic targets. Recently, ferroptosis, an iron-dependent cell death pathway driven by lipid peroxidation, has emerged as a critical mechanism underlying dopaminergic neuron vulnerability. Preclinical studies highlight the therapeutic potential of ferroptosis inhibitors




ISBN: 978-81-980623-8-3

(ferrostatin-1, liproxstatin-1) and iron chelators (deferiprone) in rescuing neuronal survival and mitigating motor deficits. Together, these insights underscore the need for integrative approaches that address protein aggregation, neuroinflammation, and ferroptosis vulnerability. Future efforts should prioritize biomarker-driven patient stratification, precision medicine, and combinatorial strategies capable of delivering true disease modification. Advancing such therapies offers hope for transforming PD management and improving long-term outcomes.

**Keywords**: Parkinson's disease, alpha-synuclein, LRRK2, TREM2 and ferroptosis.

**PL-29**

## IMPACT OF MDR-TB CASES ON MORTALITY RATES IN BANGALORE DISTRICT

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Tuberculosis (TB) continues to be a major global health concern, with multidrug-resistant tuberculosis (MDR-TB) emerging as a challenge to control. This study analyzed the impact of MDR-TB on mortality in Bangalore district using hospital-based data from 2019–2021. A retrospective review showed 17 MDR-TB cases out of 323 in 2019, 23 of 213 in 2020, and 117 of 258 in 2021. Deaths recorded were 51, 37, and 36, respectively. MDR-TB showed an increasing trend, though mortality remained stable, suggesting effective hospital-based management.The retrospective cross-sectional study was conducted in government hospitals across urban and rural Bangalore. Records of confirmed TB patients were classified into MDR-TB, rifampicin-resistant TB (RR-TB), and drug-sensitive TB. Data were extracted from hospital registers and patient files. Patients with incomplete details or lost to follow-up were excluded. Demographics, TB type, and treatment outcomes (cured, ongoing, default, death) were analyzed. Mortality was compared between MDR-TB and non-MDR TB cases using descriptive statistics, with subgroup analysis by age and gender.Hearby, the study concluds that the MDR-TB prevalence has shown an alarming increase in Bangalore district, though mortality has not risen proportionally. Strengthening surveillance, early detection, and timely treatment are essential to curb drug-resistant TB.

**Keywords:** Tuberculosis, MDR-TB, Mortality, Drug Resistance, Public Health

**PL-30**

## EXPLORING THE POTENT ACTION OF FERULIC ACID ALONG WITH METFORMIN IN DEHYDROEPIANDROSTERONE INDUCED PCOS IN FEMALE WISTAR RATS

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In the present study, the potent action of ferulic acid along with metformin in dehydroepiandrosterone induced PCOS in female Wistar rats was evaluated. The objective of the study was to evaluate the effects of ferulic acid, metformin and their combination in a dehydroepiandrosterone (DHEA)-induced Polycystic Ovarian Syndrome (PCOS) model in female Wistar rats. PCOS was induced by administering DHEA (6 mg/kg, subcutaneously) for 21 days. Treatments included metformin (300 mg/kg, orally), ferulic acid (100 mg/kg, orally), and their combination (300 mg/kg + 100 mg/kg) for 14 days. Parameters such as body weight, oestrous cycle, glucose tolerance, testosterone levels, and ovarian histopathology were assessed. DHEA significantly affected body weight and disrupted the oestrous cycle. Preventive therapy improved insulin sensitivity and glucose metabolism, leading to hormonal balance and mitigating PCOS symptoms. Combination treatment regulated the oestrous cycle more effectively than individual therapies, improved reproductive health, and reduced elevated testosterone levels, addressing hyperandrogenism. It also helped to manage blood glucose levels and prediabetic conditions. Ovarian tissue in the combination group showed increased folliculogenesis and enhanced vascularity, indicating improved ovarian health. Thus, it can be concluded that the ferulic acid metformin combination effectively ameliorates dehydroepiandrosterone (DHEA)-induced polycystic ovarian syndrome (PCOS) model.

**Keywords:** Polycystic Ovarian Syndrome, Ferulic acid, Metformin, Dehydroepiandrosterone, Oestrous cycle.

**PL-31**

## A COMPARATIVE STUDY ON COST AND EFFECTIVENESS OF CLOPIDOGREL AND TICAGRELOR IN ACUTE CORONARY SYNDROME PATIENTS

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Coronary artery disease (CAD) involves atherosclerotic plaque buildup in coronary arteries, restricting blood and oxygen flow to the heart, potentially leading to acute coronary syndrome (ACS). ACS encompasses conditions like ST-elevation myocardial infarction (STEMI), non-ST-elevation myocardial infarction (NSTEMI), and unstable angina (UA). This prospective observational study at a tertiary care cardiology center in Erode analyzed the cost and effectiveness of clopidogrel and ticagrelor in 188 inpatient ACS patients (above 18 years). The study aimed to identify the more cost-effective drug and measure quality of life using the Nottingham Health Profile. The cohort included 92 patients on clopidogrel (72 male, 20 female) and 96 on ticagrelor (76 male, 20 female). Age distribution showed clopidogrel use at 10.9% for 18-45 years, 63% for 45-65 years, and 26.1% for >65 years. Ticagrelor use was 23% for 18-45 years, 62.5% for 45-65 years, and 14.5% for >65 years. Cost analysis revealed clopidogrel (clopilet) averaged Rs. 7.75 per tablet, while ticagrelor (Brilinta) averaged Rs. 60 per tablet. The study concluded that ticagrelor is more effective but also more costly than clopidogrel.

**Keywords**: Coronary artery disease, acute coronary syndrome (ACS), Nottingham Health Profile, clopidogrel, Ticagrelor.

**PL-32**

## CROSS-SECTIONAL ASSESSMENT OF SLEEP QUALITY, COMORBIDITIES, AND DRUG UTILIZATION PATTERNS AMONG ADULTS

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Sleep disorders are common but underdiagnosed, contributing to poor quality of life and increased risk of cardiometabolic diseases. Screening with validated tools such as the Epworth Sleepiness Scale may help in early detection. To assess the prevalence of poor sleep quality and excessive daytime sleepiness among adults, and to explore their associations with comorbidities, lifestyle habits, and drug utilisation. A cross-sectional observational study will be conducted among approximately 200 adults (≥18 years) recruited from outpatient clinics and community health programs. After obtaining informed consent, baseline demographic, clinical, and medication data will be collected. Participants will complete a structured Sleep Questionnaire, including the Epworth Sleepiness Scale. Clinical parameters such as BMI, neck circumference, and blood pressure will also be recorded. Data will be analysed using descriptive and inferential statistics with a significance level of $p<0.05$. The prevalence of poor sleep quality is estimated at around 30%. Abnormal sleep patterns and excessive daytime sleepiness are anticipated to correlate with hypertension, diabetes, obesity, and depression. Lifestyle factors such as alcohol use, caffeine intake, smoking, and irregular sleep schedules are expected to emerge as significant predictors of sleep disturbance. This study is expected to highlight the burden of sleep disorders in adults and identify modifiable lifestyle and drug-related factors. Findings support the integration of routine sleep screening into clinical practice for early diagnosis and improved management.

**Keywords:** Sleep disorders, Epworth Sleepiness Scale, cross-sectional study, comorbidities, lifestyle factors.

**PL-33**

## NEUROPROTECTIVE POTENTIAL OF SELECTED PHYTO MOLECULES FOR THERAPEUTIC IMPLICATIONS IN ALZHEIMER'S DISEASE.

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ISBN: 978-81-980623-8-3

A significant target in the treatment of Alzheimer's disease (AD) is the inhibition of acetylcholinesterase (AChE). The need for inventive therapeutic agents has been emphasized by the limited efficacy and numerous adverse effects of common anti-acetylcholinesterase medications. Natural products have grown into a major source of potential neuroprotective agents, particularly those that come from medicinal plants. Through molecular docking, this study aimed to find out the anti-Alzheimer's potential of certain bioactive compounds, such as DSN BCN, DMC, DXN-A, and IRN, against human acetylcholinesterase (PDMB ID: 2ACE); and HDAC (PDB ID: 2ODC), which provide promising avenues for AD therapy. Using Auto Dock Vina software, molecular docking was utilized for analyzing ADMET, Lipinski's rule, and molecular docking with the goal to predict potentially selected bioactive antagonists. The significant binding affinities of all ligands that target specific amino acid residues within AChE and HDAC have been highlighted by the study's docking outcomes. Furthermore, while compared to the reference standard, BCN, DMC, and DSN revealed greater binding affinity. Good gastrointestinal absorption was shown by the positions of BCN, DMC, and DSN inside the white region among the investigated compounds.

**Keywords:** Alzheimer's disease, ADMET analysis, molecular docking, and inhibitors of AChE and HDAC.

**PL-34**

## TRACKING AND REDUCING ANTIBIOTIC OVERUSE: A 6-MONTH AUDIT AND FEEDBACK INTERVENTION IN HIGH-BURDEN DEPARTMENTS

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Antimicrobial resistance remains a critical global challenge, particularly in hospital settings where inappropriate prescribing practices contribute to the rise of antimicrobial resistance (AMR), treatment failures and increased healthcare costs. This study, conducted at Namakkal, India aimed to evaluate bacterial resistance patterns and assess the impact of a 6-month audit and feedback intervention on antibiotic prescribing and patient outcomes. A total of 153 patients were included between August 2024 and February 2025, with clinical specimens obtained from urine (35.9%), pus (28.7%), wound swabs (11.1%), and blood (7.2%). E. coli (65 isolates) emerged as the predominant pathogen, followed by Klebsiella pneumoniae (20), Staphylococcus aureus (19) and Pseudomonas aeruginosa (12). Antibiotic susceptibility testing revealed high resistance to Ampicillin (90%), Amoxicillin-Clavulanate (85%), and Ciprofloxacin (70%). Conversely, high sensitivity was observed for Meropenem (95% in E. coli, 90% in K. pneumoniae), Amikacin (90% in E. coli, 85% in K. pneumoniae), and for Gram-positive isolates, Vancomycin and Linezolid (95%). Clinical effectiveness was highest in urinary tract infections (90% day 5), followed by wound (85% day 10) and other infections (80% day 7). These highlights the crucial role of antimicrobial stewardship strategies, particularly audit and feedback thus enhancing treatment outcomes, reducing resistance emergence, and achieving cost savings in high burden hospital settings.

**Keywords:** Antibiotic resistance, Audit and feedback, antimicrobial stewardship, Escherichia coli, Broad-spectrum antibiotics

**PL-35**

## INVESTIGATING IMPACT OF CALCIUM CHANNEL BLOCKERS ON PHARMACOKINETICS OF LAPATINIB: POSSIBLE ROLE OF CYTOCHROME P450 ENZYMES AND P-GLYCOPROTEIN EFFLUX TRANSPORTERS

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Lapatinib, an oral tyrosine kinase inhibitor used to treat breast cancer, is associated with cardiotoxicity. As a result, cardioprotective agents, including calcium channel blockers, are often co-prescribed, creating a potential for pharmacokinetic interactions that need to be evaluated. This study assessed the effects of calcium channel blockers on P-glycoprotein-mediated efflux, cytochrome 3A4-regulated metabolism, and overall pharmacokinetics of lapatinib using an ex vivo everted gut sac model, an in vitro metabolic stability assay, and in vivo pharmacokinetic interaction studies in rats. Calcium channel blockers such as verapamil and nicardipine increased the apparent permeability of lapatinib by 1.92 and 1.68 folds, respectively. Further, lapatinib's metabolic clearance in human liver microsomes was decreased by 15.78 and 9.47 folds in the presence of nicardipine and diltiazem, respectively at the concentration of 100µM. In vivo, the Cmax of lapatinib was observed to be increased by 29.30% with diltiazem (25 mg/kg) and 36.76 % with nicardipine (4 mg/kg) pretreatment. However, verapamil (20 mg/kg) reduced its Cmax by 30.44%. Pre-treatment with diltiazem and nicardipine increased lapatinib exposure, while verapamil reduced it. These findings emphasize the need for careful monitoring when calcium channel blockers are co-administered with lapatinib to ensure safe and effective therapy.

**Keywords:** Lapatinib, Calcium channel blockers, CYP3A4, P-glycoprotein, Pharmacokinetic drug-drug interactions.

**PL-36**

## EVALUATION OF INSULIN INJECTION PRACTICES AND IMPACT OF EDUCATION ON INSULIN USAGE AMONG TYPE 2 DIABETES PATIENTS IN NILGIRIS

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Proper insulin injection techniques are essential for optimal insulin absorption, prevention of lipodystrophy, and avoidance of complications in patients with Type 2 Diabetes Mellitus (T2DM). However, limited data exists on injection practices among the South Indian population. This study aimed to assess insulin administration knowledge and practices among T2DM patients, identify errors, and evaluate the impact of an educational intervention. A prospective, open-label study was conducted at Government Medical College Hospital, Nilgiris, Tamil Nadu (IRB No: IRBGMC0029) among 269 T2DM patients on insulin therapy for six months. Baseline knowledge and practice were assessed using a prevalidated questionnaire. Patients received education on correct insulin administration and disposal techniques through pamphlets and pictorial aids. Post-intervention assessment showed a significant improvement in knowledge scores (Pre: 6.73 ± 1.898; Post: 9.19 ± 1.789; $t = -18.505$, $p < 0.05$). Safe needle disposal practices improved markedly, with the number of patients discarding needles in sharp containers increasing from 24% (n=66) to 57.6% (n=155) after a single educational session. The findings highlight substantial gaps in knowledge and practices regarding insulin injection techniques among T2DM patients. Educational interventions were effective in enhancing both knowledge and safe disposal behavior, emphasizing the crucial role of clinical pharmacists in diabetes education. Implementing structured insulin stewardship programs could significantly improve patient safety and glycemic control in the community, and there is a pressing need to establish such programs across India to standardize safe insulin use.

**Keywords:** Type 2 Diabetes Mellitus, Insulin Injection, Patient Education, Insulin Therapy, Safe Disposal

**PL-37**

## "PHARMACIST-LED COUNSELLING FOR DYSLIPIDAEMIA: A KNOWLEDGE, ATTITUDE, AND PRACTICES (KAP) STUDY."

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Dyslipidaemia is a significant public health issue in India and a key risk factor for heart disease. This cross-sectional study was conducted among 50 Dyslipidaemia participants from adults in Thrissur district over 2 months using a self-developed, structured questionnaire validated by subject matter experts. The instrument was developed based on a thorough review of existing literature to assess sociodemographic, the three KAP domains, and key principles of medication adherence. The study showed moderate knowledge; 52% scored adequately. Awareness about muscle pain related to statin use stood at 48%. Although the overall attitude was positive (average score: 3.85 out of 5), this did not reflect in actual practice. Only 48% of eligible respondents reported perfect medication adherence, and just 48% would seek help upon




ISBN: 978-81-980623-8-3

experiencing a potential side effect. The data were analysed using Anova ($p<0.05$) This study reveals a considerable gap between patients' positive attitudes and their real knowledge and practices. It highlights the urgent need for pharmacist-led initiatives, especially in educating patients about medication adherence and the right steps for handling adverse drug reactions. Targeted counselling from pharmacists is crucial for enhancing patient safety and improving heart health.

**Keywords**: Adverse drug reactions, Medication adherence, Patient education, Pharmacy practice

**PL-38**

**A CROSS-SECTIONAL MUAH-16 ANALYSIS OF MEDICATION ADHERENCE OF HYPERTENSIVE PATIENTS**

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Hypertension is a prevalent chronic condition where non-adherence to medication can significantly increases the risk of cardiovascular events, compromise treatment efficacy and can even increase the risk of cardiovascular mortality. No studies have been conducted so far in Thrissur on assessment of medication adherence of hypertensive patients using 16-item Medication Usage Adherence Helper (MUAH-16). This cross-sectional study was conducted among 37 hypertensive patients in a community setting over a three-month period using a structured Google Form survey. Adherence was measured using MUAH-16 scale assessing patient behaviours, routines, and self-reported barriers to taking medication, including forgetfulness, treatment complexity, and lifestyle disruptions. The study population had a mean age of 53.9 years, with a majority being female (66.7%). Results showed that forgetfulness (32%) and having a busy schedule (27%) were the most commonly cited reasons for missing medication. A significant portion of respondents (43%) reported having coexisting conditions such as diabetes, high cholesterol, or heart disease, which can complicate treatment regimens($P<0.05$). The most effective adherence strategy reported was linking medication intake with a daily routine like meals (49%). Other common aids included using a pillbox (22%) and receiving reminders from family members (14%). Despite these aids, over half of the participants (51%) admitted to sometimes forgetting to take their medication. The study demonstrates that practical barriers are significant, highlighting the need for patient education focused on simple, routine-based strategies and memory aids to improve medication adherence in the community.

**Keywords:** Barriers, Cross-Sectional Study, Hypertension, Medication Adherence, Patient Education.

**PL-39**

**POTENTIAL OF TRICHOSANTHES CUCUMERINA L. FOR MANAGING METABOLIC RELATED DISORDERS:AN INSIGHT OF IN-VITRO STUDIES**

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The Cucurbitaceae plant family's Trichosanthes cucumerina L. is a crop rich in nutritional and medicinal qualities. In numerous folkloric remedies, fruits are utilized to address various metabolic disorders such as hyperglycemia, hyperlipidemia, diabetes, and obesity. Additionally, they are traditionally employed to alleviate fever, skin disorders,bleding disorder, and hypertension, and are also employed for cardioprotective, hepatoprotective, analgesic purposes. This research aims to investigate the therapeutic potential of Trichosanthes cucumerina L. using in-vitro and method for addressing hyperlipidemia,hyperglycemia,and associated metabolic disorders, while also conducting its phytochemical profiling for quality assessment and validation of traditional claims. The hydroalcohol extract of dried Trichosanthes cucumerina L. fruit was used in this investigation. In addition to the in vitro enzyme inhibitory capability against the enzymes α-amylase, α-glucosidase,Carbonic, anhydrase and pancreatic lipase, the in vitro antioxidant capacity was investigated utilizing the DPPH and hydroxyl scavenging assay. The findings demonstrated that the fruit extract exhibits greater antioxidant activity and significant enzyme inhibition potential. Several identified metabolites in Trichosanthes cucumerina L. fruits could be responsible for the therapeutic potential linked to metabolic disorders. The results of this investigation demonstrated the potential of the traditionally significant plant Trichosanthes cucumerina L. to treat illnesses connected to metabolism. The fruit extract's phytocomponents may be in charge of the enzymes' inhibitory and antioxidant properties. Therefore, Trichosanthes cucumerina L. fruits will be helpful as alternate treatments for hyperglycemia, hyperlipidemia, and associated metabolic diseases.

**Keywords:** Trichosanthes cucumerina L., Metabolic disorders, Antioxidant activity, Enzyme inhibition, Phytochemical profiling.

**PL-40**

**IMPROVING PSYCHIATRIC CARE: PHARMACIST'S ROLE IN MEDICATION ADHERENCE"**

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This prospective interventional study was conducted over six months in the psychiatry outpatient department to evaluate the impact of clinical pharmacist interventions on prescribing patterns, follow-up trends, drug-related problems, and medication adherence among psychiatric patients. A total of 102 patients aged ≥18 years with psychiatric disorders, with or without comorbidities, were included. Among them, 59 were males and 43 were females, with the majority falling within the 31–45 years age group (37.25%). The most common psychiatric condition observed was psychosis (39.21%), followed by insomnia (13.72%), schizophrenia (12.74%), anxiety disorder (11.76%), bipolar disorder (6.86%), anger disorder (4.90%), depression (4.90%), and other psychiatric conditions (5.88%). Risperidone emerged as the most commonly prescribed antipsychotic drug, frequently combined with Trihexyphenidyl to manage extrapyramidal side effects. The pharmacist-led educational intervention focused on improving patient awareness, medication counselling, and adherence monitoring. Findings revealed that pharmacist involvement not only optimized prescribing practices but also contributed to the identification and prevention of drug-related problems, ultimately enhancing medication adherence. This emphasizes the crucial role of clinical pharmacists in bridging the gap between prescribers and patients, ensuring rational drug use, and improving therapeutic outcomes in psychiatric care. The study highlights that structured pharmacist-led interventions can significantly strengthen psychiatric management by enhancing patient safety and adherence.

**Keywords:** Psychiatric disorders, Pharmacist intervention, Antipsychotic drugs, Medication adherence

**PL-41**

**FORMULATION AND CHARACTERIZATION OF ARROWROOT STARCH–SODIUM ALGINATE MUCOADHESIVE BUCCAL FILMS OF ZOLMITRIPTAN FOR TARGETED MIGRAINE THERAPY**

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Mucoadhesive buccal films have emerged as a promising alternative to conventional oral dosage forms, especially for antimigraine therapy where rapid onset and avoidance of first-pass metabolism are critical. Plant-based polymers such as arrowroot starch (AR) and sodium alginate (SA) offer biocompatibility, cost-effectiveness, and film-forming potential.This study aimed to formulate zolmitriptan-loaded buccal films using AR starch and SA, evaluate their physicochemical and mechanical properties, and optimize polymer ratios for uniform drug release and mucoadhesion. Films were prepared by solvent casting with varying AR:SA ratios (100:0, 0:100, 50:50, 70:30, 30:70). Citric acid was incorporated to reduce starch retrogradation and glycerol as a plasticizer. Drug–excipient compatibility was confirmed through FTIR, DSC, and XRD. Films were characterized for thickness, weight variation, folding endurance, tensile strength, moisture content, surface pH, mucoadhesive strength, SEM morphology, drug content uniformity, and in-vitro drug release in phosphate buffer (pH 6.8). All formulations produced flexible, transparent, non-sticky films with acceptable mechanical strength. FTIR, DSC, and XRD confirmed no major drug–excipient interactions. AR starch films showed burst release within 10




ISBN: 978-81-980623-8-3

minutes, while SA films exhibited sustained release. The 50:50 AR:SA blend (F3) demonstrated optimal balance—uniform thickness (0.20 mm), high folding endurance (385), suitable tensile strength (2.4 kg), uniform drug content (~100%), and consistent drug release with smooth SEM surface morphology. Mucoadhesive strength improved with SA incorporation, confirming its synergistic role with starch. AR starch–SA composite buccal films present a sustainable, plant-based platform for zolmitriptan delivery in migraine therapy. The optimized 50:50 formulation achieved desirable mucoadhesion, mechanical integrity, and controlled drug release, supporting its potential for clinical translation. Future work will focus on permeability and stability studies.

**Keywords**: Arrowroot starch, Sodium alginate, Zolmitriptan, Buccal films, Mucoadhesion, Migraine therapy

**PL-42**

## EMPOWERING SAFE OTC MEDICATION USE: IMPACT OF PHARMACIST COUNSELLING AND EDUCATIONAL ZINES

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Over-the-counter medications are widely used for self-medication, providing an accessible and cost-effective way to manage minor ailments. Many patients lack proper knowledge about drug administration techniques and precautions while using OTC products such as eye-drops, topical-agents, and syrups. This reduces therapeutic effectiveness and can lead to avoidable complications. Hence, structured educational materials such as PILs, pictorial aids and zines can be crucial in improving patient knowledge and minimizing administration errors. A prospective-interventional study was conducted over 6 months, with total sample enrolment of 210 participants. Participants were randomly assigned to one of three groups: counselling only; counselling & zine; or zine only. A KAP questionnaire was filled before and after intervention. A follow-up was conducted after 1 week of the intervention to measure change in KAP. Statistical-analysis was done using MS-Excel and SPSS. The study demonstrated improvement in KAP score for all the intervention groups. Mean-difference was highest in the Counselling & Zine group (7.30), followed by the Counselling group (6.86) and the Zine group (4.11). Welch's ANOVA showed significant difference between the intervention groups (Statistic = 14.458, $p < 0.05$). The study demonstrates counselling plays a vital role in OTC medication safety through education but zines prove effective at reinforcing deep-learning and real-world practice. Participants, considered zines to be a helpful educational tool with clear visuals that made the content easy to understand thus indicating their potential for patient-education. The combination of verbal counselling with zines appeared to create the most optimal method for patient-education and responsible medication use.

**Keywords:** Over-the-counter (OTC) medications, Self-medication, counselling, education, Knowledge, Zines.

**PL-43**

## KNOWLEDGE, PRACTICE, ADHERENCE, AND RISK FACTORS OF FOOT CARE AMONG TYPE 2 DIABETES MELLITUS PATIENTS IN NILGIRIS

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Diabetic foot complications remain a leading cause of morbidity, disability, and amputations among individuals with diabetes. Poor knowledge and inadequate adherence to foot care practices significantly contribute to these adverse outcomes. This study aimed to assess the knowledge, practice, and adherence to foot care, identify risk factors for foot ulcers, and evaluate the impact of an educational intervention using a foot care pamphlet. A prospective interventional study was conducted among 383 male and female Type 2 diabetes patients aged above 30 years attending Government Medical College and Hospital, Udhagamandalam, Nilgiris, from October 2024 to March 2025. Patients with severe infections, previous history of foot ulcers, or incomplete questionnaires were excluded. Ethical clearance was obtained (IRB No: IRBGMC0070). Baseline knowledge, practice, and adherence were assessed using a validated questionnaire, followed by distribution of an educational pamphlet and reassessment after two weeks. Findings revealed that 64.3% had inadequate foot care practices, 37.8% had poor glycemic control, 31.5% were smokers, and 8.2% had peripheral vascular disease. Only 12% performed regular foot examinations, 28% dried between toes, and 26% moisturized their feet. Knowledge scores significantly improved from baseline ($M = 3.84$, $SD = 1.21$) to follow-up ($M = 7.02$, $SD = 1.60$) ($p < 0.001$). The study concludes that simple educational strategies, particularly clinical pharmacist-led counseling supported by educational materials, can effectively improve patient knowledge, encourage healthy practices, and potentially prevent diabetic foot complications, thereby reducing the risk of ulceration and subsequent amputations.

**Keywords:** Diabetic foot care, Knowledge, Practice, Adherence, Risk factors, Type 2 Diabetes mellitus, Nilgiris

**PL-44**

## PHARMACIST-LED INTERVENTIONS TO ADDRESS VACCINE HESITANCY AND IMPROVE CONFIDENCE: A COMMUNITY-BASED STUDY

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Vaccine hesitancy and low confidence in immunization services remain major barriers to coverage. This study evaluated the effectiveness of pharmacist-led counselling in reducing vaccine hesitancy and improving confidence. A pre–post interventional design was employed among 101 community participants. Baseline data on vaccine hesitancy and confidence were collected using a structured questionnaire, followed by pharmacist-led educational and counselling sessions. Post-intervention outcomes were analyzed using paired t-tests and chi-square tests. At baseline, 39.6% of participants expressed hesitancy, while only 58.4% reported confidence in vaccine safety and effectiveness. Following intervention, hesitancy decreased significantly to 17.8% ($p<0.001$), while confidence rose to 81.2% ($p=0.002$). Willingness to recommend vaccination to family increased from 52.4% to 76.2% ($p=0.004$). These findings demonstrate that pharmacist-led interventions are effective in reducing vaccine hesitancy and enhancing community confidence. Integrating pharmacists into vaccination awareness programs may be a key strategy to strengthen immunization services.

**Keywords:** Vaccination, interventional study, vaccine hesitancy, vaccine confidence, pharmacist-led counselling.

**PL-45**

## EFFECT OF ITRACONAZOLE EMULGEL ENRICHED WITH PAPAIN AND BROMELAIN HERBAL EXTRACTS TO ENHANCED DERMATOPHYTOSIS MANAGEMENT

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The risk of dermatophytosis is heightened by the growing resistance to conventional antifungal drugs, raising concerns about treatment failures and emphasizing the need for innovative therapeutic approaches. To address these challenges, Emulgel is being used which acts as dual control release system. The aim of this study is to prepare and evaluate the Itraconazole emulgel using herbal extracts named bromelain and papain represents a novel and effective approach in combating dermatophytosis. This synergistic blend not only enhances therapeutic efficacy but also increases drug permeability and to minimize potential drug resistance for the management of fungal infections. Different concentration of bromelain, papain and their combinations were used. Carbapol 934 was used as gelling agent. Neem oil and Tulsi oil were used as penetration enhancers. The herbal emulgel was prepared in three steps by formation of emulsion and gel and then obtained emulsion was mixed with the gel stage to the extent of 1:1 with gentle stirring. All the excipients were tested for compatibility studies by FTIR Spectroscopy, which revealed that there were no physical and chemical interaction occured. All the prepared emulgels showed satisfactory physicochemical properties like color, homogeneity, consistency, extrudability, spreadability and pH value. The drug release was found to be higher for




ISBN: 978-81-980623-8-3

formulations F4 (88.44 ± 0.44%) and F5 (94.59 ± 0.42%). In-vitro antifungal activities against T. rubrum, T.mentagrophytes, M. gypseum were determined by well diffusion method. The observed stability data indicated that the formulations remained stable under accelerated storage conditions. It was concluded that integrated emulgel could be a promising formulation for effective treatment of dermatophytosis after clinical studies in future. Ongoing research continues to explore its efficacy and safety.

**Keywords:** Emulgel, Itraconazole, Bromelain, Papain, Dermatophytosis.

**PL-46**

**UNDERSTANDING KNOWLEDGE, ATTITUDES, AND PRACTICE ON ALCOHOLIC LIVER DISEASE IN THE GENERAL POPULATION**

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Alcoholic liver disease (ALD) is a progressive spectrum of alcohol-induced liver injury, ranging from fatty liver to cirrhosis, and is among the most preventable causes of liver-related morbidity and mortality. Public awareness of ALD risk factors, complications, and preventive measures plays a vital role in reducing its burden. However, general population knowledge and perceptions remain underexplored. The aim of this study was to evaluate the knowledge, attitudes, and practices (KAP) related to ALD among the general population, with particular focus on awareness of risk factors, perceptions of disease seriousness, and preventive behaviors. A cross-sectional KAP survey was conducted among 107 adults over one month (05 July to 05 August) using a structured online questionnaire. The form collected demographic information along with responses on knowledge, attitudes, and practices toward ALD. The findings revealed encouraging levels of knowledge: over 80% identified alcohol as a cause of ALD, and 72% recognized its progression to cirrhosis if untreated. Preventive practices were moderately reported, with many participants undergoing liver health check-ups and maintaining healthy lifestyle habits. Attitudinal responses showed that just over half considered ALD a serious health concern, while nearly 90% supported awareness initiatives, including education for both drinkers and non-drinkers and the implementation of community programs. In conclusion, the study highlights positive awareness and favorable attitudes toward ALD in the population, though gaps in perception and preventive behaviors persist. Strengthening education, promoting routine screening, and implementing community-based programs are essential to improve liver health outcomes.

**Keywords:** Alcoholic liver disease, KAP survey, public awareness, preventive practices, liver health.

**PL-47**

**STUDIES on the EFFECT of AGMATINE in SLEEP DEPRIVATION-INDUCED ALZHEIMER'S DISEASE THROUGH the GUT-BRAIN-AXIS in MICE**

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Alzheimer's disease (AD), a progressive neurodegenerative disorder, is aggravated by chronic sleep deprivation (CSD), which disrupts the gut–brain axis (GBA), leading to neuroinflammation, cognitive impairment, and gut dysbiosis. This study explored the therapeutic potential of agmatine, a naturally occurring polyamine derived from L-arginine, in alleviating CSD-induced AD-like pathology in Swiss albino mice through modulation of the GBA. CSD was induced using the modified multiple platform method for 56 days, followed by treatment with agmatine (20–80 mg/kg), L-arginine (100 mg/kg), or probiotics ($1\times10^{10}$ cfu/ml/mouse) for 21 days. Behavioral evaluations—including the elevated plus maze, open field test, and radial arm maze—demonstrated significant improvements in anxiety-like behavior and cognitive performance in agmatine-treated mice compared to the CSD group. Biochemical and microbiological analyses revealed that agmatine restored gut microbial balance by increasing beneficial Lactobacillus and reducing pathogenic E. coli, while enhancing intestinal barrier function through upregulation of tight junction proteins (ZO-1 and occludin) and reduction of serum LPS-binding protein. These effects limited systemic inflammation and were accompanied by elevated brain agmatine levels, decreased neuroinflammatory markers, and increased brain-derived neurotrophic factor (BDNF) expression. Histological analysis further confirmed reduced tissue damage in both gut and brain. Collectively, these findings highlight the multifaceted neuroprotective role of agmatine, suggesting its potential as a promising therapeutic candidate for preventing or slowing the progression of sleep deprivation-induced Alzheimer's disease via modulation of the gut–brain axis.

**Keywords:** Agmatine, Alzheimer's disease, Sleep deprivation, Gut-brain axis, Microbiota, Neuroinflammation.

**PL-48**

**STUDY ON INVITRO ANTIOXIDANT ANTIDIABETIC ACTIVITIES OF ALCOHOL EXTRACT OF ABRUS PRECATORIOUS DRIED ROOT**

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Diabetes mellitus is a chronic metabolic disorder that affects millions of people worldwide and continues to pose a major public health challenge. Despite the availability of synthetic drugs such as sulfonylureas, biguanides, α-glucosidase inhibitors, and thiazolidinediones, their long-term use is often limited by adverse effects, drug resistance, and high cost. This has driven global interest in herbal medicines, which are traditionally valued for their therapeutic efficacy, accessibility, and safety. The present dissertation focuses on the in-vitro evaluation of antioxidant and antidiabetic activities of the alcoholic extract of Abrus precatorius (L.) dried root, a plant widely recognized in Ayurveda and Siddha systems of medicine for its pharmacological potential.A comprehensive literature review revealed over 800 medicinal plants with reported antidiabetic activity, with Abrus precatorius belonging to the Fabaceae family showing promising results in earlier studies. The root extract was prepared using Soxhlet extraction and subjected to preliminary phytochemical screening, confirming the presence of bioactive compounds such as glycosides, flavonoids, tannins, phenols, and proteins. The in-vitro antidiabetic activity was assessed through α-amylase and α-glucosidase inhibition assays, which are key enzyme systems regulating postprandial hyperglycemia. Antioxidant potential was evaluated using radical scavenging methods including DPPH and ABTS assays, which determine the free radical neutralizing capacity of plant extractsThe results demonstrated that the ethanolic extract of Abrus precatorius root exhibited significant inhibition of carbohydrate-hydrolyzing enzymes and showed dose-dependent radical scavenging activity, indicating strong antioxidant and antidiabetic properties. These findings validate its traditional use and highlight the potential of Abrus precatorius root extract as a natural therapeutic candidate in diabetes management and oxidative stress-related disorders. Further studies, including in-vivo evaluations and isolation of active constituents, are necessary to develop safe and effective formulations for clinical use.

**PL-49**

**MATERNAL THYROID AUTOIMMUNITY AND PREGNANCY OUTCOME: A STUDY ON THE ASSOCIATION BETWEEN ANTI-TPO ANTIBODIES AND PRETERM BIRTH**

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Preterm birth is a major global health concern, responsible for nearly one million neonatal deaths annually and contributing to long-term morbidity among survivors. While traditional risk factors such as infection, maternal hypertension, and adverse lifestyle habits are well recognized, recent studies suggest that autoimmune and endocrine mechanisms may also play a role. Thyroid autoimmunity, particularly the presence of anti-thyroid peroxidase (anti-TPO) antibodies, has been implicated in miscarriages, infertility, and adverse pregnancy outcomes. However, its independent role in preterm births remains unclear. This study aimed to explore the association between anti-TPO antibody levels, thyroid function markers, and preterm birth in pregnant women during the second trimester. A prospective cohort of women aged 18–45




ISBN: 978-81-980623-8-3

years was enrolled, and serum samples were analyzed for anti-TPO antibodies and thyroid function (T3, T4, and TSH) using chemiluminescent immunoassays (CLIA). Statistical analyses included Spearman's correlation and odds ratio estimation with 95% confidence interval. Elevated anti-TPO antibody levels were significantly associated with preterm birth (Spearman's ρ = 0.1626, p = 0.0266). The risk of preterm delivery increased incrementally with each unit increase in anti-TPO levels (OR 1.004; 95% CI), whereas no significant associations were observed for thyroid hormone parameters. These findings indicate that thyroid autoimmunity, independent of thyroid hormone dysfunction, may contribute to adverse obstetric outcomes in pregnant women. Incorporating anti-TPO antibody screening into routine antenatal care could enable the early identification of women at a higher risk of preterm delivery and support the development of preventive interventions aimed at improving maternal and neonatal health.

**Keywords:** Preterm Birth, Anti-Thyroid Peroxidase Antibodies, Thyroid Autoimmunity, Maternal-Fetal Health, Biomarker

**PL-50**

## RECENT ADVANTAGES & PHARMACO THERAPY FOR DERMATOLOGY (VITILIGO)

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Human skin pigmentation and melanin synthesis are incredibly variable, and are impacted by genetics, UV exposure, and some drugs. Patients' physical appearance, psychological health, and social functioning are all impacted by a sizable number of skin conditions that cause pigmentation abnormalities. Hyper pigmentation, where pigment appears to overflow, and hypo pigmentation, where pigment is reduced, are the two major classifications of skin pigmentation. Albinism, melasma, vitiligo, Addison's disease, and post-inflammatory hyper pigmentation, which can be brought on by eczema, acne vulgaris, and drug interactions, are the most common skin pigmentation disorders in clinical practice. Anti-inflammatory medications, antioxidants, and medications that inhibit tyrosinase, which prevents the production of melanin, are all possible treatments for pigmentation problems. Skin pigmentation can be treated orally and topically with medications, herbal remedies, and cosmetic products, but a doctor should always be consulted before beginning any new medicine or treatment plan. This review article explores the numerous types of pigmentation problems, their causes, and treatments, as well as the 25 plants, 4 marine species, and 17 topical and oral medications now on the market that have been clinically tested to treat skin diseases. My aim to provide you various knowledge and information about the skin disease and including Vitiligo and Sexually Transmitted Disease to make world free of its conditions and any human being loss.

**Keywords:** skin pigmentation, melanin, tyrosinase inhibitors, hypo pigmentation, hyper- pigmentation, vitiligo, skin lightening, de-pigmentation, clinical observation.

**PL-51**

## HEPATOPROTECTIVE ACTIVITY OF GREEN SYNTHESIZED SILVER NANOPARTICLES USING AQUEOUS LEAF EXTRACT OF IXORA COCCINEA IN ALBINO WISTAR RATS

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Background: Liver disorders remain a major global health concern, demanding safe and effective hepatoprotective agents. Green synthesis of nanoparticles using medicinal plants is gaining attention due to its eco-friendly approach and enhanced therapeutic potential. Objective: The present study aimed to evaluate the hepatoprotective activity of green synthesized silver nanoparticles using aqueous leaf extract of Ixora coccinea against carbon tetrachloride ($CCl_4$)-induced hepatotoxicity in Albino Wistar rats. Methods: Aqueous leaf extract of Ixora coccinea was subjected to green synthesis for silver nanoparticle formation. Albino Wistar rats were divided into groups and administered synthesized nanoparticles at doses of 200 and 400 mg/kg. Hepatotoxicity was induced using $CCl_4$. Hepatoprotective effects were assessed by biochemical estimations of serum markers (SGOT, SGPT, ALP, and bilirubin) and confirmed by histopathological analysis of liver tissue. Results: Phytochemical screening of the extract revealed the presence of bioactive compounds. Treatment with silver nanoparticles of Ixora coccinea significantly reduced serum liver enzyme levels and bilirubin in a dose-dependent manner. Histopathological examination supported the biochemical findings, showing preserved hepatocyte architecture and reduced necrotic changes compared to the $CCl_4$ control group. Conclusion: Green synthesized silver nanoparticles of Ixora coccinea demonstrated significant hepatoprotective activity against $CCl_4$-induced liver damage. These findings highlight their potential as a natural and effective therapeutic option for liver disorders, warranting further investigation.

**Keywords:** Ixora coccinea, Hepatoprotective activity, silver nanoparticles, Carbon tetrachloride, Albino Wistar rats

**PL-52**

## A COMMUNITY-BASED INTERVENTIONAL STUDY ON PHARMACIST-LED MENSTRUAL HYGIENE EDUCATION TO ENHANCE AWARENESS AND PRACTICES

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Poor menstrual hygiene among adolescent girls in urban slums remains a major public health challenge, contributing to health problems and increased school absenteeism. The present study aimed to assess the impact of pharmacist-led educational sessions on menstrual hygiene knowledge and practices among adolescent girls residing in a slum area. A six-month community-based interventional study was conducted among 101 menstruating females aged 13–45 years who had resided in the locality for at least six months and provided informed consent. A structured questionnaire was administered to evaluate knowledge, practices, and menstrual product use before and after pharmacist-led counseling. Data were analyzed using Wilcoxon signed-rank test for pre- and post-counseling comparisons, while Mann–Whitney U and Kruskal–Wallis tests assessed differences across socio-demographic variables. Chi-square tests were employed for categorical associations, and Spearman's correlation examined the relationship between knowledge and psychological distress, with $p < 0.05$ considered statistically significant. At baseline, only 19.8% of participants reported changing menstrual products every 4–6 hours and 36.6% practiced handwashing with soap. Following pharmacist-led education, significant improvements ($p < 0.001$) were observed in both knowledge and practices, with nearly all participants adopting recommended measures such as frequent changing of products, genital washing, sun-drying of cloths, and safe disposal. The findings conclude that pharmacist-led education is an effective community-based intervention that significantly improves menstrual hygiene knowledge and practices among women in slum populations.

**Keywords:** Menstrual hygiene, Adolescent girls, Slum areas, Pharmacist-led education, Community-based intervention, Knowledge, Practices, Public health, Hygiene practices, School absenteeism.

**PL-53**

## A NOVEL CLASS OF QUINOLONE-HYDRAZONE PPAR-Γ AGONISTS: PRECLINICAL EFFICACY IN TYPE 2 DIABETES

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This study presents the synthesis and preclinical evaluation of a novel series of quinolone-based hydrazone derivatives, focusing on their potential as therapeutic agents for type 2 diabetes (T2D). We identified compounds (7c) and (7e) as potent and selective peroxisome proliferator-activated receptor gamma (PPAR-γ) agonists, exhibiting concentration-dependent activation comparable to the established drug pioglitazone in both HepG2 and L6 myotube cell lines. In vivo experiments using streptozotocin (STZ)-nicotinamide-induced diabetic rats demonstrated that compound (7e) significantly improved glucose homeostasis by lowering fasting blood glucose and enhancing glucose




ISBN: 978-81-980623-8-3

tolerance. Histopathological and molecular analyses revealed that the therapeutic effects are linked to the protection of pancreatic islets and the upregulation of key metabolic genes, including PPAR-γ, Glut4, and AdipoQ, while simultaneously suppressing pro-inflammatory markers like TNF-α, IL-6, and NF-κB p65. Computational modelling, including molecular docking and 100 ns molecular dynamics simulations, provided a structural basis for the high-affinity binding of (7c) and (7e) to the PPAR-γ ligand-binding domain. These findings position compounds (7c) and (7e) as promising dual-acting candidates for T2D management, offering both improved insulin sensitivity and anti-inflammatory benefits.

**Key Words:** Quinoline-Hydrazone, PPAR-γ, Type 2 Diabetes.

**PL-54**

## INVESTIGATION ON THE ROLE OF AGMATINE IN SIMULATED MICROGRAVITY-ASSOCIATED CEREBRAL DYSFUNCTION

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Microgravity, modeled via hindlimb unloading (HU), disrupts lipid homeostasis, elevates oxidative stress, and provokes systemic inflammation, compromising metabolic and liver health. This study evaluated whether agmatine and its precursor L-arginine mitigate HU-induced pathophysiology. Adult rodents underwent HU and received agmatine (40, 80, or 160 mg) or L-arginine. Outcomes included lipid profile, oxidative stress indices, and biochemical and histopathological parameters assessed in serum and liver, pancreas, and colon tissues. Liver integrity, gut dysbiosis, and inflammatory signaling were examined via ELISAs for IL-6, IL-10, TNF-α, LPS-binding protein (LBP), and corticosterone, alongside tissue histology. Agmatine dose-dependently improved lipid metabolism, normalizing dyslipidemia and enhancing antioxidant defenses in serum and tissues. Hepatic assessments demonstrated reduced steatosis and inflammation, with preservation of liver architecture. Agmatine also attenuated dysbiosis, indicating stabilization of gut microbiota. Immunoinflammatory profiling showed decreased IL-6, TNF-α, and LBP, coupled with increased IL-10, consistent with an anti-inflammatory shift. Lower corticosterone levels suggested attenuation of HU-related stress responses. L-arginine, as a precursor, provided supportive benefits, though agmatine exhibited more pronounced effects across endpoints. Collectively, agmatine counters HU-induced metabolic dysregulation, oxidative damage, hepatic injury, and microbiome imbalance, highlighting its therapeutic promise for microgravity-associated health risks. These findings support further mechanistic studies and translational evaluation of agmatine in space medicine, including dose optimization, safety, and efficacy in prolonged microgravity.

**Keywords:** Hindlimb unloading; Metabolic dysregulations; Agmatine; Dysbiosis.

**PL-55**

## A STUDY ON KNOWLEDGE, ATTITUDE AND PRACTICE ABOUT SELF-MEDICATION AMONG RURAL POPULATION OF KALABURAGI DISTRICT

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The World Health Organization (WHO) defines self-medication as the use of drugs to treat self-diagnosed disorders or symptoms, or the continued use of prescribed drugs for chronic or recurrent conditions. This study aimed to assess the knowledge, attitude, and practice regarding self-medication in the rural population of Kalaburagi district and to evaluate the impact of an educational intervention. A six-month prospective community-based educational study was conducted using a structured questionnaire. A pre-test was followed by an educational intervention where participants were provided information leaflets about the risks of self-medication, and a post-test was administered after 14 days. Data were analysed using IBM SPSS 25.0, with paired t-test applied for statistical significance. Out of 247 participants, 145 (58.7%) were males and 102 (41.3%) females; the majority (45.8%) were aged 21–40 years, and 25.9% were labourers. The mean knowledge score significantly improved after intervention (65.1%). Findings revealed that rural respondents generally had insufficient knowledge about self-medication, with many considering it unsafe during pregnancy and for all age groups, while a few believed it could harm health. Notably, rural residents showed awareness by checking expiry dates before drug use. The study concluded that after educational intervention, knowledge, attitude, and practices regarding self-medication improved significantly.

**Keywords:** Self-Medication, World Health Organization, Rural population, Over the Counter, Adverse Drug Reactions.

**PL-56**

## AGMATINE: A POTENTIAL REGULATOR OF DYSREGULATED GUT-BRAIN AXIS IN ALZHEIMER'S DISEASE

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Alzheimer's disease (AD) is a progressive, multifaceted disease characterized by neurodegeneration, dysbiosis (altered gut microbiota composition) and dysregulated agmatine level. Gut-brain-axis (GBA) has pivotal role in regulating neuronal functions. Agmatine, a novel neuro-modulator/transmitter, exerts multiple effects on the CNS including neuroprotection, richly present in gut secreted by microbes. Present study evaluates the effect of agmatine on dysregulated GBA in AD, and to explore the agmatine's potential in the bidirectional modulation of GBA. AD was induced by single injection of streptozotocin (STZ) (3 mg/kg, ICV). Central and oral agmatine administered consecutively for 21 days to evaluate its effect on dysbiosis and AD-associated behavioral alterations. Microbial estimation was performed for Lactobacillus spp.(Beneficial microbe) and E. coli (Pathogenic microbe) in suitable media. Biochemical parameters were estimated in brain and ileum tissues. STZ treatment produced AD-like pathologies in mice behaviorally, induced dysbiosis, and reduced tight junction proteins (TJPs) in ileum and altered neuroinflammatory and oxidative stress mediators in brain. ICV and oral agmatine administration significantly attenuated depressive-like behavior as evidenced by decreased immobility time in FST, produced an anxiolytic effect in EPM and improved cognitive function in the MWM and NOR and restored dysregulated gut microbiome by increasing beneficial bacteria and reducing harmful bacteria. This treatment also reversed the biochemical alteration in the ileum by increasing TJPs and in brain by increasing anti-oxidants and reducing oxidative stress mediators. In conclusion, this study offers novel insights into modulation of the GBA by agmatine for the treatment of AD and associated complications.

**Keywords:** Alzheimer's Disease, Gut-Brain-Axis, Agmatine, Dysbiosis, STZ.

**PL-57**

## EVALUATION OF NEUROPROTECTIVE POTENTIAL OF SITAGLIPTIN IN STREPTOZOTOCIN-INDUCED ALZHEIMER'S DISEASE MODEL

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Alzheimer's disease (AD) is characterized by cholinergic deficits, cognitive decline, and neurodegeneration. Repurposing antidiabetic drugs such as Sitagliptin has shown promise in modulating neuroprotective pathways. This study aimed to evaluate the neuroprotective effects of Sitagliptin on cognitive function, anxiety-like behavior, and acetylcholinesterase (AChE) activity in a streptozotocin (STZ)-induced rat model of AD. Rats were divided into five groups: control, STZ-induced negative control, standard treatment with Rivastigmine, and low- (5 mg/kg) and high-dose (10 mg/kg) Sitagliptin groups. Cognitive and anxiety-related behaviors were assessed using the elevated plus maze, T-maze, and light/dark chamber tests. AChE activity was measured as a marker of cholinergic modulation. Sitagliptin treatment significantly improved cognitive performance and reduced anxiety-like behaviors in a dose-dependent manner. High-dose Sitagliptin produced effects comparable to Rivastigmine. Both doses reduced AChE activity, suggesting cholinergic pathway modulation as a




ISBN: 978-81-980623-8-3

possible mechanism. Sitagliptin demonstrates neuroprotective potential in AD by improving memory, reducing anxiety, and modulating AChE activity. These findings support the repositioning of Sitagliptin as a potential adjunct therapy for AD and warrant further studies exploring its effects on amyloid-beta and tau pathology.

**Keywords:** Sitagliptin, Alzheimer's disease, Streptozotocin, Acetylcholinesterase, Cognitive function

**PL-58**

**PHARMACIST-LED PHARMACOVIGILANCE AND INTERVENTIONS: PREVENTING ADRS AND DDIS IN HOSPITALIZED PATIENTS**

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Pharmacist-led pharmacovigilance plays a vital role in enhancing patient safety by ensuring early detection and prevention of adverse drug reactions (ADRs) and drug–drug interactions (DDIs), which are common yet under-recognized causes of morbidity and prolonged hospitalization. An ongoing six-month prospective study in the Medicine wards and ICU of a tertiary care hospital involves clinical pharmacists actively reviewing prescriptions, monitoring laboratory values, and participating in ward rounds to identify, assess, and manage suspected ADRs and DDIs using validated scales. So far, 120 interventions have been documented, of which 70% were ADR-related and 30% were DDI-related. The most frequent interventions included drug discontinuation (30%), dose adjustment (25%), therapeutic substitution (20%), laboratory monitoring (15%), and supportive therapy (10%), with an overall physician acceptance rate of 82%. These interventions have led to significant clinical benefits, including prevention of severe ADRs in 25 patients, resolution of DDIs in 15 cases, avoidance of ICU transfer in 10 patients, and a 2.5-day reduction in average hospital stay. Notably, nearly 48% of events were deemed preventable, underscoring the impact of proactive pharmacist involvement. A key example was the identification of a rifampin–corticosteroid interaction, where timely pharmacist intervention successfully prevented a life-threatening adrenal crisis. Overall, this ongoing study highlights that pharmacist-led pharmacovigilance significantly improves the detection and management of ADRs and DDIs, thereby reducing hospital burden and improving patient outcomes.

**Keywords:** Pharmacovigilance, Clinical pharmacist, Adverse drug reaction, Drug–drug interaction.

**PL-59**

**FEASIBILITY AND IMPACT OF PHARMACIST-LED CONTRACEPTIVES EDUCATION MICRO-SESSIONS IN COMMUNITY PHARMACY.**

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This study evaluated the viability and effects of short (5 minute) training sessions delivered by pharmacists for users of barrier and chemical contraceptives at community pharmacies in Gandhinagar and Ahmedabad. Standardized counselling was given to 58 individuals (mean age 26.7 ± 5.1 years) in a pre-post study. From a baseline mean of 5.8 ± 1.9 to 8.7 ± 1.5 out of 10, knowledge scores showed a substantial improvement ($p < 0.001$). Emergency contraception awareness grew from 48% to 85%, while knowledge of how to use condoms correctly increased from 52% to 91%. Adherence to oral contraceptives increased from 72% to 84% ($p = 0.04$). With low attrition (7%) and high feasibility reported by pharmacists, these micro-sessions are a practical and effective method to significantly improve contraceptive knowledge and safe sex practices, demonstrating strong potential for scaling up sexual health promotion in pharmacy settings.

**Keywords:** Contraceptives Education, Micro-Sessions, Community Pharmacy, Community pharmacist.

**PL-60**

**AN OBSERVATIONAL STUDY ON KNOWLEDGE, ATTITUDE, AND PRACTICE TOWARDS VACCINATION IN A COMMUNITY SETTING**

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Vaccination is a cornerstone of public health, yet hesitancy and poor awareness remain barriers to achieving optimal coverage. This study aimed to assess baseline knowledge, attitude, and practice (KAP) regarding vaccination in a community population. A cross-sectional observational survey was conducted among 101 participants using a pre-validated questionnaire. Data were analysed using descriptive statistics and chi-square tests to determine associations with sociodemographic factors. Findings revealed that 54.5% of respondents demonstrated adequate knowledge, while 45.5% lacked awareness, particularly about adult immunization. Although 61.3% expressed a positive attitude, 38.7% reported safety concerns. Only 47.5% adhered to recommended vaccination practices. Educational status was significantly associated with knowledge ($p=0.023$), while socioeconomic status correlated with practices ($p=0.041$). These results indicate substantial baseline gaps in vaccine-related awareness and practices despite relatively favourable attitudes. The findings emphasize the need for targeted, pharmacist-led interventions to address misconceptions and improve vaccination adherence.

**Keywords**: Vaccination, observational study, knowledge-attitude-practice, determinants, pharmacist role.

**PL-61**

**EFFECT OF SELECTED POLYHERBAL MIXTURES ON DIABETIC COMPLICATIONS IN ALBINO WISTAR RATS**

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Leaves of OCIMUM sanctum, AEGLE marmelos, SYZYGIUM cumini were subsequently chosen. Investigators infusions via aqueous, ethanolic, and hydroalcoholic techniques utilizing cold maceration then integrated those into three polyherbal mixtures (PHM1 in the ratio 1:2:3, PHM2 in the ratio 2:3:1, PHM3 in the ratio 3:1:2) at disparate proportions. Investigators gauged in-vitro antioxidant activity capabilities via DPPH and reducing power analyses plus examined antimicrobial properties via agar well diffusion versus ascorbic acid and ofloxacin, correspondingly. Throughout 21 days, polyherbal mixtures or metformin was utilization to treat nicotinamide, streptozotocin induced type 2 diabetic rats. In-vivo antidiabetic activity was gauged within these rats. Investigators scrutinized parameters including body weight, food as well as water ingestion, fasting blood glucose, lipid profile, liver also kidney markers, urine output. Furthermore, researchers scrutinized diabetic sequelae through these methods: wounds healed within excision models (standard: Soframycin), glycerol induced nephropathy (standard: Pioglitazone), and researchers gauged neuropathy via thermal plus cold allodynia tests (standard: Pregabalin). PHM3 displayed antimicrobial and strong antioxidant efficacy (zone of inhibition approximates ofloxacin; IC50 approximates ascorbic acid). PHM3 yielded large abatements in fasting blood glucose as well as ameliorated wound contraction in-vivo. PHM3 additionally furnished nephroprotection also analgesic effects compared to PHM1 and PHM2. Statistical analysis, using two-way ANOVA with a BONFERRONI test, confirmed significance at $p<0.05$ to $p<0.001$. Among the formulations, PHM3, which has a 3:1:2 ratio of O. sanctum, S. cumini, and A. marmelos, showed the strongest effect against diabetes and its complications.

**Key words:** OCIMUM sanctum, AEGEL marmelos, SYZYGIUM cumini, Streptozotocin, Nicotinamide e.

**PL-62**

**CURRENT TRENDS IN THE CLINICAL ASSESSMENT OF AEROALLERGENS IN ALLERGIC CONDITIONS**

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The global incidence of allergic disorders-such as asthma, allergic rhinitis, and atopic dermatitis—continues to rise, largely driven by sensitization to aeroallergens like pollen, dust mites, mold spores, and




ISBN: 978-81-980623-8-3

pet dander. Rapid urbanization, climate change, and environmental pollution have altered allergen profiles and increased disease burden. This review explores recent clinical advancements in the assessment and management of aeroallergen-induced allergic conditions. A prospective and interventional study was conducted over 6 months at Bengaluru Allergy Centre, Jayanagar. A total of 88 adult patients (18–70 years) were enrolled based on inclusion/exclusion criteria. Data were collected via structured questionnaires and review of medical records. Patient demographics, symptoms, diagnostic outcomes, treatment patterns, and quality of life (QOL) were analyzed. Data were analyzed using SPSS version 27. Descriptive statistics were applied to demographic and clinical variables. Paired sample t-tests were used to compare pre- and post-intervention QOL scores. Significance was set at $p<0.001$. Dust (80.7%) was the most common trigger, followed by pollution and indoor allergens. The most frequent aeroallergens were Dermatophagoides farinae (56.8%), D. pteronyssinus (47.7%), and Blomia tropicalis (37.5%). Common symptoms included sneezing (70.2%), itching (skin/eyes/throat), and respiratory complaints. Sublingual immunotherapy (SLIT) was used in 98.9% of patients. A significant improvement in QOL scores was observed post-treatment ($p<0.001$). The study highlights the high burden of aeroallergen-induced allergic conditions in the adult population, with dust mites being the predominant allergens. Early diagnosis and individualized treatment, especially SLIT, significantly improved patient outcomes and QOL. Comprehensive allergen identification and patient education are vital in allergy management strategies.

**Keywords:** Aeroallergens, Allergic Rhinitis, SLIT, Dermatophagoides, Quality of Life

**PL-63**

## EVALUATION OF ANTIBIOTIC USAGE AND OUTCOMES IN DIABETIC AND NON-DIABETIC PATIENTS WITH CELLULITIS

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Cellulitis is a common bacterial skin and soft tissue infection characterized by erythema, warmth, and induration. The most frequent causative organisms are Staphylococcus aureus and β-hemolytic streptococci, particularly Streptococcus pyogenes. Other pathogens, such as Escherichia coli and Pseudomonas aeruginosa, may also be involved. The condition predominantly affects the extremities and requires prompt and appropriate antibiotic therapy. To evaluate antibiotic usage patterns and clinical outcomes in diabetic and non-diabetic patients with cellulitis.A cross-sectional observational study was conducted over six months (August 2022–March 2023) in the Department of General Surgery at NRI General & Superspecialty Hospital, Mangalagiri. A total of 54 patients diagnosed with cellulitis were enrolled and categorized into diabetic and non-diabetic groups. Demographic data, antibiotic regimens, and clinical outcomes were analyzed.Among 54 patients, 28 were diabetic and 26 non-diabetic. In the diabetic group, the majority (50%) were aged 40–60 years, whereas in the non-diabetic group, 46.1% were aged 60–80 years. Male predominance was observed in both groups (75% in diabetics and 80.7% in non-diabetics). The most frequently prescribed antibiotics were cephalosporins and β-lactam/β-lactamase inhibitor combinations, often supplemented with metronidazole in complicated cases. Clinical recovery was slower in diabetic patients, with a higher incidence of recurrence and prolonged hospital stay compared to non-diabetic patients. Antibiotic therapy remains the cornerstone of cellulitis management. Diabetic patients demonstrated poorer outcomes, emphasizing the need for early diagnosis, careful selection of antibiotics, and strict glycemic control to prevent complications and improve recovery.

**Keywords:** Cellulitis, Antibiotic usage, Diabetic patients, non-diabetic patients, Clinical outcomes

**PL-64**

## ENVIRONMENTAL STRESSORS AND PHARMACY PRACTICE OUTCOMES IN TRAVEL-INDUCED MIGRAINE MANAGEMENT

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Migraine is a debilitating neurological condition often intensified by travel-related stressors such as noise, vibration, posture strain, and irregular sleep, which significantly impact patient quality of life. The aim of this study was to assess awareness of travel triggers among migraine patients, identify drug-related problems in therapy, and explore the pharmacist's role in improving management. A cross-sectional survey was conducted using a questionnaire adapted from validated migraine trigger and medication adherence scale. There is no single standardized questionnaire that directly measures travel related environmental stressors vibration, noise, posture) as migraine triggers. So it is the customised questionnaire adapted from migraine disability assessment (MIDAS) and headache impact test (HIT-6). The study was carried out in Thrissur, Kerala among 50 patients with a confirmed diagnosis of migraine. The mean age of participants was 34.8 ± 9.2 years, and males accounted for 54 percent. Travel stressors most frequently reported posture (3.9 ± 1.1, 68 percent), followed by vibration strain (3.5 ± 1.3, 54 percent) and noise (3.2 ± 1.0, 47 percent). Drug-related problems included analgesic overuse in 32 percent ($p < 0.05$), non-adherence in 29 percent ($p<0.01$). These findings demonstrate that travel stressors substantially contribute to migraine attacks and drug-related problems remain frequent. The significance of the study demonstrates that travel stressors highly influence the drug use patterns, especially overuse of analgesics and leading to potential medication non-adherence. Pharmacists play a critical role in counselling, optimizing therapy, and preventing inappropriate drug use to enhance patient outcomes. As this study was drawn on self-reported data from one region, future multicentric investigations could further validate and expand these findings.

**Keywords:** Headache, quality of life, medication adherence, travel stressors

**PL-65**

## EVALUATION OF NEUROPROTECTIVE ACTIVITY OF BACOSIDE-LOADED NANOPARTICLES IN SCOPOLAMINE INDUCED ALZHEIMER'S DISEASE IN ZEBRAFISH MODEL (DANIO RERIO)

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Alzheimer's disease (AD) is a multifactorial neurodegenerative disorder characterized by progressive cognitive decline, cholinergic dysfunction, oxidative stress, and neuroinflammation. Current pharmacological interventions provide only symptomatic relief without altering disease progression. To overcome these limitations, we explored a novel nanotechnology-based approach employing bacoside-loaded solid lipid nanoparticles (BLNPs) derived from Bacopa monnieri, a traditional nootropic herb. BLNPs were formulated using a pre-emulsion ultrasonication–solvent evaporation technique and extensively characterized by particle size analysis, zeta potential, Fourier-transform infrared spectroscopy (FTIR), and scanning electron microscopy (SEM), confirming nanoscale stability and successful drug loading. A scopolamine-induced zebrafish (Danio rerio) model of Alzheimer's disease was established to evaluate neuroprotective efficacy. Behavioural performance was assessed via T-maze and inhibitory avoidance paradigms, while biochemical assays measured acetylcholinesterase (AChE) activity, lipid peroxidation (MDA), and antioxidant enzymes (SOD, CAT, GPx). BLNP-treated zebrafish exhibited significantly improved memory retention, reduced oxidative stress, and normalized cholinergic function compared to pure bacoside and standard rivastigmine treatment. Histopathological analysis further confirmed neuronal preservation in BLNP-treated groups. Acute toxicity studies demonstrated excellent safety margins, supporting translational potential. Collectively, this study highlights that nano formulated bacosides exert superior neuroprotective effects by synergistically modulating oxidative, cholinergic, and inflammatory pathways. This innovative therapeutic strategy offers a promising platform for developing plant-based, nano-enabled interventions for Alzheimer's disease and related neurodegenerative disorders.

**Keywords:** Alzheimer's disease; Bacopa monnieri; Bacoside-loaded nanoparticles.




ISBN: 978-81-980623-8-3

**PL-66**

## NEUROPROTECTIVE ACTIVITY OF ISOLATED BIOACTIVE METABOLITES AND THEIR UNDERLYING MECHANISMS IN THE TREATMENT OF ALZHEIMER'S DISEASE

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Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by memory loss, cognitive decline, oxidative stress, and cholinergic dysfunction. Current therapies provide only symptomatic relief, thereby necessitating the search for novel neuroprotective agents. Natural bioactive metabolites have emerged as promising candidates due to their multi-targeted pharmacological actions. The present study aimed to explore the neuroprotective potential of isolated bioactive metabolites and their underlying mechanisms using computational approaches. A network pharmacology-based analysis was performed to predict the key targets and pathways associated with selected metabolites, highlighting their involvement in regulating oxidative stress, amyloid aggregation, and cholinergic signaling. Molecular docking studies further revealed strong binding affinities of these metabolites with Alzheimer's-related targets such as acetylcholinesterase, beta-secretase, and tau-related kinases, suggesting their role in modulating multiple pathological hallmarks of AD. The study provides a mechanistic basis for the neuroprotective activity of bioactive metabolites and supports their potential as multi-target therapeutic leads. Future investigations will involve in vitro and in vivo validation to substantiate their efficacy and safety in the management of Alzheimer's disease.

**Keywords:** Alzheimer's disease, bioactive metabolites, neuroprotection, network pharmacology, molecular docking

**PL-67**

## UNLOCKING ENHANCED PHYTOTHERAPY: QUERCETIN AND BARBALOIN COMBINATION COMBATS ALZHEIMER'S DISEASE INDUCED BY ALCL3

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Alzheimer's disease (AD) presents a formidable global challenge, demanding innovative therapeutic strategies. Our study investigated the enhanced neuroprotective effects of a novel combination of the phytochemicals quercetin and barbaloin in an aluminum chloride (AlCl3 )-induced rat model of AD. This research aimed to comprehensively evaluate their combined therapeutic potential on cognitive, biochemical, and cellular markers of neurodegeneration.We employed a robust research design, utilizing a comprehensive array of evaluations. Behavioral tests, including the Morris Water Maze (MWM), Elevated Plus Maze (EPM), and Rotarod, were used to assess cognitive function and motor coordination. We also measured key biochemical markers of oxidative stress (SOD, CAT, MDA, DPPH), acetylcholinesterase (AChE) activity, and total brain protein. Finally, histopathological analysis was conducted to examine neuronal integrity. Our findings reveal that AlCl3 exposure led to significant cognitive impairment and motor deficits, severe oxidative stress, elevated AChE activity, and pronounced neuronal degeneration. While quercetin monotherapy offered a degree of protection, the co-administration of quercetin and barbaloin demonstrated a significantly superior and multi-faceted therapeutic effect. This combination markedly improved cognitive performance, reversed oxidative damage, inhibited AChE activity, and preserved neuronal integrity more effectively than individual treatments. These compelling findings highlight the potential of this phytochemical combination as a potent, synergistic strategy for combating the complex pathology of Alzheimer's disease.

**Keywords:** Alzheimer's Disease (AD), Aluminum Chloride (AlCl3), Quercetin, Barbaloin

**PL-68**

## A PHARMACY PRACTICE PERSPECTIVE ON GUT HEALTH, LIFESTYLE, AND DANDRUFF SEVERITY

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Dandruff is a common scalp issue influenced by both internal and external factors. Recent findings indicate that gut bacteria, lifestyle choices—such as diet, stress, sleep, and exercise—and anti-dandruff treatments significantly affect dandruff severity. This study examined how gut-related symptoms, lifestyle factors, and treatment practices are linked to dandruff severity in adults.The study aimed to find a connection between gut symptoms—like bloating, constipation, and eating habits—and the severity of dandruff. It also looked at how lifestyle behaviors, including diet, stress management, sleep hygiene, and physical activity, affect the development and severity of dandruff. Moreover, the research assessed the effectiveness of anti-dandruff shampoos and medications in controlling dandruff, while considering their relationship with gut bacteria and lifestyle choices.From a pharmacy practice perspective, a survey was conducted among adults aged 18 and older. This survey collected information on demographics, gut symptoms, lifestyle habits, personal experiences with dandruff, and treatment methods. Participants rated their dandruff severity using adapted dermatology questions. Statistical analysis explored the prevalence and relationships among gut health, lifestyle factors, treatment methods, and dandruff severity.The findings aim to clarify how gastrointestinal symptoms, dietary choices, stress, sleep, and treatment practices relate to dandruff severity. The study concludes that dandruff severity results from interactions among gut bacteria, lifestyle, and treatments. A combined approach that improves diet, manages stress and sleep, adjusts gut bacteria, and uses medications may help control dandruff and promote scalp health.

**Keywords:** Seborrheic dermatitis, gastrointestinal microbiome, lifestyle, therapeutics.

**PL-69**

## DEVELOPMENT OF ANTIBIOGRAM OF SECONDARY CARE HOSPITAL, GUJARAT

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Antimicrobial resistance (AMR) represents a major challenge in clinical practice, particularly in secondary care hospitals where empirical therapy is often initiated before culture results are available. The development of an antibiogram provides essential evidence to guide rational prescribing and improve antimicrobial stewardship. This study aimed to develop an antibiogram for a secondary care hospital by analysing the antimicrobial susceptibility profiles of clinical isolates. Data were collected through the hospital microbiology laboratory and prospectively collected data on blood, urine, sputum, pus, and tissue specimens processed during the study period. For each commonly encountered pathogen, susceptibilities were correlated with routinely used agents (e.g., cephalosporins, fluoroquinolones) and ICU/life-saving drugs (e.g., aminoglycosides, carbapenems, vancomycin, linezolid). Results were stratified by patient sex (male/female) to evaluate differences in organism distribution and resistance–sensitivity patterns. A total of 740 clinical samples were analysed, with Escherichia coli identified as the most frequent pathogen (≈45%), followed by Klebsiella pneumoniae, Pseudomonas aeruginosa, and Staphylococcus aureus. mong Gram-negative isolates, resistance to cephalosporins and fluoroquinolones was high (60–70%), while aminoglycosides retained 70–80% sensitivity and carbapenems showed 75–85% efficacy. Pseudomonas aeruginosa demonstrated >65% resistance to fluoroquinolones but remained around 70% sensitive to piperacillin–tazobactam and carbapenems. For Gram-positive isolates, Staphylococcus aureus exhibited >70% resistance to penicillin and macrolides, whereas vancomycin and linezolid preserved nearly 100% sensitivity. Sex-wise trends revealed higher urinary infections in females and bloodstream and respiratory infections in males. These findings emphasize the urgent need for regular antibiogram updates to guide empirical therapy, strengthen antimicrobial stewardship, and support better clinical decision-making in secondary care hospitals.




ISBN: 978-81-980623-8-3

**Keywords:** Antibiogram, Secondary Care Hospital, Empirical Therapy, Antimicrobial Stewardship.

**PL-70**

## ADVANCEMENTS IN ADJUVANT-BASED VACCINES: MECHANISMS OF IMMUNE MODULATION, DEVELOPMENT APPROACHES, AND EMERGING TRENDS FOR NEXT-GENERATION IMMUNIZATION AGAINST CANCER

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Vaccine adjuvants have emerged as indispensable components of modern immunization approaches, offering the ability to enhance, modulate, and sustain immune responses against a wide spectrum of cancer. Traditional adjuvants such as aluminum salts remain widely used, yet recent advancements in oil-in-water emulsions, nanoparticle systems, Toll-like receptor (TLR) agonists, cytokine modulators, and novel biomaterial-based platforms have expanded the horizon of vaccine design. These adjuvants function through multiple mechanisms, including improved antigen presentation, activation of pattern recognition receptors, modulation of cytokine and chemokine signalling, and establishment of depot effects for sustained antigen release, thereby bridging innate and adaptive immunity. Despite these advances, challenges such as safety, stability, and formulation complexities persist, demanding innovative strategies to balance efficacy with tolerability. Emerging approaches, including multi-adjuvant combinations and precision-engineered nanocarriers, highlight the transition toward next-generation vaccines capable of tailoring immune responses to specific disease contexts. Clinical translation has already been realized in several licensed vaccines, underscoring the clinical and public health relevance of adjuvant technologies. Integration of systems immunology, synthetic biology, and biomaterials engineering holds promise for developing personalized and durable vaccines against both established and emerging health threats. This review provides comprehensive insights into the mechanisms, design strategies, clinical applications, and future trends of adjuvant-based vaccines, emphasizing their pivotal role in shaping next-generation immunization platforms for infectious diseases and cancer.

**Keywords:** Prophylactic Vaccine, Immunization, Toll like receptor, Nanoparticle, CAR-T cell Therapy.

**PL-71**

## KNOWLEDGE, ATTITUDE & PRACTICE OF ANEMIA AMONG PREGNANT WOMEN IN A TERTIARY CARE HOSPITAL OF NAMAKKAL DISTRICT, TAMIL NADU.

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Anemia during pregnancy remains a major global public health concern particularly in developing countries, where it contributes significantly to maternal and fetal morbidity. The present study was conducted to assess the knowledge, attitude and practices (KAP) related to anemia among pregnant women attending a tertiary care hospital in Namakkal district, Tamil Nadu. A prospective observational design was performed by enrolling 60 pregnant women aged 18–35 years. Data were collected using a structured questionnaire that included socio-demographic details, medical history and KAP components. Statistical analysis was performed to identify patterns and gaps. The results revealed that 58% of participants had previously been diagnosed with anemia, yet only 66.7% demonstrated a basic understanding of the condition. Awareness regarding specific causes such as poor diet, pregnancy-related risks and short birth intervals was inadequate. Although 72.4% acknowledged the role of diet in prevention, misconceptions persisted with 63.6% unaware of the inhibitory effect of tea and coffee on iron absorption. Preventive practices showed mixed results: 62.8% reported regular iron supplement intake, while irregular or non-adherence was mainly due to forgetfulness, side effects or perceived lack of necessity. Only 56.6% attended regular antenatal check-ups and awareness of free iron tablet distribution was low (7.7%). Overall, the study highlighted moderate awareness, average attitudes, but inconsistent preventive practices. The findings underscore the urgent need for strengthened antenatal counseling, nutritional education and effective communication about government supplementation programs. Enhancing awareness and addressing practice gaps can significantly reduce anemia-related complications and improve maternal and neonatal outcomes.

**Keywords:** Anemia, Pregnancy, Knowledge, Attitude, Practice.

**PL-72**

## ENHANCED HISTAMINERGIC TRANSMISSION AMELIORATES SINGLE PROLONGED STRESS-INDUCED SPATIAL MEMORY ALTERATION

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Post-traumatic stress disorder (PTSD) is increasingly acknowledged as a contributor to spatial memory deficits, a cognitive disturbance often accompanied by changes in central histaminergic transmission. Despite histamine's established involvement in diverse cognitive functions, its specific role in stress-induced spatial memory dysfunctions is still unclear. In this study, mice subjected to single prolonged stress (SPS), a widely used animal model for PTSD, displayed considerable spatial memory impairments, reflected by increased reference and working memory errors in the radial arm maze paradigm. central histaminergic modulation, various histaminergic agents were administered intracerebroventricularly (i.c.v.) on days 1st and 7th post-SPS, including histamine, L-histidine, H1 agonist FMPH, H2 agonist amthamine, H1 antagonist cetirizine, H2 antagonist ranitidine, and H3 inverse agonist thioperamide. The results revealed that histamine-enhancing agents, particularly at higher doses, significantly alleviated both reference and working memory deficits on the seventh day, whereas no significant benefit was observed immediately post-SPS on the first day. However, the H3 receptor inverse agonist thioperamide reversing SPS-induced spatial memory deficits at both the 1st and 7th days, underscoring the unique relevance of H3 modulation in trauma-related memory dysfunction. Antagonism of H1 and H2 receptors by cetirizine and ranitidine did not show any significant effect on reference and working memory errors. These findings collectively suggest that central histamine transmission, especially via H1, H2, and H3 receptor stimulation, offers a promising avenue for mitigating SPS-induced spatial memory.

**Keywords:** PTSD; histamine; single-prolonged stress; histamine receptors; spatial memory.

**PL-73**

## AGE AND GENDER BASED COMPARISON OF GLYCEMIC PARAMETERS IN DIABETES MELLITUS

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Diabetes Mellitus a chronic metabolic disorder characterized by hyperglycemia and impaired glucose regulation involving Glycated Hemoglobin (HbA1c), Fasting Blood Glucose (FBG), Postprandial Blood Sugar (PPBS), Serum Insulin Fasting, Estimated Average glucose (EAG) being key biomarkers for assessment. The objective is to evaluated the association of age and gender with glycemic parameters and to determine it at different age group. Cross sectional study was done by collecting the data from Green Cross Laboratory and Article Pathology Laboratory which involve 1827 number of patient in which 878 females and 949 male. Data categorized on age and gender, statistical evaluation was done for Glycated Hemoglobin, Estimated Average Glucose, Fasting Blood Sugar, Post Prandial Blood Sugar, Serum insulin fasting. On evaluation males tend to have higher glucose levels (HbA1c, EAG, FBG, PPBS) whereas females show higher serum insulin levels. With age, both genders show rising glucose parameters (HbA1c, EAG, FBG, PPBS). Females show marked increases around post -menopausal age, while males peak earlier (HbA1c/EAG at 60-69 years, PPBS at 30-39 years). S.Insulin peaks earlier in females (50-59 years) but later in males (70-79). Interpreting males are more prone to hyperglycemia compared with females who shows compensatory higher insulin response.




ISBN: 978-81-980623-8-3

**KEY WORDS:** Diabetes Mellitus, Glycated Hemoglobin, Fasting Blood Glucose, Post Prandial Blood Sugar, Estimated Average Glucose, Serum Insulin Fasting, Age, Gender

**PL-74**

## NEPHROPROTECTIVE EFFECT OF IXORA JAVANICA EXTRACT AGAINST GENTAMICIN-INDUCED NEPHROTOXICITY IN WISTAR RATS

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Ixora javanica DC. (Rubiaceae), widely distributed across India, is valued in traditional medicine for its therapeutic applications. This research systematically investigates its botanical, phytochemical, and pharmacological attributes with emphasis on antioxidant and nephroprotective activities. Morphological examination highlighted diagnostic traits such as scarlet tubular flowers, opposite coriaceous leaves, and dense corymbose inflorescences. Phytochemical analysis confirmed the presence of alkaloids, flavonoids, tannins, glycosides, saponins, and steroids, indicating a rich reservoir of bioactive compounds. Antioxidant assays demonstrated significant radical scavenging activity, strongly associated with elevated phenolic and flavonoid content. In vivo studies using gentamicin-induced nephrotoxicity models in Wistar rats revealed that I. javanica extracts markedly improved renal function biomarkers, including reductions in serum creatinine, urea, and blood urea nitrogen, alongside restoration of endogenous antioxidant enzymes such as superoxide dismutase, catalase, and glutathione. Histopathological evaluation corroborated the protective effect by demonstrating preserved renal architecture in treated groups. These findings substantiate the ethnomedicinal claims of I. javanica and highlight its potential as a natural therapeutic agent against oxidative stress–related renal dysfunction. This thesis advances pharmacognostic understanding of the species and positions it as a promising candidate for future drug discovery, encouraging further phytochemical isolation, mechanistic exploration, and translational research.

**Keywords**: Ixora javanica, Gentamycin, Nephroprotective, Antioxidant and Phytochemical

**PL-75**

## OPTIMISING CARDIOVASCULAR DISEASES IN PHARMACOVIGILANCE

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Cardiovascular diseases are the leading cause of morbidity and mortality worldwide. Pharmacovigilance play a critical role in detecting, assessing, preventing and managing adverse drug reactions, associated with cardiovascular diseases like anticoagulants, lipid – lowering agents. Optimization is required to reduce drug related risks and improve patient safety. Optimizing cardiovascular drug related vigilance involves proactive monitoring to identity and mitigate adverse drug events in cardiac patients, who are susceptible to drug interactions due to polypharmacy. Optimization requires artificial intelligence and machine learning for safety signal detection, incorporating real world data and big data analytics, enhancing patient and healthcare professional engagement, and implementing early intervention strategies to minimize risks and burden of cardiac diseases.

**Keywords:** pharmacovigilance, cardiovascular diseases, adverse drug reactions

**PL-76**

## PHARMACIST LED APPROACH TO DETECTION AND AWARENESS OF ANAEMIA IN A COMMUNITY SETTING

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Anaemia is a major global public health burden that compromises physical capacity, and cognitive performance, particularly among women of reproductive age, yet it often remains undetected in community settings. This cross-sectional study was conducted over a short period among 35 participants recruited from a community pharmacy using a structured pharmacy-based questionnaire delivered through Google Forms. The questionnaire captured demographic variables, symptom profiles, dietary practices, lifestyle habits, comorbidities, and supplement use, allowing quantifiable assessment of risk indicators and awareness. Calculating responses across these domains enabled correlation of lifestyle determinants with anaemia-related manifestations. Results showed that 58% of participants reported fatigue, 42% dizziness, and 35% pallor, while 47% of women identified heavy menstrual bleeding as a contributory factor. Inadequate intake of green leafy vegetables, fruits, and legumes was reported by 62%, and 39% consumed tea or coffee immediately after meals, suggesting interference with iron absorption. Poor hydration and fewer than seven hours of sleep were observed in 54% of symptomatic respondents. Supplement adherence was suboptimal, with 46% reporting irregular or discontinued use due to gastrointestinal side effects. Women with multiple pregnancies or recent childbirth demonstrated higher prevalence of anaemia-related symptoms compared with nulliparous participants. These findings confirm that pharmacy-based screening is a feasible and accessible approach for identifying at-risk individuals and correlating lifestyle and dietary patterns with clinical burden. The study underscores the vital role of pharmacists in early detection, patient education, and timely referral, thereby enhancing awareness and contributing to improved prevention and management of anaemia at the community level.

**Keywords:** Community health**,** Iron deficiency, Nutritional assessment, Risk factors, Supplement adherence.

**PL-77**

## CROSS-SECTIONAL STUDY ON SUPPLY CHAIN MODELS EXISTING IN THE SELECTED COMMUNITY PHARMACIES OF PUNE CITY

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Pharmacies play a crucial role in society by providing a wide range of healthcare products. An uninterrupted supply chain model will help achieve excellence in pharma services. Hence, this study was conducted to examine the SCM and various significant Parameters/Key challenges in randomly selected community pharmacies (CPs) over a period of 6 months, Expert Approved questionnaires administered through both physical visits and electronically. The data were subjected to descriptive statistics. The results of this study showed the mean age of the Pharmacists was 36.87 ± 8.66. Males comprised 90%, and pharmacy owners were 92.5%. Only 2.5% had > 15 years of experience. 75% Pharmacies showed a hybrid model (combinations of green, agile, and lean) for 95% of the allopathic products. The satisfactory responses in SCM challenging sub-parameters are 1) Finance-related: Asset Management (80%), Sales (92.5%), Contribution margin (92.4%), Costs (90%), Financial profitability (90%), Costs of Return (90%), and Logistics costs (67.5%). 2) Velocity: Punctuality (90%), Compliance (67.5%), Delivery Performance (75%), Time management (90%), Speed (87.5%), Lead time (90%), Responsiveness (85%), Flexibility (90%). 3) Sustainability: Environmental ethics (82.5%), Recyclability (67.5%), Return of items (72.5%). 4) Quality parameters: Reliability (82.5%), Quality (87%), Legal compliance (77.5%), Availability (82.5%), System Outputs (72.5%), Trust (82.5%), Service (90%). 5) Resource utilization: Resource (87.5%), Inventory (85%), Transport measurements (87.5%), Logistics measurements (87.5%), Internal processes (87.5%), Resources available (85%). 6) Chain service parameters: Responsiveness (80%), Privacy (77.5%), Security (85%), Growth and learning (90%), Innovation (72.5%), Measurement and customization production (85%), Efficiency (75%), Reality (82.5%). This study highlights the need for in-depth research and the integration of AI technology to overcome these challenges and further enhance the Efficiency of the supply chain model.1-5

**Keywords:** CP; Community Pharmacy, SCM; Supply chain management, SCMI: Supply chain model information. AI: Artificial Intelligence

**PL-78**




ISBN: 978-81-980623-8-3

**CLINICAL AND EPIDEMIOLOGICAL PROFILE OF PRIMARY LUNG CANCER PATIENTS: IMPACT OF CHEMOTHERAPY ON QUALITY OF LIFE AND ADVERSE EFFECTS**

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Primary lung cancer is one of the most common malignancies in India and remains a leading cause of death worldwide. Prevention of smoking and early detection can reduce morbidity and mortality. This prospective observational study was conducted for 9 months to evaluate epidemiological and clinical profile of primary lung cancer patients on chemotherapy and to assess their quality of life and adverse drug reactions. A total of 63 patients with primary lung cancer receiving chemotherapy at NRI General and Super Speciality Hospital, Chinnakakani,Guntur, between June to march were enrolled. QoL was assessed using EORTC-30, EORTC-13at baseline after 2 to 4cycles of chemotherapy and ADRs were evaluated using naranjo's algorithm, Modified Hartwig and siegel, thornton scale. Males predominated (68.25%), with most aged 61-70 years. Non-small cell lung cancer was common (84.12%), predominantly adenocarcinoma (64.15%). Over 50% had advanced disease. Smoking was a risk factor (60.31%). Frequent symptoms were cough (82.53%) and dyspnea(74.6%). QoL improved significantly in early-stage patients but showed little or no improvement in advanced disease. The most common ADRs were nausea, vomiting, anemia, alopecia, and leukopenia. Paclitaxel + cisplatin regimen had the highest ADR incidence, followed by Paclitaxel + Carboplatin. Conclusion: Primary lung cancer is increasingly diagnosed in India, occurs in 7th decade of life and Adenocarcinoma was most common type. While chemotherapy improves QoL in early stages, there's no significant improvement in advanced stages. ADRs were common, prominent recognition and adequate clinical management is mandatory for patient's safety.

**Keywords**: Chemotherapy, Primary lung cancer, Quality of life, Pharmacovigilance

**PL-79**

**WOUND HEALING POTENTIAL OF 5-AMINO SALICYLIC ACID BY TISSUE REGENERATION USING IN-VIVO MODEL IN ALBINO WISTAR RATS**

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The biological process of wound healing is complex and involves inflammation, proliferation, and tissue remodeling. It is frequently impeded by oxidative stress, infection, and delayed cellular reactions. The current study examined the potential for wound healing of topical gel and ointment formulations of 5-amino salicylic acid (5-ASA), a substance with well-established anti-inflammatory and antioxidant characteristics. Using pharmaceutically approved excipients, both formulations (2.5%) were created. They were then evaluated for physicochemical characteristics such as pH, viscosity, spreadability, homogeneity, and drug content, all of which were determined to be appropriate and stable for topical use. In vitro cytotoxicity on 3T3-L1 fibroblast cells showed that the gel ($IC_{50}$: 125.62 µg/mL) was safer than the ointment ($IC_{50}$: 410.50 µg/mL) and plain medication ($IC_{50}$: 28.13 µg/mL). Gel treatment at 10-20 µg/mL increased fibroblast proliferation and migration, demonstrating its stimulatory effect on wound closure (scratch assay). Acute cutaneous irritation tests in rabbits (OECD 404) found no evidence of edema, proving dermal safety. In vivo incision wound models in Wistar albino rats revealed that topical 5-ASA dramatically enhanced wound contraction, tensile strength, and epithelialization when compared to untreated controls. The gel formulation outperformed the ointment in terms of wound healing performance, with nearly full closure by days 12-15. Histopathological study revealed increased fibroblast proliferation, angiogenesis, collagen deposition, and re-epithelialization in gel-treated groups. Overall, the findings point to the possibility of repurposing 5-ASA as a topical wound-healing agent, with the gel formulation emerging as a safe and effective candidate for tissue regeneration and chronic wound treatment.

**Keywords:** 5-amino salicylic acid, wound healing, 3T3-L1 fibroblast, tissue renegeration.

**PL-80**

**PREDICTORS OF OUTCOMES & HEALTH-RELATED QUALITY OF LIFE (QOL) IN PATIENTS WITH DIABETIC FOOT ULCERS (DFU): A PROSPECTIVE OBSERVATIONAL STUDY**

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Diabetic Foot Ulcer (DFU) is one of the most common , much feared & serious complications of Diabetic Mellitus , associated with poor wound healing , increased risk of amputation and impaired QOL .This study aimed to determine patient and ulcer characteristics that predict wound healing and Health-related QOL in patients living with Diabetes.A prospective observational study was conducted in adults with DFU referred to a tertiary care hospital between September 2023 and march 2024 (7 months) at NRI General and Super Speciality Hospital , Guntur. A total of 48 patients were enrolled and monitored throughout hospitalization, and data on ulcer healing, amputation status & QOL were collected. QOL was assessed at baseline using a short-term questionnaire. The mean age was 60.12 ± 9.94 years. During follow- up, 20.83 % patients achieved ulcer healing,72.91% underwent amputation,6.25% required skin grafting. Poor healing was significantly associated with long term ulcer duration of > 6 months. QOL scores were analysed against demographic and ulcer characteristics. Severity of ulcer, graded using the Wagner classification, was found to be the main predictor of poor QOL. This study was concluded by demonstrating that the patients with DFU exhibited reduced QOL, most strongly influenced by ulcer grade.Poor wound healing is strongly correlated with long-standing ulcers. These findings emphasise the importance of early detection, prompt intervention, appropriate ulcer management and prevention strategies to improve healing outcomes and preserve QOL in patients with DFU.

**Keywords**: Diabetic Foot Ulcer (DFU), Quality of Life (QOL), predictors, outcome, short- form questionnaire

**PL-81**

**A PROSPECTIVE OBSERVATIONAL STUDY TO ASSESS THE INCIDENCE AND RISK OF PSYCHOTROPIC DRUG-INDUCED MOVEMENT DISORDERS**

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The prevalence of mental disorders has risen significantly and by 2030 they are projected to become the second leading cause of global disease burden. Psychotropic drugs though essential for management are increasingly associated with adverse drug reactions (ADRs), particularly movement disorders. This prospective observational study aimed to evaluate the incidence and risk of psychotropic drug induced movement disorder and was conducted over 9 months (July 2024-April 2025) in the Psychiatry Department of NRI General and Superspeciality Hospital Guntur.A total of 239 patients receiving psychotropic drugs (antidepressants, antiepileptics, antipsychotics) were included. The mean age was 37.5 ± 12.9 years, with a nearly equal gender distribution (males-50.21% and females-49.79%). Among 56 identified movement disorders, tremors were most common (69.64%), followed by Akathisia (16.07%), while dyskinesia and dystonia were least observed (1.78% each). Antipsychotic monotherapy accounted for the highest incidence (n=22) followed by antipsychotic combinations (n=15). Olanzapine (n=88) and Risperidone (n=57) were most frequently prescribed;Olanzapine responsible for 15 cases and Risperidone for 10 cases of movement disorders. Among antidepressants,Escitalopram and Seratraline each induced one case. Valproate sodium, the only antiepileptic identified caused 7 cases. Causality assessment (Naranjo's scale) showed probable in 51.78% and possible in 48.22% of cases. Severity analysis (Hartwig's scale) revealed 96.43% were moderate ,3.57% were mild and none were severe. The study concludes that




ISBN: 978-81-980623-8-3

antidepressants pose a lower risk of movement disorders compared to antipsychotics and combined antipsychotic–antidepressant therapy carries a lower risk than antipsychotic combinations alone. No significant difference was found among individual antipsychotics.

**Keywords**: - Antipsychotics, movement disorders, anti-depressants, anti-epileptics.

**PL-82**

**A CROSS-SECTIONAL ANALYSIS OF DYSMENORRHEA SEVERITY AND DRUG UTILISATION USING WALIDD AND NRS SCALES**

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Dysmenorrhea is a common gynaecological disorder that impairs quality of life, academic performance, and workplace productivity. Despite its burden, no study from Kerala has applied the WaLIDD scale to assess functional impairment. This study evaluated the severity and impact of dysmenorrhea using WaLIDD and Numerical Rating Scale (NRS) scores, and examined associations with drug use, lifestyle, and self-care. A cross-sectional survey was conducted among 36 women from colleges and workplaces over two months using a structured Google Form. WaLIDD (0–12) quantified functional impairment in work ability, pain location, intensity, and duration, while NRS (0–10) measured subjective pain. Results showed moderate to severe dysmenorrhea (WaLIDD ≥4) in 62.5% of participants, with 55% reporting absenteeism or restricted activity. A strong positive association was observed between WaLIDD and NRS scores ($p<0.05$), with higher values linked to disability and loss of productivity. NSAIDs were the most common pharmacological measure; 22% initiated them prophylactically or at onset with effective relief, 41% delayed intake with reduced benefit, and 37% did not use NSAIDs. Non-pharmacological measures included heat therapy (48%), stretching or exercise (32%), and adequate sleep, with 44% reporting milder symptoms when sleeping more than eight hours. Lifestyle factors were significant: poor hydration and <8 h sleep were present in 67% of severe cases, while regular fruit and vegetable intake correlated with reduced severity. Frequent caffeine intake aggravated symptoms. The study highlights the importance of calculating WaLIDD and NRS scores to capture severity and consequences, emphasizing timely NSAID use, lifestyle modification, and pharmacist-led education.

**Keywords:** Dysmenorrhea, Lifestyle, NRS, NSAIDs, WaLIDD.

**PL-83**

**"EVALUATING THE THERAPEUTIC POTENTIAL OF NIGELLA SATIVA EXTRACT VIA DRY POWDER INHALER IN THE ANIMAL MODELS"**

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This study investigates potential therapeutic advantages of Nigella sativa extract administered via dry powder inhaler (DPI) utilizing animal models. Nigella sativa offers a promising alternative for respiratory treatment due to its potent anti-inflammatory, antioxidant, and antibacterial properties. A DPI containing an extract from Nigella sativa was prepared, and its pharmacological efficacy in treating respiratory ailments in Wistar rats and mice was evaluated. Histological examination, lung function testing, and inflammatory markers were used to assess the extract's effects. Our results demonstrate a significant decrease in oxidative stress markers, inflammatory cell infiltration, and airway resistance when comparing the treated groups to the controls. These findings suggest that a DPI-administered Nigella sativa extract might be a helpful treatment for respiratory ailments, and they encourage further clinical investigation.

**Keywords:** Nigella sativa extract, anti-inflammatory, Dry Powder Inhaler, cell infiltration.

**PL-84**

**EVALUATION OF NEUROPROTECTIVE ACTIVITY OF BOUGAINVILLEA GLABRA LEAVES EXTRACT ON EXPERIMENTALLY INDUCED NEUROTOXICITY IN ALBINO RATS**

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The present study aimed to evaluate the neuroprotective activity of Bougainvillea glabra against aluminium chloride ($AlCl_3$)-induced neurotoxicity in albino rats. Rats were divided into five groups, and the extract was administered one hour prior to $AlCl_3$ (50 mg/kg). Behavioral observations were made daily for 50 minutes, followed by assessment of locomotor activity, rota-rod performance, and elevated plus maze test on day 8. On day 9, rats were sacrificed, and the brain was isolated for biochemical estimations including glutathione, superoxide dismutase (SOD), lipid peroxidation, protein estimation, and histopathological analysis. Aluminium chloride treatment markedly increased lipid peroxidation and nitric oxide levels in the cortex, hippocampus, and striatum while reducing glutathione in hippocampus and striatum. Treatment with Bougainvillea glabra extract attenuated these alterations by preserving antioxidant defenses and preventing oxidative stress–mediated damage. Moreover, the extract inhibited the $AlCl_3$-induced elevation of acetylcholinesterase and $Na^+/K^+$-ATPase activity in cortex, hippocampus, and striatum. A significant increase in tumor necrosis factor-α induced by $AlCl_3$ in cortex and hippocampus was also suppressed by the extract. The findings clearly demonstrate that Bougainvillea glabra exhibits neuroprotective effects and potentiates the protective efficacy of piracetam against aluminium-induced cognitive dysfunction and oxidative damage in rats, suggesting its therapeutic promise for neurodegenerative conditions associated with oxidative stress.

**Keywords:** Bougainvillea glabra; Aluminium chloride; Neuroprotection; Cognitive dysfunction; Piracetam

**PL-85**

**EVALUATION OF THE EFFECTIVENESS OF HYDROQUINONE-BASED TREATMENTS VERSUS NON-HYDROQUINONE-BASED TREATMENTS IN MELASMA AT A TERTIARY CARE HOSPITAL.**

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Melasma is a chronic, relapsing hyperpigmentation disorder that remains a therapeutic challenge due to its persistent course and tendency to recur. Hydroquinone has long been considered the standard depigmenting agent because of its strong efficacy, but concerns about long-term safety and adverse effects have encouraged the use of non-hydroquinone alternatives such as retinoids, kojic acid, and niacinamide. Evidence directly comparing these treatment options in Indian populations is limited. To address this gap, a prospective comparative observational study was conducted in the Dermatology Department of Akash Super Speciality Hospital over six months. A total of 52 patients were enrolled, of whom 13 received hydroquinone-based therapy and 39 were treated with non-hydroquinone regimens. The primary outcome was the change in Melasma Area and Severity Index (MASI) scores, assessed at baseline, 8 weeks, and 16 weeks. Statistical analysis included paired and independent t-tests, with effect sizes measured by Cohen's d and correlations assessed using Pearson's correlation. Both treatment groups showed significant reductions in MASI scores from baseline ($p < 0.001$), indicating clinical benefit. Hydroquinone achieved a greater mean reduction (41.8%) compared with non-hydroquinone therapy (33.8%), and this difference was statistically significant ($p < 0.05$). Effect size analysis indicated strong treatment effects in both groups (Cohen's $d > 2.5$). Among adjuncts, tretinoin use was significantly correlated with better MASI reduction ($p < 0.05$), while vitamin C, thyroid imbalance, and stress were not influential. Sunlight exposure showed borderline significance ($p = 0.058$). Overall, hydroquinone-based therapy was more effective, though both regimens provided meaningful improvement.

**Keywords:** Melasma, observational study, hydroquinone, non-hydroquinone, MASI scores.

**PL-86**

**A RANDOMIZED CONTROLLED STUDY EVALUATING PEANUT ORAL IMMUNOTHERAPY FOR INDUCING DESENSITIZATION AND MODIFYING THE ALLERGIC RESPONSE.**

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Oral immunotherapy (OIT) has shown promise in treating peanut allergy, but its safety and efficacy have not been rigorously evaluated in a double-blind, placebo-controlled setting. To assess the safety and efficacy of peanut OIT in children with peanut allergy using a double-blind, placebo-controlled trial. In this multicentre study, children aged 1–16 years with confirmed peanut allergy were randomized to receive either peanut flour OIT or placebo. The protocol included dose escalation, a build-up phase, and maintenance, followed by an oral food challenge (OFC) after approximately one year. Skin prick tests (SPTs) and immunologic assays were performed at defined intervals. Of 28 participants, three in the OIT group withdrew due to allergic reactions. At OFC, all remaining OIT participants (n = 16) tolerated a cumulative dose of 5000 mg (≈20 peanuts), compared to a median of 280 mg (range: 0–1900 mg) in the placebo group (n = 9; P < .001). OIT recipients showed significant reductions in SPT wheal size (P < .001), IL-5 (P = .01), and IL-13 (P = .02), along with increased peanut-specific IgG4 (P < .001). Peanut-specific IgE rose initially (P < .01) but returned to baseline by OFC. An elevated ratio of FoxP3(high) to FoxP3(intermediate) CD4+ CD25+ T cells was also observed at OFC (P = .04). Peanut OIT induced desensitization and measurable immunologic changes. Continued follow-up will determine whether sustained tolerance can be achieved.

**PL-87**

## AGMATINE RESTORES EXCITATORY/INHIBITORY BALANCE IN A PROPIONIC ACID-INDUCED RAT MODEL OF AUTISM VIA NMDA AND GABAERGIC MODULATION

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Autism spectrum disorder (ASD) is a complex neurodevelopmental condition characterized by impaired social interaction, cognitive deficits, and disruption of the excitatory/inhibitory (E/I) balance, primarily due to dysregulated glutamatergic NMDA receptor signaling and impaired GABAergic neurotransmission. Agmatine, an endogenous metabolite of L-arginine with neuromodulatory properties, exhibits neuroprotective and anti-excitotoxic effects. The present study investigated the impact of postnatal propionic acid (PPA) (250 mg/kg/day, p.o. for 3 days) exposure in male rat pups (PND 21) and evaluated agmatine as a potential therapeutic intervention for ASD. Specifically, we examined the role of agmatine in restoring E/I balance in a PPA-induced rodent model of autism and explored its interaction with NMDA receptor function through pharmacological modulation using an NMDA antagonist (memantine) and a partial NMDA agonist (D-cycloserine). Behavioral outcomes (social interaction, stereotypy, locomotion, memory), neurochemical assays (GABA and glutamate levels), oxidative stress markers, and inflammatory indices were assessed. Agmatine (80 mg/kg, i.p.) significantly ameliorated PPA-induced behavioral deficits and restored GABAergic/glutamatergic balance. Co-treatment with memantine (10 mg/kg, i.p.) potentiated agmatine's effects, whereas D-cycloserine (15 mg/kg, i.p.) partially reversed its benefits, suggesting that agmatine exerts protection in part via modulation of NMDA receptor overactivation. Overall, these findings indicate that agmatine restores E/I balance in autism through NMDA receptor regulation and enhancement of GABAergic neurotransmission, highlighting its promise as a novel therapeutic strategy for ASD.

**Keywords:** Agmatine, Autism, NMDA receptor, GABA, Excitatory/Inhibitory imbalance.

**PL-88**

## EVALUATION OF A POLYHERBAL FORMULATION IN A CITRAL-INDUCED RAT MODEL OF BENIGN PROSTATIC HYPERPLASIA: BIOCHEMICAL AND HISTOLOGICAL INSIGHTS

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Benign prostatic hyperplasia (BPH) is a common condition characterized by prostate enlargement, leading to urinary dysfunction. This study utilized a citral-induced model in rats to evaluate the pharmacological impact of a polyherbal formulation, Effectto®, at a low dose (90 mg/Kg) and a high dose (180 mg/Kg), for the treatment of BPH. A citral-induced model for atypical type BPH in rats was used to assess the efficacy of the polyherbal formulation. The prostate weight index and testes weight index were measured to determine the formulation's impact. Biochemical markers such as serum PSA, serum TNF-α, serum BUN, and serum creatinine, along with histopathological evaluation of testis and prostate were also analyzed. Data were expressed as mean ± SD, and statistical significance was assessed using Tukey's multiple comparison test after a one-way ANOVA. Effectto® significantly reduced prostate weight in citral-induced BPH rats. High dose of Effectto® decrease the prostatic weight index (0.23±0.035) compared to the disease control (0.32±0.033). Serum PSA levels were also reduced to 1.45±0.60 with high dose of Effectto® compared to 3.86±0.65 in the disease control. Furthermore, the formulation was successfully able to reverse citral induced prostate enlargement, demonstrating activity in several parameters equal to that of standard. This study demonstrates that citral effectively induces BPH in rats. The polyherbal formulation, Effectto®, significantly reversed BPH-associated changes in prostate tissue and serum PSA levels, providing scientific evidence supporting its potential use as a treatment for BPH.

**Keywords:** Prostate, Hyperplasia, Citral, BPH, PSA.

**PL-89**

## TO STUDY THE CLINICAL APPROACH OF THE DIAGNOSIS AND THE THERAPEUTIC MANAGEMENT OF ENCEPHALOPATHY AND ITS LIFE-THREATENING COMPLICATIONS

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To study the clinical approach of the diagnosis and the therapeutic management of Encephalopathy and its lifethreatening complications. The study has been carried out on patients who have been under the treatment for encephalopathy. Patients in the age group of 18 to 80 were considered, a total of 50 cases were collected within 6 months. In our study out of 50 patients, female patients were slightly higher than the male patients, Encephalopathy has been observed slightly more in the span 60 80 of age i.e. 50 patients, out of which 24 were male and the rest of them were female. All the patients considered are inpatients. In our study, we noticed that the rational and regular use of medication can help the patient to get back to their normal life. The combination of clindamycin and Magnex forte was most commonly used in combination therapy where minimal ADRs were observ ed, and meropenem was well tolerated in patients in our study with mild ADRs but not many serious adverse events were noted.

**PL-90**

## ENHANCED CENTRAL HISTAMINERGIC TRANSMISSION REVERSED MEMORY DYSFUNCTION IN DIABETIC MICE

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Central histaminergic transmission regulates several physiological functions, including cognitive function. Therefore, the present study investigates the plausible role of central histaminergic transmission in diabetes-induced memory dysfunction in radial arm maze (RAM) test. We reported that a single i.p. injection of streptozotocin (200 mg/kg) induced hyperglycaemia and which resulted in increased number of working and reference memory errors in RAM test, indicative of diabetes-induced memory dysfunction. The present findings reveals that an enhancement of histaminergic transmission in diabetic mice mediated by central (i.c.v.) administration of histamine, L-histidine, or central histamine neuronal releaser, H3 receptor antagonist significantly reduced the increased number of working and reference memory errors in diabetic mice on RAM test. Furthermore, central-i.c.v. injection of histamine H1 receptor agonist, FMPH or H2 receptors agonist, amthamine also attenuated the number of working and reference memory errors in diabetic mice on RAM test. Thus, the results of the




ISBN: 978-81-980623-8-3

present investigation delineate the counter-regulatory role of central histaminergic transmission predominantly via H1 and H2 receptor on memory dysfunction in diabetic mice.

**Keywords:** Histamine, RAM, Diabetic mice

**PL-91**

**AGMATINE IN PARAVENTRICULAR NUCLEI REGULATES HPA AXIS PHYSIOLOGY IN CHRONIC UNPREDICTABLE STRESS**

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Agmatine, a novel neurotransmitter and neuromodulator, has been recognised as endogenous regulator of stress, yet its function within the hypothalamus-pituitary-adrenal (HPA) axis is not fully understood. This study evaluates the effects of intra-paraventricular (i-pvn) administration of agmatine and its precursor, L-arginine, on brain corticotropin-releasing hormone (CRH), plasma adrenocorticotropic hormone (ACTH), and serum corticosterone (CORT) in Sprague-Dawley rats subjected to various stress paradigms, including eustress, acute immobilization stress (AIS), chronic unpredictable stress (CUS), and chemical stress induced by lipopolysaccharide (LPS). Following stereotaxic i-pvn cannulation and recovery, rats received single or repeated doses of agmatine or L-arginine, then underwent behavioural assessment for anxiety and depression-like symptoms and biochemical evaluation of CRH, ACTH, and CORT. The results demonstrate a dose-dependant effect of agmatine: moderate doses increased ACTH, while the highest dose (8 µg/rat) reduced it significantly. In contrast, low doses increased CORT levels under eustress. L-arginine administration reduced both ACTH and CORT in eustress conditions. Notably, both compounds supressed ACTH and CORT elevation in AIS, and single or repeated administration mitigated hormonal surges, improved behavioural outcomes, and prevented body weight loss in rats exposed to CUS and LPS. These findings reveal that i-pvn agmatine and L-arginine modulate ACTH and CORT levels in dose and time-dependant manner, highlighting agmatine's important role in regulating HPA axis function and supporting its therapeutic potential in stress-related neurobehavioral disorders.

**Keywords**: CUS, Agmatine, Stress.

**PL-92**

**A PROSPECTIVE OBSERVATIONAL STUDY ON IDENTIFICATION, MONITORING AND ASSESSMENT OF SOLICITED ADVERSE EVENTS DUE TO VACCINE IN LESS THAN 12 YEARS AGE GROUP**

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This prospective observational study aimed to identify, monitor, and assess solicited adverse events (AEs) following vaccination in children under 12 years of age. The study, conducted over one year at a tertiary care teaching hospital, enrolled a total of 760 patients, with 210 solicited adverse events reported in 174 patients. Participants were divided into three age groups: Group 1 (<1 year), Group 2 (1-5 years), and Group 3 (>5 years). The overall incidence of AEs was significantly higher in Group 3 (31.57%) compared to Group 1 (21.71%) and Group 2 (19.74%) (p=0.003). Local AEs, such as injection site pain (10.53% in Group 1, 8.55% in Group 2) and swelling (1.32% in Group 2) , were more common in younger children, while being rare in Group 3 (1.32%) (p=0.001). Systemic AEs were significantly more prevalent in Group 3 (30.26%) compared to Group 1 (13.16%) and Group 2 (11.84%) (p=0.0001). Headache was the most frequently reported systemic AE in Group 3 (22.37%), significantly higher than in Group 2 (5.26%) and Group 1 (1.32%) (p=0.001). Pyrexia (fever) was observed across all groups but did not significantly differ among them (p=0.77). The majority of AEs were mild across all age groups, with the highest proportion in Group 3 (30.26%) (p=0.0001). Most events were classified as "possible" according to WHO causality assessment, especially in Group 3 (27.63%). Most AEs required no intervention , with all reported adverse events resolving completely across all groups. The study confirms the overall safety of vaccines in children, with age-related variations in the type and frequency of solicited AEs, suggesting the importance of tailored monitoring strategies.

**Keywords:** Vaccine, Adverse Events, Solicited Adverse Events, Immunization, Children, Pediatric, Vaccine Safety, Prospective Study, Reactogenicity, Systemic Adverse Events, Local Adverse Events, Severity, Causality.

**PL-93**

**MULTI-TARGET NEUROPROTECTIVE EFFECTS OF RUTIN IN ALCOHOL WITHDRAWAL-INDUCED DEPRESSION: INSIGHTS FROM NETWORK PHARMACOLOGY, MOLECULAR DOCKING, AND IN VIVO EVALUATION**

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Alcohol withdrawal-induced depression (AWD) represents a significant neuropsychiatric complication from chronic alcohol consumption, characterized by oxidative stress, neuroinflammation, and disrupted neurotransmitter signaling. This study investigates rutin's therapeutic potential through network pharmacology, molecular docking, and in vivo evaluations. Network pharmacology identified key targets like TNF-α, NMDA receptor, and PI3K/AKT pathway, while molecular docking showed strong binding affinities of rutin to these targets (binding energy for TNF-α: −9.2 kcal/mol; NMDA receptor: −8.5 kcal/mol). In vivo experiments were conducted on Wistar rats (n = 8 per group) in seven groups: Normal Control, Ethanol Control, Rutin (50, 100, 200 mg/kg), Memantine (20 mg/kg), and Rutin 50 mg/kg + Memantine 20 mg/kg. Behavioral outcomes showed reduced immobility time in FST and TST in the rutin 200 mg/kg group versus Ethanol Control, with increased sucrose consumption in SPT and improved OFT exploration, indicating antidepressant effects. Rutin (200 mg/kg) significantly decreased MDA and NO levels while increasing antioxidant enzymes SOD, CAT, and GSH (***p < 0.001 vs. Ethanol Control). Pro-inflammatory cytokines TNF-α, IL-1β, and IL-6 were downregulated (***p < 0.001), and neurotransmitter analysis showed restored GABA (***p < 0.01) and reduced glutamate levels (***p < 0.01). The combination of rutin (50 mg/kg) and memantine (20 mg/kg) produced synergistic improvements compared to monotherapy (**p < 0.01). In conclusion, rutin particularly at 200 mg/kg, exerts a significant neuroprotective and antidepressant effect in alcohol withdrawal-induced depression by targeting inflammation, oxidative stress and neurotransmitter dysregulation, supporting its potential as a multi-target phytotherapeutic candidate for managing AWD.

**Keywords:** Alcohol withdrawal syndrome, rutin, flavonoids, neuroprotection, NMDA receptor, oxidative stress, neuroinflammation, network pharmacology, molecular docking, Depression.

**PL-94**

**ANTI EPILEPTIC ACTIVITY EVALUATION OF LIMONIA ACIDISSIMA ETHANOLIC LEAF EXTRACT IN EXPERIMENTAL ANIMAL MODELS**

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Epilepsy is a chronic disorder of cerebral dysfunction. It is characterized by abnormal patterns on the electroencephalograph and severe seizures, often with loss of consciousness. The present investigation focuses on evaluating the anticonvulsant activity of Limonia acidissima extract in various experimental models. Ethanolic extracts of Limonia acidissima were screened for the CNS depressant property using the Digital Actophotometer. The ethanolic extract of Limonia acidissima exhibited a significant decrease in the locomotor scores compared to the control group, indicating the extract has CNS depressant activity. The anti-convulsant activity of the extract is evaluated using the maximal electric shock model. The effect of the extract on different phases of convulsion is determined. Ethanolic extracts of Limonia acidissima showed a significant dose-dependent anticonvulsant effect. The administration of Ethanolic extracts of Limonia acidissima (ELLA) at doses of 600 and 800 mg/kg protected the animals from seizures and significantly reduced the duration of the tonic extensor phase. Currently available anti-epileptic drugs are effective but have no improvement in some patients, and their adverse drug reactions make treatment complicated. Thus, navigating naturally occurring compounds leads to




ISBN: 978-81-980623-8-3

much safer and more effective treatments. The anticonvulsant activity produced by the Limonia acidissima extract is comparable to drugs diazepam and phenytoin.

**Keywords:** epilepsy, anticonvulsant activity, Limonia acidissima, locomotor activity

**PL-95**

## AGMATINE MITIGATES BEHAVIORAL ABNORMALITIES AND OXIDATIVE STRESS ASSOCIATED WITH 3-NITROPROPIONIC ACID-INDUCED NEUROTOXICITY IN RATS

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Huntington's disease (HD) is a progressive neurodegenerative disorder characterized by motor dysfunction, cognitive decline, and psychiatric abnormalities, primarily associated with increased oxidative stress. Despite considerable research, a definitive cure for HD remains vague. Agmatine, a naturally occurring biogenic amine produced by the decarboxylation of L-arginine, has recently gained attention for its diverse neuromodulatory and neuroprotective properties. The present study was designed to investigate the effect of agmatine on 3-Nitropropionic acid (3-NP)-induced behavioral impairments and oxidative stress in rats. To induce an HD-like phenotype, rats were pre-treated with 3-NP (10 mg/kg, i.p.) on days 1, 3, 5, 7, and 9, followed by agmatine (5–20 mg/kg, i.p.) treatment from day 10 to day 21 of the experimental protocol. Systemic administration of 3-NP exhibited significant motor dysfunction, memory deficits, depressive-like behavior, and oxidative stress in rats. These alterations were accompanied by decreased antioxidant defense system. However, treatment with agmatine significantly improved motor performance in the narrow beam walk test and reduced immobility time in the forced swim test. Moreover, agmatine administration enhanced spatial learning and memory in the Morris Water Maze test. Besides this, agmatine intervention attenuated oxidative stress by reducing malondialdehyde (MDA) and nitrite levels while enhancing endogenous antioxidant defense (SOD, CAT, and GSH). Thus, the present study highlights the therapeutic potential of agmatine in counteracting 3-NP-induced behavioral abnormalities and oxidative stress parameters. Further studies are warranted to elucidate the precise mechanism of agmatine against 3-NP-induced neurotoxicity in rats.

**Keywords:** Huntington disease, Agmatine**,** 3-Nitropropionic acid, Oxidative stress.

**PL-96**

## AGMATINE MITIGATES LPS-INDUCED NEUROBEHAVIORAL AND GUT MICROBIOTA ALTERATIONS IN MICE

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Neuroinflammation is increasingly recognized as a driver of neurological and psychiatric disorders, not only impairing mood, memory, and motor function but also disrupting systemic health through the gut-brain axis (GBA). This study explored whether agmatine, a naturally occurring derivative of L-arginine, could counteract brain and gut disturbances triggered by lipopolysaccharide (LPS) induced neuroinflammation in mice. A single intracerebroventricular (icv) injection of LPS (12 µg) induced widespread behavioral and biological changes, including anxiety and depressive-like behaviors, locomotor and memory impairment, poor coordination, elevated inflammatory markers, and marked alterations in gut microbiota. Specifically, beneficial bacteria such as Lactobacillus declined while pathogenic E. coli expanded, accompanied by increased gut permeability, loose stools, and liver tissue damage. Administration of agmatine at 10, 20, and 40 µg, icv attenuated these effects in a dose-dependent manner, with 40 µg showing the strongest impact. Treated animals displayed improved behavioral outcomes, reduced neuroinflammation, restored gut bacterial balance, and normalized ileum and liver architecture. Further, agmatine modulators such as L-arginine, aminoguanidine, and arcaine also demonstrated protective effects, suggesting an underlying role for endogenous agmatine pathways. Overall, the data support agmatine as a promising therapeutic candidate for conditions where brain inflammation and gut dysfunction are intertwined. These findings underscore its potential relevance to neurological complications where neuroinflammation and gut dysbiosis co-exist, warranting further mechanistic and translational exploration.

**Keywords**: Agmatine, LPS, Gut-Brain Axis, Gut Dysbiosis, Neuroinflammation.

**PL-97**

## INFLUENCE OF TETRACYCLINES ON INFLAMMATION AND THEIR INTERACTION WITH ASPIRIN IN MALE WISTAR RATS

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Intensive investigations have revealed that a number of agents, other than conventional anti-inflammatory drugs favourably influence the process of inflammation. Some such drugs reported to possess anti-inflammatory activity include ascorbic acid, calcium salts, calcium channel blockers, and enzymes like chymotrypsin, etc. However, like minocycline, tetracycline failed to provide significant benefit for patients with rheumatoid arthritis. Since the mechanism involved in pathogenesis of acute and chronic inflammation are different and there are scanty reports regarding anti-Inflammatory activity of minocycline and other tetracyclines in acute inflammation. The Present study was therefore planned to investigate the influence of oxytetracycline (OXC), tetracycline (TRC), doxycycline (DXC) and minocycline (MNC) on experimentally induced acute and sub-acute inflammation in albino rats and also to explore their interaction with aspirin, a commonly used non-steroidal anti-inflammatory drug. oxytetracycline (OXC), tetracycline (TRC), Doxycycline (DXC) and Minocycline (MNC) in their therapeutic equivalent doses significantly ($p<0.01$) suppressed both acute as well as sub-acute inflammation. And the suppression was almost comparable to that of aspirin. DXC and MNC in their sub anti-inflammatory (SAI) dose when co-administered with SAI dose of aspirin produced synergistic anti-inflammatory activity without significant gastric toxicity in sub-acute model of inflammation. The results indicate that DXC or MNC when used concurrently with aspirin might reduce the anti-inflammatory dose and there by decrease the gastric toxicity.

**Keywords**: Aspirin, Inflammation, Interaction, Tetracycline

**PL-98**

## STUDY OF PREVALENCE, RISK FACTORS AND MANAGEMENT OF ALLERGIES IN PEDIATRIC POPULATION: A CROSS-SECTIONAL STUDY

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Pediatric allergies have become a major public health concern due to rising prevalence, influenced by genetic susceptibility, environmental triggers, and lifestyle factors. Allergies commonly present with respiratory symptoms, skin rashes, gastrointestinal disturbances, and, in severe cases, anaphylaxis. These conditions negatively affect growth, learning, quality of life, and increase healthcare burden. The present study aimed to assess the prevalence, risk factors, and management of allergies among children. A cross-sectional study was conducted among pediatric outpatients using a structured questionnaire and clinical observation. Data on demographics, family history, allergen exposure, clinical symptoms, caregiver knowledge, and treatment adherence were collected and analysed. Descriptive statistics were used to calculate prevalence and percentages. Associations between family history, allergen exposure, and occurrence of allergies were assessed using chi-square test. A p-value <0.05 was considered statistically significant. Among children studied, 38% had respiratory allergies, 25% presented with skin manifestations, and 15% reported gastrointestinal symptoms. Dust (40%), pollen (22%), pet dander (18%), and food allergens (15%) were the most common triggers. Family history of allergy was present in 35% of cases. Caregiver knowledge regarding allergen avoidance was low (28%), and only 45% of children adhered to regular prescribed medications. The study highlights the high prevalence of pediatric allergies and identifies family history and environmental exposures as




ISBN: 978-81-980623-8-3

significant risk factors. Limited awareness and poor adherence to therapy emphasize the need for early diagnosis, caregiver education, school-based programs, and improved access to effective treatment strategies.

**Keywords:** Pediatric allergies, Prevalence, Risk factors, Management strategies, Allergen exposure

**PL-99**

## CURRENT MODALITIES OF TREATMENT OF CANCER USING MOLECULAR THERAPY

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The treatment of cancer is being revolutionized by molecular therapies, which target specific genetic and epigenetic drivers of carcinogenesis. This review aims to synthesize the current modalities of molecular therapy, critically evaluating their mechanisms, clinically efficacy and limitations, with a focus on advanced immunotherapies and gene-editing applications. The analysis underscore the transformative impact of monoclonal antibodies and tyrosine kinase inhibitors in disrupting proliferative signaling pathways. A paramount advancement is exemplified by chimeric antigen receptor (CAR) T-cell therapy, which has achieved unprecedented remission rates in refractory B-cell malignancies by generating autologous T-cells engineered to target tumour- associated antigens. Furthermore, the CRISPR-Cas 9 system presents a ground breaking tool for enhancing CAR T -cell function through precise genomic editing interrogating gene function and potentially directly disrupting oncogenic drivers. Significant challenges persist including on-target/off-tumor toxicities, antigen escape, cytokine release syndrome and the logistical complexities of personalized therapeutics. Molecular therapies constitute the vanguard precision oncology. The strategic integration of gene editing technologies like CRISPR Cas 9 with cell based immunotherapies heralds a new frontier, mandating continued research to mitigate adverse effects and expand the applicability of these potent modalities to solid tumors.

**KEYWORDS:** Chimeric Antigen Receptor (CAR) T-Cell, Clusterd Regularly Interspaced Short Palindromic Repeats- CRISPR Cas 9, Genome editing, immunotherapy and tyrosine kinase inhibitors

**PL-100**

## A PROSPECTIVE OBSERVATIONAL STUDY ON THE ADVERSE DRUG REACTIONS AND MEDICATION ADHERENCE OF HALOPERIDOL AND RISPERIDONE IN TREATING PSYCHOTIC DISORDERS

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Pharmacovigilance, when used in psychiatry, can assist in identifying adverse drug reactions (ADRs) and notify doctors about the possibility of these occurrences in their everyday work, with timely diagnosis largely dependent on regular monitoring and assessment of prescriptions by clinical chemists. In this prospective observational study conducted in the Department of Psychiatry, Government Medical College Hospital, Tiruppur, a total of 180 patients were enrolled, and demographic details (age, weight, sex), prescribed medications, and study-specific information were documented using a structured data collection form, with the Medication Adherence Rating Scale, Naranjo's Scale, and Modified Kuppuswamy Scale applied for evaluation. Out of 180 patients, 170 were eligible for analysis, of which 54.7% were male and 45.3% female. Among them, 120 (70.5%) patients had schizophrenia, 18 (10.5%) had bipolar affective disorder, 21 (12.55%) had psychosis, 9 (5.29%) had substance-induced psychotic disorder, and one each (0.58%) had mood disorder and schizoaffective disorder, while 7 patients were excluded. Assessment using the Naranjo ADR Scale showed that the majority of ADRs were of moderate severity, with most patients belonging to the lower socioeconomic class. Importantly, risperidone was associated with better compliance and fewer side effects compared to haloperidol. These findings emphasize the need for continuous ADR monitoring in psychiatric practice to ensure safer treatment, optimize adherence, and improve patient outcomes.

**Keywords:** Haloperidol, Risperidone, Naranjo scale, Medication Adherence

**PL-101**

## RISK FACTORS FOR THROMBOEMBOLIC EVENTS IN PATIENTS WITH DIALYSIS-DEPENDENT CKD: POOLED ANALYSIS OF FOUR GLOBAL ROXADUSTAT PHASE 3 TRIALS

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This study depicts the proportion of anemia, risk factors associated with CKD and the effect of patient counselling. Anemia is a well-known complication in chronic kidney disease (CKD) and associated with progression of CKD, poor quality of life, and increase in morbidity and mortality. Anemia in CKD is due to erythropoietin deficiency from reduced renal mass, iron and nutritional deficiencies, elevation of pro inflammatory mediators in CKD may affect the erythropoiesis in CKD. It was observed that common risk factors were diabetes mellitus, hypertension, and dyslipidemia. CKD is a complex, progressive condition that develops slowly in some individuals, but rapidly in others. In addition to the underlying cause of renal failure, the rate of disease progression may be observed by the presence of CKD risk factors. The risk factors may increase progression of CKD to the end stage. Knowledge, Attitude and Practice of the patients were assessed using KAP questionnaire before and after counselling using a suitable patient information leaflet. The counselling provided was effective in improving the knowledge, attitude and practice of patients with chronic kidney disease. Pharmacists are in an ideal position to provide patient education and optimize patient care. Greater understanding about the illness and a change of attitude and practice would in turn results in a better therapeutic outcome. For future research the study should be done in a large sample and for long duration of period as a multicenter study.

**Keywords:** Anemia, Erythropoitin deficiency, Dyslipidemia, Chronic kidney disease

**PL-102**

## EVALUATION OF NEUROPROTECTIVE EFFECT OF EMBLICA OFFICINALIS FRUIT EXTRACT ON ACRYLAMIDE INDUCED NEUROTOXICITY IN RATS

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The study investigates the neuroprotective effects of Emblica officinalis (Indian gooseberry) against acrylamide-induced neurotoxicity in Wistar rats. Acrylamide, a chemical formed during high-temperature cooking, poses significant health risks, particularly neurotoxicity. It leads to oxidative stress, axonal damage, and behavioral deficits such as impaired grip strength, hyperalgesia, and locomotor dysfunction. Emblica officinalis, rich in bioactive compounds and antioxidants, is evaluated for its protective effects. Rats were divided into control, standard and experimental groups receiving acrylamide(50mg/kg) alone or combined with low/high (250mg/kg and 500mg/kg) doses of E. officinalis extract and standard Vitamin C (100mg/kg). Behavioral tests including locomotor activity, grip strength, narrow beam (hind limb impairment), and thermal hyperalgesia indicated that E. officinalis, especially at 500 mg/kg, significantly reversed acrylamide-induced deficits.The findings suggest that E. officinalis mitigates neurotoxicity by enhancing antioxidant defenses and possibly improving neuronal function. The study supports further exploration of E. officinalis as a therapeutic agent against chemically induced neurotoxicity and reinforces its traditional medicinal value.

**Keywords:** Emblica officinalis, Acrylamide, Neurotoxicity, Oxidative stress, Antioxidants, Wistar rats, Grip strength, Hyperalgesia, Locomotor dysfunction, Vitamin C, Neuronal function

**PL-103**

## ANESTHETIC ACTIVITY OF THYMUS VULGARIS AND SYZYGIUM AROMATICUM IN ZEBRAFISH MODELS

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ISBN: 978-81-980623-8-3

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The growing demand for safer, plant-based anesthetic agents has directed attention toward medicinal plants such as Thymus vulgaris (thyme) and Syzygium aromaticum (clove), both recognized for their antimicrobial, analgesic, and sedative properties. This study evaluated their anesthetic activities in zebrafish (Danio rerio), a widely accepted experimental model due to its genetic similarity to humans and high sensitivity to anesthetic agents. Essential oils of thyme and clove were tested at concentrations ranging from [e.g., 25–100 mg/L], and anesthetic efficacy was assessed by recording induction time (loss of equilibrium and responsiveness) and recovery time (return to normal swimming). Behavioral changes were also noted. Results demonstrated a clear dose-dependent effect for both extracts. Clove oil, at 50 mg/L, achieved induction in approximately [e.g., 120 ± 10 seconds] with recovery in [e.g., 90 ± 8 seconds], whereas thyme oil at the same concentration required [e.g., 210 ± 15 seconds] for induction and [e.g., 160 ± 12 seconds] for recovery. Higher concentrations of thyme oil improved efficacy but remained less effective than clove oil. The superior activity of clove oil is attributed to its high eugenol content, known for strong sedative and anesthetic properties. These findings suggest that clove oil can serve as a cost-effective, accessible, and eco-friendly alternative to synthetic anesthetics, particularly in aquaculture and veterinary practices, while thyme oil may act as a supportive anesthetic at higher doses. Overall, the study concludes that clove oil demonstrates greater promise as a natural anesthetic agent.

**Keywords:** Zebra fish,Thymus vulgaris, Syzygium aromaticum, Anesthesia, Eugenol

**PL-104**

## PHARMACOLOGICAL EVALUATION OF LIMONENE ON LETROZOLE AND HIGH FAT DIET INDUCED POLYCYSTIC OVARIAN SYNDROME (PCOS) IN RATS

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Polycystic ovarian syndrome (PCOS) is a prevalent endocrine disorder affecting 5%–10% of women of reproductive age. Although its etiology is multifactorial, oxidative stress, insulin resistance, obesity, hypothyroidism, hyperprolactinemia, and dyslipidaemia are key contributors. Limonene, a naturally occurring monoterpene, exhibits antioxidant, anti-inflammatory, anxiolytic, and metabolic regulatory properties. The objective behind the research was to evaluate the pharmacological effect of limonene on Letrozole and high-fat diet (HFD)-induced PCOS in rats. Female Wistar rats were divided into five groups (n=6): Group I (Normal Control) received sodium CMC and control diet; Group II (PCOS Control) received Letrozole (0.5 mg/kg, p.o.) for 42 days and HFD for 84 days; Group III and IV received Letrozole + HFD along with limonene (50 mg/kg and 100 mg/kg, respectively) from days 43–84; Group V received Metformin (100 mg/kg) as a standard treatment. Body weight, oestrous cycle, behavioural parameters, oral glucose tolerance test (OGTT), insulin tolerance test (ITT), biochemical markers, and ovarian histology were assessed. PCOS induction disrupted estrous cyclicity, increased body and ovarian weights, glucose intolerance, testosterone, triglycerides, oxidative stress markers, and pro-inflammatory cytokines, while reducing antioxidant enzymes, estradiol, progesterone, and behavioural activity. Limonene treatment dose-dependently reversed these alterations, showing comparable efficacy to Metformin. Limonene effectively ameliorated endocrine, metabolic, oxidative, and behavioural disturbances in a Letrozole and HFD-induced PCOS model, suggesting its potential as a therapeutic agent for PCOS management.

**Keywords:** PCOS, Limonene, insulin resistance, oxidative stress, estrous cycle.

**PL-105**

## DENGUE: AN EMERGING PUBLIC HEALTH CONCERN

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Dengue fever is an arboviral disease caused by dengue virus. Symptomatic dengue infection causes a wide range of clinical manifestations, from mild dengue fever (DF) to potentially fatal disease, such as dengue hemorrhagic fever (DHF) or dengue shock syndrome (DSS). The global burden of the disease is not well known, but its epidemiological patterns are alarming for both human health and the global economy. According to the WHO, dengue control is technically feasible with coordinated international technical and financial support for national programs.The references were selected from PubMed, Web of Science and Google Scholar database using search strings containing a combination of terms that included dengue fever, pathogenesis, epidemiology, diagnosis, prevention and control. Dengue fever is common in tropical areas. Texas has the highest number of cases of dengue fever in the United States. If left untreated, dengue fever can develop into the fatal dengue hemorrhagic fever. The disease is quite severe in young children as compared to adults.

**Keywords:** Dengue Fever, Dengue Hemorrhagic Fever, Dengue Shock Syndrome, Pathophysiology, Dengue transmission, Mosquito life cycle, Epidemiology, Detection, management and prevention and control of dengue fever.

**PL-106**

## PRECLINICAL PHARMACOKINETIC EVALUATION OF METHOTREXATE AND PROTON PUMP INHIBITOR INTERACTIONS: INSIGHTS FROM RAT AND RABBIT ARTHRITIS MODELS

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Pharmacological interactions significantly impact therapeutic effectiveness and patient safety during pharmacotherapy. This study investigates the pharmacokinetic interaction between methotrexate (MTX), a conventional treatment option for rheumatoid arthritis, and proton pump inhibitors (PPIs), commonly utilized for the treatment of gastric acid-related disorders. Utilizing rat and rabbit models of arthritis induced by Freund's adjuvant, this research assessed the effects of the concurrent administration of pantoprazole and omeprazole on the pharmacokinetics of MTX and its anti-inflammatory effectiveness. Inflammation was meticulously quantified through precise measurements of paw edema using vernier calipers, along with biochemical markers of inflammation. The combination of MTX and pantoprazole significantly reduced inflammation and enhanced gastrointestinal tolerance compared to MTX administered with omeprazole, which demonstrated relatively lower efficacy and increased adverse reactions. These findings highlight a clinically relevant pharmacokinetic drug interaction that is essential for optimizing MTX therapy in patients requiring acid suppression. This preclinical evidence emphasizes the necessity for careful PPI selection to maximize therapeutic benefits while minimizing toxicity, thereby promoting safer and more effective management of rheumatoid arthritis. While artificial intelligence (AI) was not employed in this research, its application could have significantly enhanced the research methodology. AI-driven algorithms are capable of more effectively analyzing complex pharmacokinetic datasets, facilitating the prediction of drug-drug interactions. Furthermore, AI could optimize dosing regimens by incorporating a variety of chemical and biological variables, potentially reducing the experimental burden. These technological advancements hold the promise to improve the precision of pharmacokinetic evaluations and strengthen personalized treatment approaches.

**Keywords:** Methotrexate, Pantoprazole, Omeprazole, Pharmacokinetic Interaction, Rheumatoid Arthritis

**PL-107**

## 7-HYDROXY FLAVONE BIOFLAVONOID AMELIORATES LETROZOLE-INDUCED POLYCYSTIC OVARIAN SYNDROME VIA INHIBITION OF OXIDATIVE STRESS AND INFLAMMATORY MARKERS

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ISBN: 978-81-980623-8-3

Background: Polycystic ovarian syndrome (PCOS) is a common gynaecological and endocrinological disorder causes anovulatory infertility that affecting 4-10% in women of reproductive age. Although current therapeutic options exist, many are accompanied by adverse effects, underscoring the need for safer and more effective alternatives. 7-Hydroxyflavone (7-HF), a natural flavonoid, has demonstrated notable biological properties; however, its therapeutic potential in PCOS remains unexplored. The current study aimed to explore the possible role of 7-HFin treating letrozole induced PCOS in rats. Methods: PCOS was induced in Female Wistar Rats by the administered of letrozole (1 mg/kg, , p.o.) for 21 days. After induction, rats were treated with 7-Hydroxyflavone at various doses (5, 10 and 15 mg/kg) and metformin (300 mg/kg) for 14 consecutive days. Result: Letrozole-induced PCOS was characterized by disrupted estrous cycle, increased body and ovarian weights, cystic ovarian follicles, altered metabolic and hormonal level, enhanced oxidative stress (elevated LPO, SOD; reduced GSH), and elevated inflammatory markers (TNF-alpha and IL-6). Treatment with 7-Hydroxyflavone significantly mitigated these alterations, restored normal estrous cycles and hormonal balance, reduced oxidative stress and inflammation, and improved ovarian histology in a dose-dependent manner.Conclusion: This study provides the first evidence that 7-Hydroxyflavone effectively mitigates letrozole-induced PCOS manifestations in rats, likely through its antioxidant, anti-inflammatory, and endocrine-modulating effects. These findings support the therapeutic potential of 7-HF as a novel candidate for PCOS management.

**KEY WORDS:** Polycystic Ovarian Syndrome (PCOS), 7- Hydroxyflavone (7-HF), Letrozole, Estrus Cycle (EC),

**PL-108**

## EFFECTIVENESS OF MONO AND DUAL ANTIPLATELET THERAPY IN ACUTE CORONARY SYNDROME IN A TERTIARY CARE HOSPITAL

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Cardiovascular diseases, particularly ischemic heart disease (IHD), remain a leading cause of mortality worldwide, with acute coronary syndrome (ACS) being a major contributor. Antiplatelet therapy plays a pivotal role in reducing morbidity and mortality by preventing thrombotic events in these patients. This study, titled “Effectiveness of Mono and Dual Antiplatelet Therapy in the Management of Acute Coronary Syndrome (ACS)”, was conducted to evaluate and compare the clinical outcomes of patients treated with aspirin monotherapy versus those receiving dual antiplatelet therapy (DAPT) consisting of aspirin and clopidogrel. A prospective observational design was employed, enrolling patients diagnosed with ACS at a tertiary care hospital. Clinical data, treatment modalities, and patient outcomes were systematically collected and analyzed. The study primarily assessed cardiovascular events such as recurrent angina, myocardial infarction, stroke, and mortality. Secondary parameters included hospital stay duration, bleeding complications, and other drug-related adverse effects. The findings demonstrated that dual antiplatelet therapy significantly reduced the incidence of recurrent ischemic events compared to monotherapy, affirming the superior efficacy of combined therapy in ACS management. However, DAPT was also associated with a modest increase in bleeding complications, highlighting the need for individualized patient assessment to balance efficacy and safety. This study reinforces the clinical benefits of dual antiplatelet therapy over monotherapy in reducing adverse cardiovascular outcomes among ACS patients. Nonetheless, the risk of bleeding necessitates cautious patient selection and continuous monitoring. The results underline the importance of evidence-based prescribing practices to optimize therapeutic benefits while minimizing harm. Future research with larger cohorts and longer follow-up is warranted to further validate these findings and refine treatment guidelines.

**Keywords:** Acute Coronary Syndrome, Antiplatelet Therapy, Aspirin, Clopidogrel, Dual Therapy, Cardiovascular Outcomes.

**PL-109**

## ESTIMATION OF HORMONAL ACTIVITY AGAINST LEVOTHYROXINE INDUCED HYPERTHYROIDISM IN EXPERIMENTAL ANIMALS USING THE BETA VULGARIS LEAVES EXTRACT

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Hormonal imbalance is a major contributor to several disorders, with hyperthyroidism being characterized by excessive synthesis and secretion of thyroid hormones. Conventional treatments such as antithyroid drugs, iodine therapy, and surgery are effective but often associated with side effects including muscle weakness, hair fall, and appetite loss. In recent years, there has been growing interest in herbal remedies due to their affordability, efficacy, and lower adverse effects. Beta vulgaris (beetroot), traditionally used in medicine for its antioxidant and hormone-modulating properties, has limited scientific evidence regarding its role in hyperthyroidism. The present study aimed to evaluate the antithyroid potential of methanolic leaf extract of Beta vulgaris (BVME) against levothyroxine-induced hyperthyroidism in female Wistar rats. Fresh leaves were shade-dried, powdered, and extracted by maceration with methanol. Hyperthyroidism was induced by oral administration of levothyroxine (500 µg/kg/day for 12 days), after which animals were divided into five groups: normal control, hyperthyroid control, standard drug (propylthiouracil), and two treatment groups receiving BVME (250 mg/kg and 500 mg/kg) for 17 days. Biochemical estimation of serum T3, T4, and TSH levels, body weight monitoring, and histopathological studies were carried out. BVME significantly ($p<0.01$) reduced T3 and T4 levels while elevating TSH in a dose-dependent manner, comparable to the standard drug. In addition, BVME attenuated levothyroxine-induced weight loss and restored normal thyroid gland histology with a 35–60% reduction in follicular cell hyperplasia and colloid accumulation. These findings suggest that methanolic leaf extract of Beta vulgaris possesses potent antithyroid activity, supporting its ethnomedicinal relevance and potential as a safer herbal alternative for managing hyperthyroidism. Further investigations are warranted to isolate and characterize the active phytoconstituents responsible for this effect.

**Keywords:** Beta vulgaris, hyperthyroidism, levothyroxine, phytoconstituents, herbal medicine, antithyroid activity, Wistar rats.

**PL-110**

## BACTERIOLOGICAL PROFILES AND PREVALENCE OF SEPTICAEMIA IN NEONATES AT A TERTIARY CARE HOSPITAL

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Neonatal septicaemia describes any systemic bacterial infection in neonates documented by positive blood culture. It is an important cause of morbidity and mortality among neonates. Neonatal sepsis may be classified according to the time of onset of the disease, < 72 hours as early-onset neonatal sepsis (EONS) and >72 hours as late-onset neonatal sepsis (LONS). EONS are caused by organisms prevalent in the maternal genital tract and LONS are caused by environmental factors. To identify the prevalence of septicaemia in neonates along with age and gender wise distribution, common associated factors and clinical signs/symptoms. Venous blood was collected aseptically and inoculated in blood culture bottle. Further isolation and identification was done by Standard Microbiological Guidelines. ESBL was detected according to CLSI guidelines. In present study out of 116 clinically suspected neonatal septicaemia cases, 89 (76.72%) were males and 27 (23.28%) were females. In present study out of 116 cases of neonatal septicaemia, 65 (56.03%) were early onset neonatal septicaemia and 51 (43.97%) were late onset septicaemia. Out of 89 male patients studied, in 31 (34.83%) cases pathogen were isolated. Out of 27 (23.28%) female patients studied, in 10 (37.04%) cases pathogens were isolated. In present study most common was Klebsiella spp. 39.02 %. Prevalence of septicaemia is 35.34% in neonates in present study. Prevalence was higher in males. And most common associated factor was preterm.

**Key words:** Neonatal septicaemia, Causative bacterial pathogens, Predisposing factors

**PL-111**


ISBN: 978-81-980623-8-3

**A CROSS SECTIONAL OBSERVATIONAL STUDY OF LEUCOPENIA AS AN EARLY TOXICITY MARKER FOLLOWING YELLOW PHOSPHOROUS POISONING CASES**

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BACKROUND: India's second-most common toxin is yellow phosphorus poisoning. Yellow phosphorus, which is present in rodenticides between 2 and 5%. 1 mg/kg is the dose that is fatal. Vomiting is the first symptom, and multiple organ failure and death are the last outcomes. Leucopenia is assessed for liver injury promptly as feasible in this article. OBJECTIVE: To assess the toxicity in yellow phosphorus poisoning. METHODS: Cross-sectional observational research was conducted. A total of one hundred patients were included in this investigation. The blood investigation was continuously monitored in the patients for any changes in the blood cell counts. RESULTS: For three days, the patient's leukocyte count was monitored. On day two, the mean patients WBC level drastically decreased. Leucopenia only happens in a small number of people. Leucopenia has been recorded in 24% of the study's participants on day 2. On day 3, 41% people were experienced leucopenia. PT/INR value rises steadily over time. On day one PT increased. On the second day, the mean INR value starts to become abnormal. This indicates internal bleeding. CONCLUSION: Leucopenia may not be considered as a toxicity marker; however, a decline in WBC starting on day two indicates further studies required long term study with large number of patients. Furthermore, the elevated PT/INR on first day indicates, it may be used as one of the toxicity markers for earlier diagnosis of yellow phosphorous poisoning.

**Keywords:** Leukopenia, Yellow Phosphorous Poisoning, Haematology, Toxicology, Plasma Exchange.

**PL-112**

**EVALUATION OF EXACERBATION CONTROL AMONG COPD PATIENTS RECEIVINGMETHYLXANTHINES, CORTICOSTEROIDS AND ANTIBIOTICS**

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Introduction: Chronic Obstructive pulmonary disease is a chronic inflammatory lung disease that causes obstructed air flow from the lungs. The aim of our study is to assess the control of symptom and exacerbation in COPD patients by comparing the CAT questionnaire and mMRC dyspnoea scale before and after treatment with drugs of methylxanthines, corticosteroids and antibiotics. Methods: This was a cross sectional observational study of patients admitted with exacerbation COPD at tertiary care hospital Tirupur. The study was approved by ethical committee and informed consent form provided by patient before inclusion. The study was conducted over the period of six months, totally 120 patients were enrolled and grouped them based on severity by GOLD classification. Result: Majority of the cases are in the age group of 46-60 years(49%) CAT Score before treatment is high in 86% of patients and after treatment Cat score is reduced to medium in 90% of patients. Before treatment mMRC score of grade 3 in majority of patients reduced to mMRC score of grade 2 after treatment. Preceding 1 year history of re-exacerbation occurs in 87% of patients and hospitalization occurs in 82% of patients. By comparing the CAT and mMRC score, the GOLD classification of majority of patients in Group C (severe) before treatment and after treatment it reduced to Group B (Moderate). Conclusion: The present study concludes that symptoms are controlled more by using methylxanthines, corticosteroids and antibiotics while comparing it with exacerbation.

**Keywords:** Chronic Obstructive Pulmonary Disease (COPD); CAT questionnaire; mMRC dyspnea scale; GOLD classification; Exacerbation; Corticosteroids

**PL-113**

**ANTI OBESITY EFFECTS OF SENNA AURICULATA EXTRACT: A MECHANISTIC INVESTIGATION OF PPAR γ MODULATION AND INSULIN SENSITIVITY IN EXPERIMENTAL MODELS**

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Obesity is a multifactorial metabolic disorder and a leading global health challenge associated with insulin resistance, type 2 diabetes, dyslipidemia, cardiovascular disease, and non-alcoholic fatty liver disease. Senna auriculata (L.) Willd, a traditional medicinal plant widely used in South India, has been reported to possess antidiabetic, antioxidant, and hepatoprotective properties. However, its role in adipogenesis and obesity management has not been fully elucidated. The present study aimed to investigate the anti-obesity effects of S. auriculata extracts with particular emphasis on mechanistic pathways involving peroxisome proliferator-activated receptor gamma (PPARγ) modulation and insulin sensitivity. Phytochemical screening revealed the presence of flavonoids, tannins, phenolic compounds, and alkaloids. In vitro assays using 3T3-L1 preadipocytes demonstrated significant inhibition of lipid accumulation as assessed by Oil Red O staining, along with improved antioxidant defense through enhanced superoxide dismutase (SOD), catalase (CAT), and glutathione (GSH) activity. In vivo studies were conducted on high-fat diet (HFD)-induced obese C57BL/6 mice. Oral administration of the extract resulted in a significant reduction in body weight gain, adipose tissue mass, and serum lipid parameters (cholesterol, triglycerides, LDL) while restoring HDL levels. Moreover, biochemical evaluation showed improvement in liver function markers and reduction of inflammatory cytokines (TNF-α, IL-6) along with increased adiponectin and insulin sensitivity. Gene expression analysis confirmed downregulation of PPARγ and leptin, and upregulation of UCP1 and adiponectin, suggesting modulation of adipogenesis and enhancement of energy expenditure. Western blot analysis further indicated activation of the AMPK pathway and regulation of associated metabolic proteins (pAMPK, pACC, CPT1A). Overall, the findings provide strong evidence that S. auriculata exerts multi-targeted anti-obesity effects by regulating adipogenesis, improving insulin sensitivity, and modulating key molecular pathways. This study scientifically validates the traditional use of S. auriculata and highlights its potential as a safe, plant-based therapeutic agent for the management of obesity and associated metabolic disorders.

**Keywords:** Obesity, metabolic disorder, lipid, high fat diet

**PL-114**

**ANTI- ALZHEIMER POTENTIAL OF SILVER NANOPARTICLES FROM PSIDIUM GUAJAVA IN A SCOPOLAMINE-INDUCED ALZHEIMER'S DISEASE.**

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Psidium guajava (guava) is rich in bioactive phytochemicals such as flavonoids, tannins, and terpenoids, known for their strong antioxidant and anti-inflammatory properties, which may contribute synergistically to the neuroprotective potential of AgNPs synthesized from its extracts. This research investigates the Alzheimer's disease-fighting potential of P. guajava leaves using a silver nanoparticle-based extract. P. guajava extract and silver nanoparticles of extract were used in scopolamine-induced Alzheimer's disease model. It seeks to enhance cognitive function and control Alzheimer's progression, offering promising therapeutic benefits. Additionally, notable improvements were observed in percentage of spontaneous behaviour, step through latency and escape latency, coupled with reduced levels of Lipid Peroxidation (LPO) and elevated Catalase (CAT) levels in biochemical assessments. The current research indicates that the AgNP of P. guajava exhibited highly significant results and it could be a potential as a promising therapeutic intervention for Alzheimer's disease. In conclusion, P. guajava extract and its silver nanoparticle formulation showed significant promising drug as potential treatments for Alzheimer's disease, based on positive results in scopolamine induced model.

**Keyword:** Alzheimer's disease, AgNP, Psidium guajava, scopolamine-induced model, Catalase.




ISBN: 978-81-980623-8-3

**PL-115**

**THERAPEUTIC POTENTIAL OF HERBAL NANOGEL CONTAINING CENTELLA ASIATICA EXTRACT FOR THE AMELIORATION OF DNFB-INDUCED ALLERGIC CONTACT DERMATITIS**

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This study investigated the therapeutic potential of a herbal nanogel containing Centella asiatica extract for the treatment of DNFB-induced allergic contact dermatitis. The extract was prepared using the maceration method and incorporated into a Carbopol 934 gel base. The nanogel formulation was conducted via the solvent diffusion method, wherein the extract was added dropwise under continuous magnetic stirring, followed by homogenization to obtain nanosized nanogel particles. The Box–Behnken Design (BBD) was utilized in a Design of Experiment (DoE) approach to optimize the formulation parameters. The optimized nanogels were characterized using FTIR, SEM, pH measurement, viscosity assessment, spreadability analysis, particle size determination, in vitro drug release studies, skin permeation evaluation, and phytochemical analysis. In vivo efficacy was evaluated using the guinea pig maximization test, complemented by histopathological and biochemical analyses. The results indicated that the optimized Centella asiatica nanogel demonstrated nanoscale stability, improved skin permeation, and significant in vitro anti-inflammatory effects. These findings suggest that the developed formulation has the potential to be a biocompatible and effective herbal nanogel for managing allergic contact dermatitis.

**Keywords:** Centella asiatica extract, Carbopol, BBD, allergic contact dermatitis.

**PL-116**

**EVALUATION OF ANTIUROLITHIATIC ACTIVITY OF SINAPIC ACID USING ALBINO WISTAR RATS**

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Urolithiasis, or kidney stone disease, is a common and recurrent urological disorder with major global health implications. Worldwide, 12–15% of individuals are affected during their lifetime, and recurrence rates approach 50% within 5–10 years. In India, the prevalence is around 12%, with a higher burden in northern and western regions. Beyond severe pain and urinary complications, urolithiasis can progress to chronic kidney disease and significantly impair quality of life, making it a pressing public health concern. Calcium oxalate crystals constitute the majority of kidney stones and are known to induce oxidative stress, inflammation, and renal tubular injury. While current treatment strategies are effective, their utility is often constrained by cost, side effects, and high recurrence, underscoring the need for safer, natural alternatives. Sinapic Acid, a phenolic compound widely distributed in plant-based foods, possesses potent antioxidant and anti-inflammatory activities, suggesting potential therapeutic value. This study investigated the antiurolithiatic activity of Sinapic Acid in albino Wistar rats. Urolithiasis was induced with 0.75% ethylene glycol in drinking water, and animals were treated orally with graded doses of Sinapic Acid. Results were compared with Cystone, a standard antiurolithiatic drug. Biochemical analyses and kidney histopathology demonstrated that Sinapic Acid significantly reduced calcium oxalate deposition, improved renal function markers, and preserved renal architecture. These findings indicate that Sinapic Acid may serve as a promising natural therapeutic agent for the prevention and management of urolithiasis.

**Keywords:** Sinapic Acid, Urolithiasis, Calcium oxalate, 0.75% Ethylene glycol, Cystone

**PL-117**

**REDEFINING ALLERGY CARE: PATIENT INSIGHTS DRIVING THE NEXT GENERATION OF FAST-ACTING, LONG-LASTING THERAPIES**

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Allergic conditions affect 30% of the population, affecting day-to-day productivity and quality of life. Despite the availability of tablets, capsules, syrups, and nasal sprays, patient dissatisfaction persists due to the delayed onset of action, short duration, and undesired side effects. Patient-driven insights are important for the development of effective therapies. This study aims to understand patient perspectives on existing allergy treatments, highlighting the common challenges, rank expectations for improvement, and understand their willingness to adopt novel therapies. A cross-sectional survey was conducted with >100 participants across diverse age groups. Responses were collected based on demographics, frequency of symptoms, preferred treatment, onset of relief, treatment limitations, desired improvements, and openness to innovation. Data was analysed to identify trends and patient priorities. Most respondents (65%) were between 36-55 years, with episodic allergies, 45% facing rare episodes and 27% seasonal flares. Tablets and capsules were the most used therapies (56%), yet 63% experienced relief only after 30-60 minutes. Patients highlighted concerns like short duration of effect (28%), slow onset (22%), side effects (20%) and missed doses (15%). Rapid relief emerged as the highest priority (83%) from participants, followed by fewer side effects (43%) and long duration of action (23%). Encouragingly, 81% participants expressed readiness to adopt improved alternatives. All the findings reveal that current therapies fall short of patient expectations stating strong opportunity for developing faster, safer and longer-acting delivery systems, particularly intranasal sprays, fast-dissolving tablets and orodispersible films that truly align with patient needs.

**Keywords:** Cross-sectional survey, Allergic rhinitis, Patient insights, Delivery systems

**PL-118**

**AGMATINE IN ACCELERATED BRAIN AGING: LINKING NEUROPROTECTION AND GUT DYSBIOSIS**

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Accelerated brain aging is a multifactorial condition marked by cognitive decline, neuroinflammation, oxidative stress and gut microbiota dysbiosis, often mediated through the gut-brain axis. This study aimed to evaluate the neuroprotective and gut restorative potential of agmatine in a D-galactose-induced rat model of accelerated brain aging. Rats were administered D-galactose (150 mg/kg) for 56 days to induce aging-related neuropathology and gut dysbiosis. Treatment groups received agmatine (40 and 80 mg/kg), L-arginine (100 mg/kg) and aminoguanidine (25 mg/kg). Cognitive and behavioural performance was assessed using the Morris Water Maze (MWM), Novel Object Recognition (NOR), Forced Swim Test (FST), Open Field Test (OFT) and Elevated Plus Maze (EPM). Biochemical analyses included quantification of neurotransmitters (dopamine, serotonin, glutamate), acetylcholinesterase activity, oxidative stress markers (MDA, nitrite, SOD, GSH) and inflammatory cytokines (TNF-α, IL-6, IL-10). Additionally, gut barrier integrity (ZO-1, occludin) and systemic LPS-binding protein (LBP) levels were measured. Microbial profiling of fecal samples revealed significant reductions in Lactobacillus and increases in E. coli populations in D-galactose-treated rats, which were reversed by agmatine treatment. Histopathological examination of the hippocampus and ileum confirmed structural improvements following agmatine administration. Notably, the 80 mg/kg dose of agmatine showed superior efficacy in restoring cognitive function, reducing neuroinflammation and oxidative stress and normalizing gut microbiota and barrier function. These findings highlight agmatine therapeutic potential in counteracting brain aging and gut dysbiosis through modulation of the gut-brain axis.

**Keywords**: Agmatine, Accelerated brain aging, Gut-brain axis, Neuroinflammation, Oxidative stress, Gut dysbiosis.

**PL-119**




ISBN: 978-81-980623-8-3

**CHROMIUM-AMINO ACID COMPLEXES AS PROMISING ALTERNATIVES TO NSAIDS: EVIDENCE FROM PHARMACOLOGICAL AND COMPUTATIONAL STUDIES**

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This research explored the analgesic and anti-inflammatory potential of novel chromium–amino acid complexes, Chromium-D-Phenylalanine (Cr-Phe) and Chromium-Glycinate (Cr-Gly). The complexes were structurally validated through UV–visible spectroscopy, FTIR, and elemental analysis. Their interactions with key inflammatory enzymes, COX-1(PDB: 1CX2) and COX-2 (PDB: 3KK6), were investigated via molecular docking, revealing strong binding affinity with scores of –8.0 and –8.9 kcal/mol respectively. Pharmacological evaluation was performed using the acetic acid–induced writhing model in mice. Both complexes produced a marked, dose-dependent reduction in abdominal constrictions (writhes) compared to controls. At 56 µg/kg, Cr-Phe inhibited writhing by 48.3%, while Cr-Gly achieved 39.12% inhibition. These effects, although slightly lower than the standard drug diclofenac sodium (55.7%), demonstrated significant analgesic potential. Interestingly, doubling the dose to 112 µg/kg did not further enhance efficacy, indicating the optimal therapeutic window lies at lower concentrations. These findings indicate that chromium–amino acid complexes are promising novel analgesic agents with safer profiles than conventional NSAIDs. Their optimal efficacy at lower doses may reduce side effects, with Cr-Phe showing greater potency than Cr-Gly. Overall, this study highlights the potential of chromium complexes as innovative scaffolds for developing next-generation analgesics with dual anti-inflammatory benefits.

**Keywords:** Acetic acid–induced writhing, Chromium D-Phenylalanine, Chromium Glycinate, Analgesic activity, writhes.

**PL-120**

**NEUROPROTECTIVE EFFECTS OF CHROMIUM-HISTIDINATE AGAINST ROTENONE-INDUCED PARKINSON'S DISEASE IN RATS: ATTENUATION OF OXIDATIVE STRESS, NEUROINFLAMMATION, AND MOTOR DEFICITS**

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This study investigated the therapeutic potential of chromium-histidinate (Cr-His) against rotenone-induced Parkinson's disease (PD) in rats through in silico and in vivo approaches. Cr-His was synthesized and characterized using UV-Vis, FT-IR, and elemental analysis. In silico docking and molecular dynamics with α-synuclein (PDB:1XQ8) demonstrated stable binding (−9.0 kcal/mol) and robust hydrogen bonding. In vivo, Wistar rats received rotenone (2 mg/kg, s.c., 28 days) to induce PD-like pathology. Behavioral assessments showed dose-dependent effects of Cr-His. At 80 µg/kg, Cr-His improved motor performance (149.16 ± 4.5 vs 59 ± 3.59 in rotenone, Day 28) and locomotor activity (171.66 ± 20.3 vs 59 ± 3.59), comparable to levodopa–carbidopa (181.16 ± 10.3). Catalepsy scores decreased significantly with Cr-His 80 µg/kg (109.12 ± 6.6 vs 142.34 ± 8.9 in rotenone, $p<0.05$). Biochemically, Cr-His restored GSH (1.06 ± 0.03 vs 0.44 ± 0.01 µmol/mg protein in rotenone), catalase (3.76 ± 0.03 vs 2.86 ± 0.05 U/mg protein), and reduced LPO by 28% (2.54 ± 0.02 vs 3.53 ± 0.09 nmol/mg protein). Nitrite levels declined by 40% with Cr-His (15.25 ± 0.17 vs 25.47 ± 0.21 µg/ml in rotenone), and dopamine levels improved by 50% (153.69 ± 3.27 vs 102.46 ± 1.23 ng/mg). TNF-α was reduced to 323.87 ± 11.1 pg/ml vs 622.62 ± 12.5 in rotenone. Histopathology confirmed dose-dependent neuroprotection with preserved neuronal morphology. Overall, Cr-His demonstrated significant neuroprotective potential in PD through antioxidant, anti-inflammatory, and motor-restorative effects, supporting its evaluation as a candidate for adjunct therapy.

**Keywords:** Chromium-Histidinate, Parkinson's Disease, Rotenone, in silico, Oxidative Stress

**PL-121**

**CHROMIUM GLYCINATE COMPLEX: PHARMACOLOGICAL AND COMPUTATIONAL INSIGHTS INTO ANTI-INFLAMMATORY AND ANTIOXIDANT POTENTIAL**

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The anti-inflammatory and antioxidant potential of Chromium Glycinate (Cr-Gly), a trace element complex, was evaluated through in vivo and in silico approaches. Anti-inflammatory activity was assessed in carrageenan-induced paw edema in rats using histopathological and biochemical analyses. The synthesized complexes were characterized by spectroscopic and elemental methods. Antioxidant and anti-inflammatory effects were determined through paw volume, grip strength, lipid peroxidation (LPO), glutathione (GSH), tumor necrosis factor-alpha (TNF-α), and histopathological alterations. Cr-Gly at 40 µg/kg produced 28% inhibition of paw edema ($p<0.01$) compared with diclofenac sodium (42.40%). Treatment with Cr-Gly reduced LPO levels (25.1%) (62.1±0.30), while GSH levels increased by 22–35%, with the highest restoration at 40 µg/kg (34.82%) (78.3±0.33). TNF-α levels were reduced by 37.28% (252.62±1.96) at the same dose. A dose-dependent effect was evident, with significant inhibition at 20 and 40 µg/kg versus carrageenan control. Histology confirmed reduced inflammatory infiltration and edema. Molecular docking and dynamics simulations showed strong binding affinity of Cr-Gly with COX-1 and COX-2. Docking revealed binding with PDB ID: 1CX2 (COX-2) and 3KK6 (COX-1), with scores of –8.0 and –8.9 kcal/mol respectively. Molecular dynamics confirmed stable hydrogen bonding. Cr-Gly demonstrated measurable anti-inflammatory and antioxidant effects under experimental conditions, suggesting relevance for further pharmacological evaluation.

**Keywords:** Chromium Glycinate, Anti-inflammatory, Antioxidant, Cyclooxygenase, Carrageenan induced paw edema.

**PL-122**

**AN ANTICIPATORY APPROACH ON STATIN-INDUCED RHABDOMYOLYSIS TREATMENT WITH HERBAL EXTRACT**

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Oxalis corniculata belonging to the family Oxalidaceae, has been used traditionally for its medicinal benefits. Recent exploration has shown it has strong antioxidant properties, which supports its use in treating various health issues, especially in precluding damage caused by certain specifics. The study aimed to test the hydroalcoholic extract of Oxalis corniculata (HAEOC) to see if it recovers the damage by statin and fibrate rat models. The aim was to check if the extract could reverse the oxidative stress and to assist in preserving kidney function. Thirty Wistar rats were divided into five groups (n=6 per group): normal control group, simvastatin-treated group, simvastatin + gemfibrozil-treated group, simvastatin-treated group with HAEOC, and simvastatin + gemfibrozil-treated group with HAEOC. All treatments were given over 30 days, and also blood and kidney samples were collected testing. The results showed that simvastatin and simvastatin and gemfibrozil combination caused significant muscle breakdown and oxidative stress, as shown by advanced situations of dangerous substances in the blood (nephrotoxicity markers – $p<0.001$) and unstable antioxidant situations ($p<0.05$). Using HAEOC alongside these medicines effectively reduced these changes by correcting serum levels, reducing oxidative stress, and preserving kidney morphology. The study demonstrates that Oxalis corniculata is a promising prophylactic drug to inhibit nephrotoxicity induced by statin and fibrate therapy.

**Keywords:** Antioxidant; Oxalis corniculata; Rhabdomyolysis, Nephroprotective

**PL-123**

**PSYCHOPHARMACOLOGICAL EVALUATION OF BIOPHYTUM SENSITIVE IN MICE**

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Biophytum sensitivum, a traditional Indian medicine herb, is employed in treating insomnia and convulsions, but scant scientific data exist




ISBN: 978-81-980623-8-3

concerning its psychopharmacological actions. The current research was designed to assess the influence of the ethanolic extract of Biophytum sensitivum (EEBS) on animal behavior. This research was particularly intended to explore the psychopharmacological activities of EEBS against locomotion, depression, anxiety, and muscle relaxation in experimental models. Biophytum sensitivum leaves were extracted with ethanol through a Soxhlet apparatus. EEBS was administered orally to animals in doses of 100 and 200 mg/kg. Locomotion was assessed through an actophotometer, depression through the Forced Swim Test (FST), anxiety using the Elevated Plus Maze (EPM), and muscle relaxation was tested on a rotarod. Statistical analysis was done through ANOVAs ($p < 0.05$). EEBS significantly enhanced locomotion. In the FST, it decreased immobility time, which was an indication of an antidepressant action. Anxiolytic activity was inferred from elevated open-arm entries and open-arm time in the EPM. Moreover, motor coordination was affected on the rotarod, showing muscle relaxation. The research corroborates the psychopharmacological efficacy of Biophytum sensitivum, showing locomotion, depression, anxiety, and muscle relaxation effects deserving further investigation on its therapeutic possibilities in neuropsychiatric disorders.

**Keywords:** Biophytum sensitivum, locomotor activity, anxiolytic activity, skeletal muscle relaxant activity, antidepressant activity.

**PL-124**

## ANTIOXIDANT, ANTIINFLAMMATORY AND SPLEEN PROTECTIVE EFFECTS OF Ipomoea digitata L. TUBER

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It was a study formulated to evaluate the antioxidant, anti-inflammatory, and spleen-protective effects of the alcoholic extract of Ipomoea digitata tuber (EEIDT). The main objective was to examine the protective effects of EEDT against aniline-induced spleen injury in male Wistar rats. The study was carried out by inducing spleen injury in Wistar rats with ID extract (200, 400mg/kg/day at 2 doses) administered. Various parameters like invitro antioxidants (DPPH, NO Scavenging), anti-inflammatory (proteinase inhibition) activities and in-vivo effects on splenic hematology, iron, lipid peroxidation, Glutathione (GSH), and NO levels were evaluated. The results showed that IEDT exposure led to significant health problems and hematological disruptions. However, IEDT treatment restored hematological balance, reduced lipid peroxidation, and normalized GSH and NO levels, indicating protective effects. The in-vitro assay determined that IEDT has both antioxidant and anti-inflammatory activities. So, it can be concluded that the IEDT is a potential natural therapeutic compound for oxidative stress-associated spleen disease.

**Keywords:** Antioxidant, Anti-Inflammatory, spleen injury, Ipomoea digitata L. Wistar Rats

**PL-125**

## QUALITY OF LIFE ASSESSMENT BEFORE AND AFTER CORONARY ARTERY BYPASS GRAFTING IN CORONARY ARTERY DISEASE PATIENTS: A PROSPECTIVE OBSERVATIONAL STUDY

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Coronary Artery Disease (CAD) results from narrowed or blocked coronary arteries, presenting as angina, myocardial infarction, or silent ischemia. In India, CAD occurs more frequently and at younger ages. Coronary Artery Bypass Grafting (CABG) effectively restores perfusion, and assessing health-related quality of life (HRQoL) post-CABG provides insight into patient recovery. To analyse and compare the quality of life and functional status of patients before and after Coronary Artery Bypass Grafting (CABG). A six-month prospective observational study was conducted at Mult speciality hospitals. Out of 120 CABG patients, 98 completed follow-ups. HRQoL was assessed using SF-36 preoperatively and at three months, with demographics, comorbidities, and risk factors recorded; data were analysed using repeated measures ANOVA. Most patients were 50–60 years (43%) and male (82%). Alcohol use (58%) and smoking (57%) were common risk factors, with triple vessel disease in 70%. CABG significantly improved all HRQoL domains, including physical, mental, and social functioning. CABG substantially improved quality of life across physical, psychological, and social domains within three months. Routine HRQoL assessment may enhance postoperative care and patient counselling.

**Keywords:** Coronary Artery Disease, CABG, Quality of Life, HRQoL, Risk factors.

**PL-126**

## INVESTIGATION OF CARDIOTOXIC EFFECTS OF GULMEHENDI LEAF HYDROALCOHOLIC EXTRACT IN ISOLATED RAT HEART MODEL

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The present study investigates the hydroalcoholic extract of Gulmehendi (Salvia Rosmarinus) leaves to assess its cardiotoxic and cardiotropic effects on isolated hearts of albino Wistar rats. Gulmehendi, a medicinal plant of the Lamiaceae family, has been widely used for its antioxidant, antimicrobial, and anti-inflammatory properties, yet its influence on cardiac function remains inadequately explored. The extract was prepared using 70% ethanol and subjected to preliminary phytochemical screening, which revealed the presence of alkaloids, carbohydrates, flavonoids, and glycosides phytoconstituents known to possess diverse pharmacological actions. The experimental model employed isolated rat hearts perfused with Krebs-Henseleit solution through the Langendorff's apparatus, a well-established technique for evaluating direct cardiac responses in controlled conditions. The hydroalcoholic extract was administered in incremental doses, and its effects were systematically compared with standard cardioactive agents, adrenaline and acetylcholine. The extract demonstrated a dose dependent positive inotropic effect (enhanced force of contraction) and positive chronotropic effect (increased heart rate). When administered with adrenaline, the extract further amplified cardiac activity, indicating a potential synergistic interaction with adrenergic pathways. In contrast, acetylcholine produced a partial attenuation of the chronotropic response while exerting negligible effect on inotropic activity, thereby indicating a selective modulatory influence on cholinergic pathways. These findings suggest that Gulmehendi leaves show significant effects on heart activity with possible therapeutic benefits. However, the strong stimulatory actions at higher doses may also lead to harmful effects on the heart, highlighting the need for further animal studies and detailed safety evaluations.

**Keywords:** Gulmehendi, Hydroalcoholic extract, Cardiotoxic activity, Perfused heart model.

**PL-127**

## GREEN NEUROPROTECTORS: BIOACTIVE EVALUATION OF MIMOSA & DELONIX IN ALZHEIMER'S

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Alzheimer's disease (AD) being a common neuro-degenerative disorder, is a major cause of disability and one of the top causes of mortality globally. The number of deaths from AD and other dementias increased from 687,751 to 1,952,677 per year [1990-2021]. Despite decades of research, effective disease modifying therapies remain exclusive, emphasizing the need for novel, multi-target strategies. The present study comparatively evaluated Mimosa pudica and Delonix regia using an integrated in silico-in vivo workflow. Phytoconstituents including mimosine (from M. pudica) and quercetin, kaempferol, lupeol, and β-sitosterol (from D. regia) were selected for their reported neuroprotective properties. In silico analyses encompassed network pharmacology, drug-likeness, ADMET profiling, and molecular dynamics simulations, identifying strong interactions with key AD-related targets such as β-amyloid aggregation and tau hyperphosphorylation. Standardized hydroalcoholic plant extracts were then administered to Albino Wistar rats, and neuroprotective efficacy was assessed using behavioural paradigms (Morris water maze, Y-maze, novel object recognition), biochemical assays (acetylcholinesterase inhibition, oxidative stress biomarkers, cytokine profiling), and histopathological examination of hippocampal tissue. Findings demonstrated that




ISBN: 978-81-980623-8-3

quercetin and mimosine exhibited significant multi-target activity, correlating with improved memory performance, reduced oxidative stress, and attenuation of neuroinflammation. These results validate computational predictions and highlight the therapeutic potential of these phytoconstituents. Dual-level approach underscores the value of integrating computational modelling with experimental validation in natural product-based drug discovery, offering promising insights into the role of M. pudica and D. regia as neuroprotective candidates for Alzheimer's disease management.

**Keywords:** Alzheimer's disease, Mimosa pudica, Delonix regia, Neuroprotection, In silico-in vivo.

**PL-128**

**COMPUTATION AND BIOLOGICAL EVALUATION OF HARNESSING DRUG REPURPOSING FOR TREATMENT OF ALZHEIMER'S DISEASE**

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Alzheimer's disease (AD) is a progressive neurodegenerative disorder marked by memory decline, cognitive impairment, and the accumulation of amyloid plaques and tau protein tangles in the brain. According to WHO estimated that 384 billion people affected due to dementia by 2025. In silico molecular docking (Schrödinger Maestro v13.1) assessed the drugs binding affinity with acetylcholinesterase (AChE) and butyrylcholinesterase (BuChE), complemented by ADMET profiling. In vitro AChE and BuChE enzyme inhibition activity was quantified by Ellman's method. Acute toxicity studies, following OECD TG guidelines, determined non-toxic doses of 3.125 mg/L for dimenhydrinate and 100 mg/L for nifedipine. In vivo studies on zebrafish, exposed to acrylamide-induced amnesia (0.75mM), treated with above fixed doses, were subjected to behavioral assessments using the Novel Tank Diving Test (NTT), Y-maze, and Novel Object Recognition (NOR) tests. The drug treatment was given for 24 days. On 29th day zebrafish brain was isolated used for biochemical analyses such as acetylcholinesterase levels, enzymatic (catalase, superoxide dismutase) and non-enzymatic antioxidants (reduced glutathione), total protein, and lipid peroxidation (malondialdehyde) levels were measured. Statistical analysis was performed using one-way ANOVA followed by Dunnett's test to efficacy and safety of these drugs for Alzheimer's therapy. Docking studies using Schrödinger Maestro 14.1 evaluated 17 drugs for their interactions with acetylcholinesterase and butyrylcholinesterase, identifying dimenhydrinate and nifedipine These drugs showed significant cholinesterase inhibition in vitro, with IC50 values for dimenhydrinate at 157.3±0.05 µM and 103.98±1.527 µM, and for nifedipine at 37.35±1.56 µM and 45.90±1.20 µM, against acetylcholinesterase and butyrylcholinesterase, respectively.

**Keywords:** Alzheimer's disease, Acetylcholinesterase, Butyl cholinesterase.

**PL-129**

**INVESTIGATING POTENTIAL ROLE OF AGMATINE IN D-GALACTOSE INDUCED GONADAL AGING IN MALE AND FEMALE RATS**

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The reproductive system changes with age, affecting hormones, cycles, and fertility. This study examines Agmatine's influence on reproductive aging induced by D-galactose in Sprague-Dawley rats. Thirty-six male and female rats were divided into six groups. D-gal induced reproductive aging at 150 mg/kg body weight over 60 days. Rats received agmatine at 40 mg/kg and 80 mg/kg, L-arginine at 100 mg/kg, and aminoguanidine at 25 mg/kg. Over a period of 12 days, estrous cycles were monitored using vaginal smears to evaluate the stages of the cycle, levels of reproductive hormones, activity of antioxidant enzymes, presence of inflammatory markers, sperm characteristics, follicle numbers, and any histological alterations. D-gal exposure significantly ($P < 0.001$) lowered serum testosterone (T), estrogen (E), and anti-Müllerian hormone (AMH), while increasing luteinizing hormone (LH) and follicle-stimulating hormone (FSH) levels. Agmatine and agmatinergic modulators significantly ($p < 0.001$) raised T, E, and AMH levels and reduced LH and FSH levels compared to D-gal. The study evaluated malondialdehyde (MDA) as a marker of oxidative stress, alongside antioxidants such as glutathione (GSH), superoxide dismutase (SOD), and catalase. It also investigated tumor necrosis factor-alpha (TNF-α) and interleukin-6 (IL-6) as pro-inflammatory cytokines, as well as interleukin-10 (IL-10) as an anti-inflammatory cytokine. D-galactose was found to significantly ($P < 0.001$) elevate oxidative stress and pro-inflammatory markers while reducing antioxidant and anti-inflammatory levels. Nevertheless, the use of agmatine and other modulators contributed to reestablishing their balance. Agmatine treatments alleviated reproductive problems caused by D-gal, indicating its promise for addressing reproductive disorders associated with aging.

**Keywords:** Reproductive Aging, D-galactose, Agmatine, infertility.

**PL-130**

**INVESTIGATION ON PATHOLOGICAL ROLE AND PHARMACOLOGICAL EFFECT OF AGMATINE IN RAT MODEL OF GLIOBLASTOMA**

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Glioblastoma (GBM) is the most malignant primary brain tumor, marked by rapid proliferation, neurological impairments, and poor prognosis. Current therapy, including temozolomide (TMZ), marginally improves survival but often worsens cognitive functions. Agmatine, an endogenous L-arginine metabolite, inhibits ornithine decarboxylase (ODC), reduces polyamine uptake, and exerts neuroprotective actions, yet its role in GBM remains unexplored. In this study, glioblastoma (GBM) was induced in Sprague Dawley rat offspring by administering N-ethyl-N-nitrosourea (ENU) intraperitoneally to dams on gestational day 15. Offspring were evaluated for survival, seizures, motor coordination, anxiety-like behavior, and cognition using validated behavioral tests including negative geotaxis, righting reflex, open field test, elevated plus maze, rotarod, and novel object recognition. Biochemical alterations were assessed through oxidative stress markers (TBARS, GSH, SOD) and inflammatory cytokines (TNF-α, IL-6, IL-10). ENU-induced rats exhibited significant mortality after postnatal day 70, along with seizures, ataxia, hyperactivity, and cognitive deficits. Thermal imaging (FLIR) revealed significantly elevated brain surface temperature in ENU-induced offspring, which was reduced following agmatine treatment. Marked increases in lipid peroxidation, TNF-α and IL-6, and a reduction in antioxidant defenses and IL-10 were also observed. Treatment with agmatine (20 and 40 mg/kg, i.p.) from postnatal day 30 produced dose-dependent improvement, as reflected by restored motor activity, reduced anxiety, enhanced memory performance, and correction of oxidative and inflammatory imbalances. Elevated brain agmatine levels after treatment further support its mechanistic role. These findings suggest a potential neuroprotective and anti-proliferative role of agmatine in ENU-induced GBM, which will be further validated through ongoing histopathological and immunohistochemical studies.

**Keywords:** Glioblastoma, Agmatine, ENU, Neurobehavior, Oxidative stress

**PL-131**

**A STUDY ON THE COMPARISON OF ATTRIBUTABLE RISK ESTIMATES FOR RISK FACTORS ASSOCIATED WITH HYPERTENSION AT A TERTIARY CARE HOSPITAL**

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Attributable risk is used as a statistical tool to find out the risk difference between two major groups. The study aims to estimate a comparison of 2 risk factors when combined and analysed within a tertiary care setting. A prospective observational study was conducted within the departments of General Medicine, Surgery, and OBG at MVJ Medical College and Research Hospital. On assessing the compartments between risk factors of 200 subjects, obesity and smoking were the highest risk groups. Some of the risk factors resulted in negative terms, showing a protective effect against the disease. We can conclude by saying that there are several risk factors when combined and compared with one another, which can lead to hypertension, with obesity being a common




ISBN: 978-81-980623-8-3

risk factor from our results. Hypertension Retinopathy was a complication recorded through our analysis, recorded within the results of the study, accounting for 18% of the sample size. (27 out of 150 patients). It is our job to monitor them on a timely basis and create awareness among the public against these risk factors leading to hypertension (one of the major diseases in recent times). Several practices, like therapeutic drug monitoring, should be implemented throughout to avoid medication issues.

**Keywords:** attributable risk, comparison, risk factors, hypertension

**PL-132**

**PHARMACOINFORMATICS-BASED SCREENING OF PHYTOCHEMICALS FROM JASMINUM OFFICINALE L. AS ANTI-PROSTATE CANCER AGENTS: A NETWORK PHARMACOLOGY APPROACH**

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Prostate cancer ranks as the second most prevalent cancer among males globally. It constitutes roughly 14.2% of newly diagnosed cancer cases in men, with an age-adjusted incidence rate of 29.4 per 100,000 individuals. Jasminum officinale L. is an ornamental plant, which possesses antiseptic, anti-ulcer, anticancer, anti-spasmodic and wound healing properties. It contains alkaloids, coumarins, flavonoids, terpenoids, steroids, phlobatanins, leucoanthocyanins and essential oils. In this study, we investigated the potential of phytochemicals from Jasminum officinale L. using a network pharmacology approach. Dr. Duke's Phytochemical and Ethnobotanical database, The Natural Products Atlas, Medicinal Plants database, Phytohub version 1.4, Coconut database, and KNApSAcK Core system databases were consulted for the phytochemicals. The SwissADME, ProTox 3.0, and CardioTOXCSM webservers were used to forecast the physicochemical, pharmacokinetic, and toxicity profile of the phytochemicals that were retrieved. The results demonstrated that the compounds were druggable and OSIRIS Property Explorer was used to forecast the drug score. Network pharmacology and enrichment analyses demonstrated that the phytochemicals will be highly effective against prostate cancer (SRC, AKT1 and EGFR). Then, molecular docking against the selected targets using Autodock tools was performed and compared with the co-crystallized ligand and standard. Owing to the various in silico studies, the compounds 2-Diacetylaminobenzoic acid, Benzyl salicylate, Caryophyllene oxide, Cis-linalol-oxide, Cis-pent-2-enyl-pentanlide, Jasmine-ketolactone, Jasminine, Kaempferol, Methyl(1R-trans)-3-oxo-2-pentylcyclopentaneacetate, Methyl-jasmonate and Oleacein were identified as hit compounds. Among them, the compounds Kaempferol and Jasminine were highly active against the tested targets with good binding energies and interaction profiles. These substances can therefore be utilized to combat prostate cancer. However, more in vitro and in vivo research is necessary.

**Keywords:** Prostate Cancer, Jasminum officinale L., In silico studies, Network Pharmacology, Molecular docking

**PL-133**

**ASSESSMENT OF PHARMACIST INTERVENTION ON DIETARY INTAKE OF SALT AMONG HYPERTENSION PATIENT**

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The intake of either too much or too little salt affects the health. Salt is a mineral composed primarily of Sodium and Chloride Ions and are used in preservation of food and electrolyte balance in our body. Sodium ions are essential for maintain the electrolyte balance, muscle contraction and electrical signaling in the nervous system. Excess consumption of salt increases the electrical conduction which leads to hypertension and cardiac disease. The study aimed to assess the optimization of salt intake by pharmacist Intervention. The Prospective, observational, randomized study was conducted with 50 hypertensive patients for the period of 6 months at Cardiology department of Karpagam hospital, Coimbatore. The study result that, Male patients were more prone to hypertension than female in 61 %. (n=15). The Lower socioeconomic patients were highly affected with hypertension in 48% (n=12). Majority of the study patients were found with comorbidities of diabetes in 55% followed by chronic kidney disease in 23%. Age wise distribution indicates that, 50-55 years of age patients are more prone to hypertension in 61%. The result indicates that, the blood pressure bring to controlled by effective counseling and Intervention. The study concludes that; there was a significant change in quality of life of the patient by the Pharmacist Intervention.

**Keywords:** Hypertension, Intervention, Comorbidity, Salt restriction.

**PL-134**

**RETROSPECTIVE ANALYSIS OF HYPERTENSION MANAGEMENT AND OUTCOMES AMONG STAGE 5-D CHRONIC KIDNEY DISEASE PATIENTS ON DIALYSIS**

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Hypertension is a major comorbidity among patients with stage 5-D chronic kidney disease (CKD) receiving maintenance hemodialysis, contributing substantially to cardiovascular morbidity and mortality. This study aimed to assess the prevalence, therapeutic management, and clinical outcomes of hypertension in this high-risk population. A retrospective cohort study was conducted at Primary kidney care Centre, involving 54 patients with stage 5-D CKD on maintenance hemodialysis. Data collected included demographic variables, serial blood pressure measurements (pre-, intra-, and post-dialysis), antihypertensive medication profiles, biomarker levels, and clinical outcomes over a one-month period. The study population consisted predominantly of males (72.5%), with a mean age of 46.3±11.71 years; the majority were within the 51–60 years age group (44.4%). Hypertension was observed in 90.4% of patients pre-dialysis and in 80.8% post-dialysis. Calcium channel blockers (nifedipine 48.1%, cilnidipine 27.7%) and beta-blockers (nebivolol 42.5%) were the most frequently prescribed agents. A significant reduction in systolic blood pressure was noted following dialysis (157.5±9.38 mmHg to 148.08±9.1 mmHg, $p<0.0001$). Laboratory findings revealed markedly reduced GFR (<10 mL/min, 30.8%) and elevated serum creatinine (>10 mg/dL, 23.1%). Clinical benefits included effective fluid overload management (92%) and correction of electrolyte imbalances (83%). Maintenance hemodialysis plays a pivotal role in blood pressure control among patients with stage 5-D CKD. Nevertheless, persistent hypertension underscores the need for individualized pharmacological regimens and integrated management strategies to mitigate cardiovascular risk and improve long-term outcomes.

**Keywords**: Hypertension, Chronic kidney disease, Hemodialysis , Biomarker.

**PL-135**

**ASSOCIATION OF COMORBIDITIES WITH GLYCAEMIC CONTROL AMONG TYPE 2 DIABETES PATIENTS**

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Type 2 diabetes mellitus (T2DM) is frequently associated with comorbid conditions such as hypertension and chronic kidney disease, which may influence treatment outcomes. Understanding the impact of comorbidities on glycemic control is essential to optimize management strategies. The objective of this study is to evaluate the relation between comorbidities and glycemic improvement in patients with T2DM. In this study total of 30 patients with T2DM were included and grouped based on the presence or absence of comorbidities where 15 patients in each group. Glycemic control was assessed by comparing baseline and 3-month follow-up HbA1c values. The primary outcome was the mean change in HbA1c, while secondary outcomes included the proportion of patients achieving HbA1c <7%. Of the 30 patients analysed, 50% had at least one comorbidity. Patients with at least one comorbidity were significantly less likely to reach the target HbA1c < 7% at 3 months than those without comorbidities. The difference was statistically significant ($p=0.009$), indicating that comorbidity status is strongly associated with poorer glycemic. In conclusion, presence of comorbidities was associated with higher HbA1c at 3 months. Whereas, patients without




ISBN: 978-81-980623-8-3

comorbidities demonstrated better glycemic improvement compared to those with comorbidities. These findings suggest that comorbid conditions may influence diabetes outcomes. Larger studies are recommended to confirm these findings.

**Keywords:** Type 2 diabetes mellitus, comorbidities, HbA1c, glycemic control.

**PL-136**

**RAPID POINT OF CARE FOR KIDNEY RELATED PROBLEM DETECTION**

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Rapid testing device for kidney related problems which is suitable for home based self testing as well as clinical screening. The rapid testing device for kidney related problems. The device is simple, rapid an non invasive diagnostic tool designed for point of care use. This device operates on the principle of electrochemical sensors, where the levels of creatinine are detected. low levels of creatinine causes kidney related diseases. so the device generally contains small micro controller, sensor, LED/LCD display, sample pad, reagent and many more. When the urine sample is applied the sensors detect the creatinine levels. The amount of creatinine can say if a person is suffering from kidney related diseases or not this method provides high sensitivity, specificity and care of interpretation making it suitable for home based self testing as well as clinical screening. The advancement includes in this is digital readers, smart phone based analysis and integration with biosensor technologies for improved accuracy. Overall this device represents a significance advancement in accessible diagnostic healthcare by combining affordability, convenience and reliability. The development of a rapid testing device for kidney related problems offers a simple, affordable and non invasive solution for early detection. By providing quick results outside of conventional laboratotries, such devices can support timely diagnosis, improve patient monitoring and potentially reduce the burden of chronic kidney disease on healthcare systems.

**PL-137**

**AWARENESS AND ACCEPTANCE OF HPV VACCINE FOR CERVICAL CANCER PREVENTION - A CROSS-SECTIONAL STUDY.**

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Cervical cancer, which is caused by Human Papillomavirus (HPV), is the second most prevalent cancer among women globally. The HPV vaccine is an essential preventive measure since it safeguards against HPV infections. This cross-sectional study examines the knowledge and attitude towards HPV among public; its connection to cervical cancer, vaccine awareness, willingness to receive it, and perceived challenges. The responses were collected through Google forms. A total of 206 participants responded the survey in which 47.8% were aware of HPV, 35% knew that HPV infection causes cervical cancer, and 29.2% knew about the HPV vaccine. A notable 52.2% of respondents expressed the view that the vaccine could lead to increased risky sexual behaviour among adolescents, and 56.7% thought only sexually active women need it. While 60.9% were ready to accept the vaccine if it was offered for free, and 40.8% felt it required more safety assurance. Based on findings, public knowledge and awareness are lacking due to insufficient education about HPV and its vaccine. And there are significant misconceptions about vaccine that hinder its acceptance. So, highlighting the need for appropriate public education programmes and awareness campaigns on cervical cancer, its prevention, and misconceptions about vaccines. Medical professionals active participation in campaigns can be effective. Tutoring medical students more about HPV infections and vaccines can help them educate the public about HPV screening and prevention. The vaccine can be made more prominent by using targeted advertisement, AI digital campaigns, and pharmacist efforts.

**Keywords:** Cervical Cancer, Human papillomavirus, HPV vaccine.

**PL-138**

**INVESTIGATION OF THE INHIBITORY EFFECTS OF PLGA-NANOPARTICLES OF SAFINAMIDE MESYLATE IN RPMI 2650 AND SH-SY5Y: AN IN-VITRO ANALYSIS**

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The current research aimed to explore the antiproliferative effects of PLGA-Nanoparticles of Safinamide mesylate (PNS) on Human squamous nasal epithelial cell (RPMI 2650 cell line) and Human bone marrow neuroblastoma cell (SH-Sy5Ycell line**)**, which represents one of the most prevalent Parkinsons' diseases (PD) associated with high incidence and mortality rates in Asian populations. The anti-parkinson's properties of safinamide mesylate in PD have not been thoroughly explored, so this study will demonstrate them. The cells received treatment with different concentrations of PNS in a dose-dependent manner (31.25,62.5,125,250,500,1000µg/ ml) and in a time-dependent (24 h) way. The viability of cells was subsequently evaluated using the MTT assay at an absorbance of 590 nm. PNS caused a decrease in cell viability and triggered apoptosis in the RPMI 2650 cell line and SH-Sy5Ycell line. PNS decreased cell growth in 24 h. Following a 24 h incubation with PNS at concentrations of 31.25, 62.5, 125, 250, 500, 1000 µg/ml, cell viability in RPMI 2650 cell and SH-Sy5Ycell line dropped from 100% in treated control cells to 63.34±0.0728, 35.34±0.028, 15.16±0.001, 5.91±0.0007, 1.05±0.0007, 0.4±0.0042 and 81.15±0.022, 64.61±0.016, 54.49±0.017, 42.97±0.015, 25.82±0.014, 4.76±0.007 respectively. The MTT assay results suggested that the PNS caused effective toxicity in RPMI 2650 cell and SH-Sy5Ycell line with IC50 value of 32.53µg/ml and 143.48 µg /ml respectively. This finding highlights the potential of PNS and probably indicates bene- ficial effects for parkinson's cell proliferation.

**Keywords:** Parkinson's disease, RPMI2650, SH-Sy5Y, PLGA Nanoparticles of Safinamide mesylate.

**PL-139**

**THE ANTIBACTERIAL, ANTIOXIDANT, AND ANTI-INFLAMMATORY PROPERTIES OF GREEN-SYNTHESIZED MAGNESIUM OXIDE NANOPARTICLES**

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This study aims to investigate the antibacterial, antioxidant, and anti-inflammatory properties of magnesium oxide nanoparticles (MgONPs) synthesized using a green method involving fresh leaves of the Kalanchoe pinnata plant. The synthesized MgONPs were characterized using UV spectroscopy, dynamic light scattering (DLS), scanning electron microscopy (SEM), and Fourier-transform infrared spectroscopy (FTIR). The antibacterial efficacy of the nanoparticles was tested against both gram-positive and gram-negative bacterial strains. Antioxidant properties were evaluated using 2,2-diphenyl-1-picrylhydrazyl (DPPH) and Phosphomolybdenum (PM) assays, while anti-inflammatory activity was assessed through the protein denaturation method. The MgONPs exhibited significant antibacterial activity, effectively inhibiting the growth of harmful bacterial strains. The antioxidant assays revealed a strong capability to scavenge free radicals, suggesting their therapeutic potential. The anti-inflammatory evaluation demonstrated the nanoparticles' ability to mitigate inflammation, highlighting their potential as natural anti-inflammatory agents. The findings of this research underscore the promising role of green-synthesized magnesium oxide nanoparticles in biomedical applications, particularly for their antibacterial, antioxidant, and anti-inflammatory properties. These insights pave the way for eco-friendly nanoparticle synthesis and their diverse uses in medicine and healthcare.

**KEYWORDS:** Kalanchoe pinnata, Magnesium oxide nanoparticles, Antibacterial, Antioxidant

**PL-140**

**PROTECTIVE EFFECT OF METADOXINE AGAINST ACECLOFENAC-INDUCED HEPATOTOXICITY IN RATS**

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ISBN: 978-81-980623-8-3

This study aimed to evaluate the protective effects of Metadoxine on liver injury caused by chronic Aceclofenac administration in male Wistar rats. The liver is vital for drug metabolism, making it vulnerable to certain drug toxicities, including those from the NSAID Aceclofenac. Metadoxine, known to accelerate alcohol clearance and protect the liver, was investigated for its potential to prevent Aceclofenac-induced damage. Over 28 days, five groups of rats were treated daily with various agents. The groups received Aceclofenac (15 mg/kg), Metadoxine (100 or 200 mg/kg), or N-acetyl cysteine (NAC, 100 mg/kg), a known hepatoprotective agent used as a positive control. The study assessed the degree of liver injury by measuring liver function tests (AST, ALT, ALP), lipid profiles, and markers of oxidative stress. Results showed that Aceclofenac alone caused a significant decrease in liver size and an elevation in AST, ALT, and ALP levels, confirming severe hepatotoxicity. This group also showed an unfavorable lipid profile (high triglycerides and LDL, low HDL). In contrast, the Metadoxine-treated groups maintained normal levels of these parameters, similar to the control group. Furthermore, Metadoxine effectively mitigated oxidative stress, increasing levels of GSH and reducing MDA, SOD, and Catalase, mirroring the protective effects of NAC. In conclusion, Metadoxine demonstrates a significant protective effect against Aceclofenac-induced liver injury in rats. These findings suggest that Metadoxine could be a beneficial therapeutic candidate for preventing hepatotoxicity in patients requiring chronic Aceclofenac treatment.

**Keywords:** Aceclofenac, Metadoxine, NAC, Hepatotoxicity, AST, SOD.

**PL-141**

**REDEFINING STROKE RECOVERY: HARNESSING NEUROPLASTICITY THROUGH MUSIC THERAPY AND ART-BASED VISUAL MOTOR TRAINING**

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Traditional stroke rehabilitation often falls short due to limited patient engagement and restricted therapeutic scope. This case series explores the use of Music Therapy and Art-Based Visual Motor Training (AVMT) as creative, non-conventional interventions to stimulate neuroplasticity in post-stroke recovery. Five patients aged 25–74 underwent 8 weeks of individualized therapy combining rhythm-based, melodic, and emotionally resonant music interventions with guided drawing, painting, and symbolic expression. Outcomes were measured using motor (Fugl-Meyer), language (Boston Naming Test, WAB), cognitive (MoCA), mood (HAM-D), and patient satisfaction scales. All patients demonstrated functional and emotional improvements. For example, upper limb motor scores improved by up to 23 points, aphasia recovery showed 35% gains in naming accuracy, and depressive symptoms (HAM-D) declined by 5–11 points. Creative engagement improved adherence and emotional well-being, even in patients with cognitive fatigue or apathy. These findings support the potential of creative therapies to activate multimodal brain networks involved in motor planning, emotional processing, and attentional control. Music and art-based approaches may serve as powerful adjuncts to conventional rehabilitation by enhancing motivation and promoting cortical reorganization. In conclusion, integrating music and visual-motor art therapies into stroke care offers a promising, patient-centered pathway to recovery. Further research is needed to better understand their mechanisms and optimize neurorehabilitation strategies through interdisciplinary, neuroplasticity-informed approaches.

**Keywords:** AVMT, Neuroplasticity, Stroke, Music Therapy, MoCA.

**PL-142**

**TAURINE MITIGATES SICKNESS BEHAVIOR IN MICE: EXPERIMENTAL EVIDENCE AND MECHANISMS**

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Sickness behavior represents adaptive behavioral modifications during infections that enhance survival by conserving metabolic resources and reducing pathogen transmission, including reduced activity, anorexia, and lethargy. By inhibiting the NF-κB pathway and reducing the production of cytokines, taurine, an amino acid that has anti-inflammatory, neuroprotective, and anxiolytic effects. This study used Swiss albino mice split into five groups (N=8) to examine the effects of taurine on lipopolysaccharide (LPS)-induced sickness behavior. Treatment groups received taurine (60 or 120 mg/kg, i.p.) or dexamethasone (1 mg/kg, i.p.) three days before LPS administration, while control groups received vehicle for three days prior to saline or LPS (0.83 mg/kg, i.p.) challenge. In-depth behavioral evaluations included brain oxidative stress analysis, elevated plus maze, open field, light-dark box, forced swim test, social interaction, sucrose preference, and food/water intake measurements. LPS treatment produced marked anorexia with decreased food/water consumption, reflecting characteristic metabolic reorganization during infection responses; it also caused pronounced anhedonia, as evidenced by decreased sucrose preference; and it significantly reduced light-dark compartment transitions, indicating decreased exploratory behavior and increased anxiety. Taurine pretreatment at both doses significantly decreased brain oxidative stress markers and attenuated LPS-induced behavioral deficits in a dose-dependent manner similar to that of dexamethasone; these neuroprotective effects were probably caused by mechanisms involving increased GABAergic transmission, antioxidant activity, maintenance of calcium homeostasis, and inhibition of the NF-κB pathway. These findings show that taurine has therapeutic potential for inflammatory conditions, suggesting that it may be used as a disease-modifying treatment that addresses behavioral symptoms as well as the underlying neuroinflammation.

**Keywords:** Acetazolamide, chitosan, central composite design, spray dryer

**PL-143**

**mRNA-BASED THERAPEUTICES BEYOND VACCINES**

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Messenger RNA (mRNA) therapeutics have transitioned from a long-standing scientific concept into a transformative reality, with the rapid development of COVID-19 vaccines demonstrating their clinical potential. The flexibility and speed of mRNA design have positioned it as a powerful platform for combating emerging viral threats. Beyond vaccines, mRNA is increasingly being explored as a versatile therapeutic modality for diverse applications, including protein replacement, cancer immunotherapy, and treatment of genetic disorders. Despite these opportunities, several challenges limit broader clinical translation. Key hurdles include avoiding unintended immune activation, achieving durable and high-level protein expression, and developing safe, efficient delivery systems capable of targeting specific tissues. Recent advances in lipid nanoparticles, modified nucleosides, and delivery strategies have begun to address these obstacles, yet optimization remains critical for long-term success. Emerging approaches, such as circular mRNA constructs and self-amplifying RNAs, offer next-generation solutions by improving stability, extending expression duration, and reducing required doses. These innovations hold promise for expanding the therapeutic scope of mRNA technologies beyond their current role in infectious disease prevention. In this review, we highlight the diverse applications of mRNA therapeutics, evaluate technological progress in design and delivery, and discuss the remaining challenges that must be overcome for broader adoption. We also explore future directions in the field, emphasizing how next-generation platforms may unlock new frontiers in medicine. Ultimately, mRNA therapeutics represent a rapidly evolving field with the potential to reshape prevention and treatment strategies across a wide spectrum of diseases.

**Keywords:** Nanoparticles, Genetic disorder, COVID 19 vaccine, mRNA Technology.

**PL-144**

**COMPARATIVE EVALUATION OF CAPOX AND FOLFOX REGIMENS WITH OR WITHOUT IRINOTECAN IN COLORECTAL CANCER: A PROSPECTIVE OBSERVATIONAL STUDY**




ISBN: 978-81-980623-8-3

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Colorectal cancer is cancer that occurs in the rectum or colon. Colorectal cancer is one among the most commonly occurring type of cancer and is also third in cancer-related mortality. Currently, CAPOX (Capecitabine and Oxaliplatin) and FOLFOX (5-fluorouracil, Leucovorin, and Oxaliplatin) are one of the conventional adjuvant treatments of colorectal cancer. To evaluate and compare the efficacy and safety of CAPOX and FOLFOX regimens, with or without irinotecan, and to assess their role in clinical outcomes of colorectal cancer patients. A prospective observational study was conducted in 158 CRC patients treated with CAPOX, FOLFOX, or their combination. Patients were enrolled using defined inclusion and exclusion criteria. Treatment efficacy, adverse effects, and clinical outcomes were documented and comparatively analysed. Of 158 patients, 62.6% received FOLFOX, 19.6% CAPOX, and 17.7% both regimens. Colon (36.7%) and rectal cancer (22%) were most common. FOLFOX was preferred and better tolerated, whereas CAPOX had more adverse effects. Combination therapy, particularly with irinotecan, yielded superior clinical outcomes. FOLFOX demonstrated superior tolerability compared to CAPOX and was the preferred regimen. Combination therapy, especially with irinotecan, showed enhanced clinical benefit, supporting its role in optimizing colorectal cancer management.

**Keywords:** Colorectal cancer, CAPOX, FOLFOX, Irinotecan, Chemotherapy

**PL-145**

## ASSESSMENT OF MEDICATION ADHERENCE IN PATIENTS WITH HYPERTENSION

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Medication non-adherence remains a major challenge in hypertension care, often resulting in uncontrolled blood pressure and preventable complications. This prospective interventional study enrolled 25 hypertensive patients and followed them over 15 days to evaluate adherence patterns, barriers, and the impact of pharmacist-led support. At baseline, adherence assessed with the MMAS-8 revealed that 44% were adherent, while 56% were non-adherent, most commonly due to forgetfulness (57%) and irregular routines (43%). Non-adherent patients received tailored pharmacist interventions, including one-to-one counselling, prioritisation of essential medicines, provision of pill organisers, and daily SMS/WhatsApp reminders. After 15 days, adherence improved significantly to 84% ($p < 0.01$), with high adherence rising from 16% to 48%. This improvement was accompanied by a meaningful reduction in blood pressure, with mean systolic values decreasing from 146.2 ± 8.5 mmHg to 137.4 ± 7.2 mmHg ($p < 0.01$) and diastolic values from 91.6 ± 5.2 mmHg to 86.1 ± 4.9 mmHg ($p < 0.05$). Patients reported high satisfaction with the interventions, particularly valuing counselling, reminders, and pill organisers. These findings highlight the important role of pharmacists in addressing practical barriers to adherence, supporting blood pressure control, and ultimately improving the quality of life for patients living with hypertension.

**Keywords:** Hypertension, Medication adherence, Pharmacist interventions, MMAS-8 scale, Blood pressure control

**PL-146**

## KNOWLEDGE, ATTITUDE AND PRACTICE TOWARDS DENGUE FEVER AMONG THE POPULATION IN RURAL COMMUNITY

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Dengue fever is caused by a mosquito- borne human viral pathogen that belongs to the genus Flavivirus of the family Flaviviridae (single, non-segmented RNA virus). Human habit of storing water, rainfall which leads to storage of water in discarded coconut shells, tires, and other material causes breeding of aedes mosquitoes, vector of dengue. The study aimed to assess the socio- demographical and health status, knowledge, attitude, and practice towards dengue among population in rural community. A cross-sectional study was conducted in rural Katheri, Salem district, Tamil Nadu involving 500 residents aged 25-70 years. After IEC approval and questionnaire design, demographic details and knowledge, attitude, and practices related to dengue were assessed, followed by systematic data analysis and report submission. A total of 515 individuals were approached, out of which 15 refused, and 500 participants were recruited, consisting of 196 males (39.2%) and 304 females (60.8%). Most of the participants were aged between 51–60 years (27%). Regarding education, 28% were illiterate, secondary (19.4%). In terms of occupation, 47.2% were employed, while 31% were homemakers. Out of these participants, 60.4% did not receive any home visits or education about dengue fever from health educators. Most of the study population had encountered dengue within their families 20.6% and social acquaintance 63%. The study showed fair knowledge and positive attitudes towards dengue, but poor awareness of transmission. Inconsistent health education and control measures highlight the need for continuous awareness programs and stronger community participation.

**Keywords:** Aedes mosquitoes, Dengue, Cross- sectional study, Rural Community, Data analysis

**PL-147**

## AGMATINE–OXYTOCIN INTERACTION: A POTENTIAL THERAPEUTIC AVENUE IN PARKINSON'S DISEASE

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Parkinson's disease (PD) is a progressive neurodegenerative disorder with multifactorial etiology involving genetic and environmental factors. Although current treatments provide symptomatic relief, there is a need for novel therapeutic strategies with disease-modifying potential. The present study was designed to investigate the interaction between agmatine and oxytocin in a lipopolysaccharide (LPS)-induced rat model of PD, characterized by motor deficits, anhedonia, tremors, and anxiety-like behaviour. Behavioural performance was evaluated using the catalepsy bar test, grip strength test, balance beam test, and open field test (OFT). Agmatine (40–80 mg/kg) and oxytocin (1.5–4.5 IU) improved behavioural outcomes, with moderate doses showing the most consistent effects. Interestingly, higher doses and their combined administration produced diminished benefits, suggesting a dose- and interaction-dependent influence. In addition, treatment alleviated LPS-induced body weight loss. Biochemical assays revealed modulation of dopamine levels and a reduction in oxidative stress, as evidenced by decreased nitrite concentrations compared with the PD control group. Collectively, the findings indicate that agmatine and oxytocin exert beneficial effects on PD-like symptoms and oxidative stress, though their interaction appears to be complex and dose-dependent. This highlights the therapeutic promise of these agents, while underscoring the importance of understanding their synergistic or antagonistic interplay in PD management.

**Keywords:** Agmatine; Oxytocin; Parkinson Disease; Lipopolysaccharide; dopamine.

**PL-148**

## SYSTEMS PHARMACOLOGY AND MULTI-SCALE MECHANISM OF BIOACTIVES FROM LIMONIA ACIDISSIMA L. IN TREATING ALZHEIMER'S DISEASE

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Alzheimer's disease is the most common type of dementia, causing up to 60-80 % of dementia cases. Limonia acidissima L. is a medicinal plant, which contains alkaloids, flavonoids, terpenoids, steroids, glycosides, tannins and settled oils. In this study, we investigated the potential of phytochemicals from Limonia acidissima L. using a systems pharmacology approach. The phytochemicals were sourced from Dr. Duke's Phytochemical and Ethnobotanical database, IMPPAT, the




ISBN: 978-81-980623-8-3

Coconut database, Phytohub version 1.4, the Medicinal Plants database, The Natural Products Atlas and the KNApSAcK Core system databases. The SwissADME, ProTox 3.0 and CardioTOXCSM webservers were used to estimate the phytochemical's physicochemical, pharmacokinetic and toxicological profiles. OSIRIS Property Explorer was used to estimate the drug score and the results demonstrated that the compounds were druggable. The network modelling and enrichment analyses predicted the phytochemical's ideal targets, which indicated that they would be extremely active against Alzheimer related targets, namely AKT1, BCL2, IL6, JUN, TNF, TP53, and STAT3. The correlation analysis was performed using Gepia2 webserver and molecular docking against the selected targets using Autodock tools was performed and compared with the co-crystallized ligand and standard. Owing to the various in silico studies, the compounds (-)-Globulol, Auraptene, Caryophyllene oxide, Dihydrosuberenol, Isoimperatorin, Marmesin, Osthenol, Osthole, Suberosin and Tanakine were identified as hit compounds. Among them, Isoimperatorin and Marmesin were highly active against the tested targets with good binding energies and interaction profiles. Thus, these compounds can be used against Alzheimer's disease. However, further in vitro and in vivo studies are warranted.

**Keywords:** Alzheimer's disease, Limonia acidissima L., In silico studies, Systems Pharmacology, Molecular docking

**PL-149**

## KNOWLEDGE, ATTITUDE AND PRACTICE TOWARDS DENGUE FEVER AMONG THE POPULATION IN RURAL COMMUNITY

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Dengue fever is caused by a mosquito- borne human viral pathogen that belongs to the genus Flavivirus of the family Flaviviridae (single, non-segmented RNA virus). Human habit of storing water, rainfall which leads to storage of water in discarded coconut shells, tires, and other material causes breeding of aedes mosquitoes, vector of dengue. The study aimed to assess the socio- demographical and health status, knowledge, attitude, and practice towards dengue among population in rural community. A cross-sectional study was conducted in rural Katheri, Salem district, Tamil Nadu involving 500 residents aged 25-70 years. After IEC approval and questionnaire design, demographic details and knowledge, attitude, and practices related to dengue were assessed, followed by systematic data analysis and report submission. A total of 515 individuals were approached, out of which 15 refused, and 500 participants were recruited, consisting of 196 males (39.2%) and 304 females (60.8%). Most of the participants were aged between 51–60 years (27%). Regarding education, 28% were illiterate, secondary (19.4%). In terms of occupation, 47.2% were employed, while 31% were homemakers. Out of these participants, 60.4% did not receive any home visits or education about dengue fever from health educators. Most of the study population had encountered dengue within their families 20.6% and social acquaintance 63%. The study showed fair knowledge and positive attitudes towards dengue, but poor awareness of transmission. Inconsistent health education and control measures highlight the need for continuous awareness programs and stronger community participation.

**Keywords:** Aedes mosquitoes, Dengue, Cross- sectional study, Rural Community, Data analysis

**PL-150**

## KNOWLEDGE, ATTITUDE, PRACTICES AND AWARENESS ON BREAST CANCER

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Breast cancer is one of the most common diseases that affect women worldwide. This study was conducted to assess the knowledge, Attitude, practices, and awareness of breast cancer as well as to assess the knowledge on breast self-examination (BSE) and clinical breast examination (CBE). The questionnaire-based study was conducted among females above the age of 18 from Komarapalayam , Namakkal district. 384 participants were randomly selected from the total population of the Komarapalayam. Data were analyzed using the Chi-square test. Following on validating the Post follow-up data, we used wilcoxan sign rank test. $P<0.05$ was considered statistically significant. 384 participants responded to the questionnaire among them 34.37% women were aged between 18-25, 59.6%women were married, 29.2 % were home maker, 40.1% were studied UG and only 2.6% were previously diagnosed breast cancer. Among them, those between the age categories of 18 to 25 demonstrated a better level of understanding on the knowledge of breast cancer. Analysis of the correlation between the overall practice score and age category revealed that the age category of 36-45 was more effective than other categories in the percentage of practice toward breast cancer conditions. We conducted a follow-up based on reevaluating the knowledge following awareness after a period of 4 months. It revealed a reasonable improvement from an average score increase of 3.54 to 12.9.

**Keywords:** Breast cancer, survey, with 384 participants, BSE/CBE, Chi-squrae test

**PL-151**

## REGENERATION OF LOST ORGANS IN HUMANS BY INACTIVATION OF P21 GENE

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Regeneration is the ability to restore lost or damaged body parts is a fascinating natural process seen across the animal kingdom. While humans can heal wounds and regenerate certain tissues like skin, liver, and blood cells, our capacity for regrowing complex structures is very limited. Interestingly, some species, such as the axolotl, can fully regrow limbs, organs, and even parts of the brain throughout their lifetime. Inspired by these remarkable creatures, researchers are exploring ways to unlock similar potential in humans. One promising path is the inactivation of the p21 gene. Normally, p21 acts like a "brake" in the cell cycle, stopping excessive cell growth. By temporarily switching off this brake, cells can multiply more freely, forming new tissue that can be reshaped into functional organs a process known as epimorphic regeneration. This approach, combined with advanced techniques like stem cell therapy, bioengineered scaffolds, and lab-grown tissues, could one day allow us to repair damaged hearts, regrow kidneys, restore hearing through ear regeneration, and even repair dental structures. Unlike traditional organ transplants, this method could reduce the need for donors, lower the risk of immune rejection, and help even severely ill patients who cannot undergo major surgery. Retinoic acid and vitamin D3 have been identified as potential tools for controlling p21 activity safely. While challenges remain such as avoiding tumor growth and addressing ethical considerations the possibility of awakening our body's hidden regenerative powers brings us closer to a future where organ loss may no longer be permanent.

**Keywords:** Regeneration, P21 Gene, Stem Cells, Tissue Engineering, Axolotl.

**PL-152**

## CHALCONE DERIVATIVES AS PROMISING LEADS FOR LIVER DISEASE MANAGEMENT: FROM CELLULAR DEFENSE TO ANTI-FIBROTICACTION"

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Chalcones, defined by the 1,3-diaryl-2-propen-1-one scaffold, are flavonoid precursors known for their diverse pharmacological properties. Their hepatoprotective potential has gained attention due to the global burden of liver diseases, which are often driven by oxidative stress, chronic, and progressive fibrosis. Chalcones act as multifaceted protectants by neutralizing reactive oxygen species (ROS), enhancing endogenous antioxidant defences such as superoxide dismutase, catalase, and glutathione peroxidase, and suppressing lipid peroxidation in hepatocytes. Additionally, they inhibit key inflammatory cytokines including TNF-α and IL-6, contributing to their anti-inflammatory profile. Representative derivative such as isoliquiritigenin and licochalcone have demonstrated efficacy in preclinical models, improving hepatocyte viability and functional biomarkers under toxic stress, such as




ISBN: 978-81-980623-8-3

acetaminophen exposure. Chalcones exhibit anti-fibrotic effects by blocking hepatic stellate cell activation and limiting collagen deposition, thereby preventing fibrosis and cirrhosis. Their biological activity is largely attributed to the unsaturated α, β-ketone group, which serves as a reactive pharmacophore. Because of alcoholism, Chemical induced food and medicine leads to Liver diseases. The present research investigation is mainly focused on the synthesis of chalcones, by Claisen-Schmidt condensation is a widely used synthetic method for generating chalcone derivatives tailored for hepatoprotective applications. Few of the chalcone derivatives have synthesized and evaluated for In vitro toxicity assays also indicate a favourable safety profile at therapeutic concentrations. Their further optimization and evaluation confirmed by Spectroscopic analysis like FTIR, Mass and NMR, etc., Future research should focus on mechanistic exploration and translational validation in vivo and clinical models to fully harness chalcones' therapeutic potential in liver disease management.

**Keywords:** Chalcones, Hepatoprotective, anti-fibrotic, anti-oxidant, Claisen-Schmidt condensation.

**PL-153**

**SMART HEALTH CARD**

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While studying digital healthcare, we came across the concept of a Smart Health Card, which we found very interesting. It is basically a digital card that uses a QR code to quickly access a patient's medical details. From our study, we learned that this card stores important information such as personal details, allergies, medical history, and even has a weight-based dose calculation tool. What makes it more useful is that in emergency situations, the card can show only life-saving information without needing internet or login, which we think is very practical. On the other hand, more detailed information like prescriptions, surgeries, and reports can be kept in a secure mode with password protection. We also learned that this system can be connected with national digital health frameworks like ABHA ID in India. Overall, from our understanding, the Smart Health Card is designed to reduce medication errors, improve patient safety, and make healthcare delivery faster and more reliable.

**Keywords:** Smart Health Card, QR code, weight-based dose calculation, emergency healthcare, digital health records.

**PL-154**

**THE FUTURE OF PHARMACOVIGILANCE: AI IN PHARMACOVIGILANCE SHAPING THE FUTURE OF DRUG SAFETY**

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Adverse Drug Reactions (ADRs) have become a significant issue in healthcare institutions leading to substantial morbidity, mortality and cost to healthcare. The traditional pharmacovigilance systems are based on spontaneous reporting, which suffers from the problem of under-reporting. Edwin GEORGE It has also been proved the contribution of AI in order to improve PV and ADRs detection. Current literature and applications of AI in pharmcovigilance, with an emphasis on machine learning algorithms, natural language processing (NLP), and real world HAs were reviewed. Informatics: AI facilitates rapid and better identification of ADRs by scanning huge amounts of structured and unstructured data, such as EHR, social media, and clinical trial databases. Machine learning algorithms can forecast potential drug safety signals and NLP strategies may enhance the retrieval of useful information from the medical record. These technologies help with the early detection, reduce reporting bias, and assist in regulatory decisions. AI may transform pharmacovigilance through ADR detection and monitoring. Its implementation in health care systems will advantage safer use of drugs, early detection signals and improved safety of patients. Artificial Intelligence (AI) has the potential to revolutionize pharmacovigilance and to enhance detection of ADRs.

**Keywords:** Artificial Intelligence, Pharmacovigilance, Adverse Drug Reaction, Machine Learning, Patient Safety.

**PL-155**

**INVESTIGATION ON THE EFFECT OF AGMATINE AND SPERMIDINE ON THE HYPOTHALAMUS–PITUITARY–THYROID (HPT) AXIS OF METHIMAZOLE-INDUCED HYPOTHYROID RATS**

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Hypothyroidism is a clinical disorder characterized by insufficient thyroid hormone production. This study evaluated the therapeutic potential of agmatine and spermidine in a methimazole-induced hypothyroid rat model, focusing on thyroid function and metabolic regulation. Adult female Sprague-Dawley rats (n = 6 per group) were divided into five groups. Hypothyroidism was induced orally by methimazole (80 mg/kg) for 21 days. After confirmation of hypothyroidism by altered serum thyroid hormone levels, treatment with agmatine (40 mg/kg) and spermidine (5 and 10 mg/kg) was administered orally for 14 days. Parameters included thyroid hormones, lipid profile, liver and kidney function, fasting glucose, serum nitric oxide, and gut microbiota. Thyroid and liver tissues were examined histologically. Methimazole significantly reduced T3 and T4 while elevating TSH, confirming hypothyroidism. It also caused weight loss, fur roughening, dyslipidemia, hyperglycemia, elevated nitric oxide, hepatic and renal dysfunction, and gut dysbiosis. Histopathology revealed thyroid follicular disruption and hepatic degeneration. Treatment with agmatine and Spermidine significantly reversed these changes. Notably, spermidine at 10 mg/kg showed the most effective restoration of biochemical and histological alterations. Both agents improved hormonal and metabolic markers and reduced tissue injury. These findings suggest agmatine and spermidine hold therapeutic promise against methimazole-induced hypothyroidism.

**Keywords:** Hypothyroidism, Methimazole, Agmatine, Spermidine, Thyroid hormones, HPT axis

**PL-156**

**IDENTIFICATION & EVALUATION OF THERAPEUTIC POTENTIAL OF HIGHLY SELECTIVE ESTROGEN RECEPTOR – BETA (ER-B) PHYTOESTROGEN IN TESTOSTERONE & N-METHYL N-NITROSO UREA (MNU) INDUCED PROSTATE CANCER MODEL**

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Overcoming the therapeutic failure due to androgen receptor (AR) resistance, remains a major global challenge in prostate cancer and selective modulation of estrogen receptor-beta (ER-β) offers a promising alternative strategy. The present study aimed to identify and evaluate a selective ER-β modulating phytoestrogen with anti-prostate cancer potential using an integrated in-silico, in-vitro, in-ovo, and in-vivo approach. A curated database of 100 phytoestrogens was established, and GPER-1 structure was predicted via homology modelling (I-TASSER), validated by Ramachandran plot and ERRAT server. The in-silico work included virtual screening, molecular docking, MM-GBSA & molecular dynamics simulations revealed Hesperetin, a bio-flavonoid, as a highly selective ER-β ligand with favourable GPER-1 affinity and binding stability. Further, the in-vitro evaluation on androgen-independent PC-3 cells demonstrated dose-dependent cytotoxicity, caspase-3 activation, and apoptotic potential (AO/EtBr staining). In-ovo assays (HET-CAM and YSM) confirmed strong anti-angiogenic activity of Hesperetin. For in-vivo validation, a novel testosterone plus N-methyl-N-nitrosourea (MNU) model was employed to induce prostate cancer in male Wistar rats, replicating molecular & histopathological features of human adenocarcinoma without surgical castration. Treatment with Hesperetin (80 mg/kg) significantly ($p<0.05$) reduced prostate weight, volume, and cancer biomarker levels, while improving survival, hormonal balance, nucleic acid concentrations, and histopathological outcomes. Collectively, these findings highlight Hesperetin as a promising ER-β selective phytoestrogen with potent anti-prostate cancer activity mediated via apoptotic, anti-angiogenic, and molecular signalling pathways. This study underscores the therapeutic potential of




ISBN: 978-81-980623-8-3

phytoestrogen-based selective ER-β modulation in prostate cancer management and supports further translational development.

**Keywords:** Prostate cancer, Estrogen Receptor-Beta, Homology modelling, Molecular Docking, Animal studies

**PL-157**

**ONCO DETECT "A RAPID AND INNOVATIVE KIT FOR BLOOD CANCER DIAGNOSIS"**

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Blood cancer such as Leukemia, Lymphoma and Multiple Myloma remain a major global health challenge due to their high mortality rates and latestage diagnosis. Current diagnostic procedures, including bone marrow biopsy and flow cytometry, though accurate are invasive, time consuming and costly. Therefore, there is a strong need for a rapid, non-invasive and affordable diagnostic method that can enable early detection and timely clinical intervention. The objective of this project is to design and develop a rapid diagnostic kit for blood cancer detection based on immunochromoatographic technology, targeting specific biomarkers and enzymes associated with hematological malignancies. The kit is based on principle of genetic markers associated with malignant blood cells using the combination of immunochromatographic technology and nanomaterial based signal amplification. The kit aims to provide a simple, one step test yielding results within 20-30 minutes. This diagnostic platform has the potential to provide a simple, rapid and cost effective tool for the early detection of blood cancers. By reducing dependency on invasive procedures and laboratory infra structure, the proposed kit could significantly improve early diagnosis, facilitate timely treatmeant, and enhance patient outcomes, especially in resource-limited settings.

**PL-158**

**THE FUTURE OF PHARMACOVIGILANCE: AI IN PHARMACOVIGILANCE SHAPING THE FUTURE OF DRUG SAFETY**

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Adverse Drug Reactions (ADRs) have become a significant issue in healthcare institutions leading to substantial morbidity, mortality and cost to healthcare. The traditional pharmacovigilance systems are based on spontaneous reporting, which suffers from the problem of under-reporting. Edwin GEORGE It has also been proved the contribution of AI in order to improve PV and ADRs detection. Current literature and applications of AI in pharmcovigilance, with an emphasis on machine learning algorithms, natural language processing (NLP), and real world Has were reviewed. Informatics: AI facilitates rapid and better identification of ADRs by scanning huge amounts of structured and unstructured data, such as EHR, social media, and clinical trial databases. Machine learning algorithms can forecast potential drug safety signals and NLP strategies may enhance the retrieval of useful information from the medical record. These technologies help with the early detection, reduce reporting bias, and assist in regulatory decisions. AI may transform pharmacovigilance through ADR detection and monitoring. Its implementation in health care systems will advantage safer use of drugs, early detection signals and improved safety of patients. Artificial Intelligence (AI) has the potential to revolutionize pharmacovigilance and to enhance detection of ADRs.

**Keywords:** Artificial Intelligence, Pharmacovigilance, Adverse Drug Reaction, Machine Learning, Patient Safety.

**PL-159**

**NEUROPROTECTIVE POTENTIAL OF ASPIDOSPERMA QUEBRACHO-BLANCO SCHLTDL. IN SCOPOLAMINE-INDUCED ALZHEIMER'S DISEASE USING ADULT ZEBRAFISH**

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This study evaluated the neuroprotective potential of Aspidosperma quebracho-blanco Schltdl. (AQB) in a scopolamine-induced Alzheimer's disease model using adult zebrafish. Six groups were designed, including a normal control, a scopolamine-induced group, a rivastigmine-treated group, and three AQB-treated groups at doses of 10, 15, and 20 mg/L. Behavioural tests such as the T-maze and light/dark preference were used to assess memory and anxiety-like behaviours, while in vitro assays including DPPH radical scavenging and MTT assays on SH-SY5Y neuronal cells evaluated antioxidant activity and neuroprotection. Histopathological analysis further assessed brain tissue integrity. Results showed that AQB significantly improved cognitive and behavioural outcomes, demonstrated by reduced transfer latency and increased preference for favourable zones, while also displaying potent antioxidant activity through effective DPPH radical scavenging. AQB inhibited acetylcholinesterase activity, suggesting enhanced cholinergic neurotransmission, and histological examination confirmed its role in preserving neuronal architecture and preventing scopolamine-induced neurodegeneration. Overall, AQB exhibited strong neuroprotective effects mediated primarily by antioxidant and anticholinesterase mechanisms, highlighting its potential as a natural therapeutic agent for mitigating cognitive decline and neuronal damage in Alzheimer's disease, and supporting its promise as a candidate for developing novel preventive and treatment strategies.

**Keywords**: Alzheimer's disease, Zebrafish, Antioxidant, Acetylcholinesterase, Neuroprotection

**PL-160**

**PRESCRIPTION ANALYSIS OF METABOLIC SYNDROME AT TWO DIFFERENT COMMUNITY PHARMACIES IN KERALA: A RETROSPECTIVE STUDY**

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Metabolic syndrome (MetS), also called insulin resistance syndrome, is a cluster of conditions that increase the risk of heart disease, stroke and diabetes. The practice of prescription of metabolic syndrome varies in different regions. So this study aims to know the prescribing pattern of 2 distinct regions in Kerala. It was an observational study and collected the data retrospectively with a duration of 5 months with 50 prescriptions each from 2 distinct regions. All the prescriptions were analysed by the XLSTAT method using Microsoft Excel. A total of 100 prescriptions were collected having MetS, 50 from each region. Maximum patients were in the age group of 51-60 years in Perumbavoor and in Thuneri, Maximum patients were in the age group of 61-70 years. 28 male and 22 female patients in both regions, indicating a male preponderance of the disease. The most commonly prescribed anti-diabetic group, was biguanides in both regions. The most commonly prescribed anti-hypertensive group either as monotherapy or combination therapy was angiotensin receptor antagonist in Thuneri. Beta-Blockers the most commonly prescribed drug for antihypertensive therapy in Perumbavoor. JNC does not recommend Beta-Blockers as first line drug for anti-hypertensive therapy. In Perumbavoor, 92% of patients were prescribed statins, and in Thuneri, 72% % of patients were prescribed statins.

**Keywords:** Metabolic Syndrome (MetS)

**PL-161**

**IMPLEMENTATION AND EVALUATION OF DRUG INFORMATION SERVICES IN SECONDARY CARE HOSPITALS: A PROSPECTIVE ANALYSIS**

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This prospective observational study evaluated the implementation of Drug Information Services (DIS) in secondary care hospitals in Suryapet over six months. The study aimed to provide drug information sources to promote quality medication use by delivering timely and accurate information about drugs to healthcare professionals. During the study period, 230 queries were received from various departments: general medicine (37%), gastroenterology (17%), orthopedics (9%), emergency medicine (8%), pulmonology (8%), dermatology (4%), general surgery (4%), gynecology (3%), and psychiatry (2%). Drug information requests




ISBN: 978-81-980623-8-3

concerned drug availability (24%), general information (13%), dosage (13%), treatment (11%), interactions (7%), pharmacokinetics (7%), and poisoning, adverse drug reactions, administration, indication, and pharmacodynamics (4% each). The service facilitated collaborations with organisations, pharmacies, and healthcare providers for education and outreach activities, encouraging medication safety. The distribution of drug information queries reveals areas that require additional assistance. By focusing on high-demand specialisations and raising awareness in underrepresented sectors, healthcare personnel can make more informed decisions related to drugs, thereby improving patient safety and treatment efficacy. Drug Information Services prove essential for enhancing medication management in secondary care settings.

**Keywords**: Drug Information Services, Drug Information Centre, Secondary care hospitals, Patient care, Adverse Drug Reactions

**PL-162**

**SYNERGISTIC THERAPEUTIC POTENTIAL OF MORUSIN AND 2',4'-DIHYDROXY-7-METHOXY-8-PRENYLFLAVAN DERIVED FROM MORUS ALBA LEAVES IN MITIGATING DIABETIC CARDIOMYOPATHY VIA NF-KB PATHWAY SUPPRESSION IN ALLOXAN-INDUCED RAT MODELS.**

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Diabetic cardiomyopathy (DCM), a severe complication of diabetes, is driven by inflammation, oxidative stress, apoptosis, and cardiac remodeling. Suppression of the NF-κB pathway is a promising therapeutic strategy. This study evaluated the synergistic potential of Morusin and 2',4'-Dihydroxy-7-methoxy-8-prenylflavan (DMP-flavan), bioactive compounds from Morus alba leaves, in alleviating DCM by targeting oxidative stress and the NF-κB pathway. H9c2 cardiomyocytes exposed to high glucose (33 mM) were used to assess ROS levels (DCF-DA fluorescence) and antioxidant enzyme activities (SOD, GPx). In vivo, alloxan-induced diabetic Wistar rats were treated with Morusin (50 mg/kg), DMP-flavan (50 mg/kg), or their combination for six weeks. Metabolic parameters, oxidative stress markers, pro-inflammatory cytokines, and NF-κB markers were analyzed. Combination therapy significantly reduced ROS levels in vitro by 45.6 ± 4.1% compared to high-glucose controls while SOD and GPx activities increased from 1.9 ± 0.3 to 4.8 ± 0.4 U/mg protein and 2.7 ± 0.4 to 5.5 ± 0.3 nmol/min/mg protein, respectively ($p < 0.01$). In vivo, combination treatment decreased FBG from 297.2 ± 12.1 mg/dL to 124.5 ± 9.2 mg/dL, HbA1c from 9.8 ± 0.4% to 6.1 ± 0.3%, and TNF-α levels from 81.4 ± 5.2 pg/mL to 38.6 ± 3.8 pg/mL ($p < 0.01$). IL-6 and IL-1β levels were similarly reduced by 50–60%. Cardiac hypertrophic index improved from 0.57 ± 0.03 to 0.34 ± 0.02 ($p < 0.01$), and histological analysis showed markedly reduced fibrosis with decreased collagen deposition. NF-κB pathway markers, including phosphorylation of IκB-α and nuclear p65 levels, were significantly downregulated, confirming suppression of NF-κB activation. Morusin and DMP-flavan synergistically mitigate DCM through NF-κB pathway suppression, reducing oxidative stress, inflammation, and cardiac remodeling.

**Keywords:** Diabetic cardiomyopathy, Morusin, 2',4'-Dihydroxy-7-methoxy-8-prenylflavan, Morus alba, NF-κB, Oxidative stress.

**PL-163**

**EFFECT OF DAPAGLIFLOZIN IN HEART FAILURE PATIENTS WITH DIABETES MELLITUS**

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This study explores the effects of dapagliflozin, a medication known as an SGLT2 inhibitor, on patients suffering from heart failure with reduced ejection fraction (HFrEF) who also have type 2 diabetes mellitus (T2DM). Dapagliflozin is currently recommended in medical guidelines for managing HFrEF because it has been shown to reduce the risk of death and illness in these patients. The research took place at Sir Thutob Namgyal Memorial (STNM) Hospital, Gangtok, and included adults aged 20 and older who were newly diagnosed with HFrEF (with a left ventricular ejection fraction of 40% or less) and T2DM. The study enrolled 69 patients divided into three groups: those with HFrEF and T2DM not taking dapagliflozin, those with HFrEF and T2DM taking dapagliflozin, and those with HFrEF but without diabetes who were also on dapagliflozin. After treatment, all groups showed significant improvements in both systolic and diastolic blood pressure, as well as in heart function measured by left ventricular ejection fraction (LVEF). The group on dapagliflozin with diabetes showed the greatest improvement, with a 9% increase in LVEF. Heart rates also normalized across all groups, suggesting better autonomic regulation. Additionally, diabetic patients taking dapagliflozin saw notable reductions in blood sugar levels, underscoring the drug's effectiveness in controlling glucose. Overall, the study confirms that dapagliflozin offers broad benefits, enhancing heart function and blood sugar control in patients with HFrEF, especially those with type 2 diabetes.

**Keywords:** Dapagliflozin, heart failure, reduced ejection fraction, type 2 diabetes, glycemic control

**PL-164**

**TRANSFORMING AMBIGUITY INTO CLARITY THROUGH DATA DRIVEN DECISION MAKING IN RISK BENEFIT ASSESSMENT OF DRUGS**

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Drug development, regulatory approval, and post-marketing surveillance are all contingent upon risk-benefit analysis (RBA). The RBA is presently being redefined by data-driven decision-making, which was formerly guided by expert opinion and clinical trial results. The integration of artificial intelligence (AI), real-world evidence (RWE), and advanced analytics facilitates a more dynamic, transparent, and objective evaluation of pharmacological safety and efficacy. The data-driven RBA integrates unstructured data, like as electronic health records and patient-reported outcomes, with structured data from pharmacovigilance databases, adverse event reports, and clinical trials. Early detection of safety signals, assessment of therapeutic benefits, and prediction of adverse drug reactions are facilitated by tools including machine learning, Bayesian modeling, and multi-criteria decision analysis (MCDA). These solutions provide continuous monitoring throughout a drug's lifecycle while enhancing regulatory evaluations. By considering clinical, demographic, and genetic subgroups, data-driven methodologies provide customized assessments. This ensures more precise identification of populations whose risks are surpassed by benefits. Despite these advancements, challenges such as interpretability, privacy, standardization, and data heterogeneity remain substantial barriers. These limits are being mitigated through continuous initiatives that integrate harmonized frameworks, explainable AI, and standardized data models.

**Keywords:** Risk-Benefit Assessment, Data Analytics Risk-Benefit Assessment, Real-World Evidence in Risk-Benefit Assessment, Predictive Modeling for Risk assessment,

**PL-165**

**PHARMACOLOGICAL INVESTIGATION ON AGMATINE IN TYPE 2 DIABETES MELLITUS WITH CO-MORBID ALCOHOLISM**

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Antidiabetic action of agmatine (40,80mg/kg,i.p.) was indicated by lowering elevated blood glucose, cholesterol, and triglyceride levels in diabetic
rats and also in alcohol-induced diabetic rats. It has shown a promising effect on the liver enzyme profile and normalized SGOT, SGPT, ALP, and amylase levels. This study thus establishes the animal model of T2DM with co-existing alcoholism and highlights evidentially the potential of agmatine in managing T2DM in alcoholic subjects. Study establishes animal model for diabetic with co-morbid alcoholism and study the pharmacological effect of agmatine in type 2 diabetes mellitus (T2DM) with co-morbid alcoholism through biochemical evaluation. Chronic alcohol consumption is a risk factor for T2DM, it disturbs glucose homeostasis and associated with the development of insulin resistance, obesity, pancreatitis, and impairment of liver function. Although agmatine has been widely used in the treatment of T2DM and alcoholism precise mechanism of its hypoglycemic action is poorly




ISBN: 978-81-980623-8-3

understood. To establish and assess an animal model for diabetics with co-morbid alcoholism and study the pharmacological effect of agmatine in T2DM with co-morbid alcoholism through biochemical evaluation. The alcohol-induced T2DM group rats were fed with Liquid Modified Diet (LMD) + ethanol (EtOH) over 3 weeks with HFD with a low dose of streptozotocin (35 mg/kg) on day 14. Other groups were fed with respective HFD or LMD or normal diet. All the groups were then evaluated for blood glucose, glucose tolerance, insulin tolerance, lipid profile, amylase, SGOT, SGPT, and alkaline phosphatase. Histopathologically liver and pancreatic morphology comparisons were also performed.

**Keywords:** T2DM. Alcoholism, Agmatine

**PL-166**

**ASSESSMENT OF AWARENESS ON SELF-REPORTING OF ADVERSE DRUG REACTIONS AMONG URBAN AND RURAL POPULATION IN BENGALURU: A COMMUNITY-BASED STUDY**

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Adverse drug reactions (ADRs) are a major public health concern and contribute significantly to preventable morbidity. The Pharmacovigilance Programme of India (PvPI) has facilitated patient-centric ADR reporting, yet community awareness and utilization remain limited. Active participation from the general public is essential to strengthen pharmacovigilance systems and ensure medication safety. To assess knowledge, attitudes, and practices related to ADR self-reporting among urban and rural communities of Bengaluru. A cross-sectional community-based study was conducted among 4,500 participants recruited using stratified random sampling. Data were collected with a pre-validated Knowledge, Attitude, and Practice (KAP) questionnaire. Sociodemographic details, education, occupation, and prior ADR experiences were correlated with awareness levels. Statistical analysis included descriptive measures and chi-square test for associations. Overall ADR self-reporting awareness was 8.3%, with significantly higher awareness among urban participants (12%) compared to rural (5%) ($p<0.05$). Education level and prior ADR experiences emerged as strong predictors of awareness. Despite low baseline knowledge, more than 70% of respondents expressed willingness to self-report ADRs if proper guidance and accessible tools were available. Dropouts accounted for <5% of participants, mainly due to incomplete responses. This large-scale community study highlights a substantial gap in ADR self-reporting awareness, particularly in rural populations. Targeted awareness campaigns and pharmacist-led interventions are warranted to promote public participation and strengthen national pharmacovigilance.

**Keywords:** Adverse drug reactions, Pharmacovigilance, Self-reporting, Community awareness, Bengaluru

**PL-167**

**THE USE OF BOTH HERBAL AND ALLOPATHIC DRUG FOR THE TREATMENT OF MALARIA IN AFRICA: A RETROSPECTIVE ANALYSIS.**

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Malaria remains one of the leading causes of morbidity and mortality in Africa, necessitating a multifaceted approach to treatment and prevention. This study provides a comprehensive analysis of the use of both allopathic (conventional pharmaceutical) and herbal anti-malarial drugs across the African continent. While artemisinin-based combination therapies (ACTs) are the cornerstone of modern malaria treatment recommended by the World Health Organization, access to and consistent use of these drugs vary significantly due to socioeconomic disparities, healthcare infrastructure limitations, and drug stockouts. Countries such as Kenya, Ghana, and Tanzania have made strides in expanding access to ACTs, yet challenges such as counterfeit medications and drug resistance—especially emerging artemisinin resistance in East Africa—undermine these efforts. In parallel, the use of traditional herbal remedies remains widespread, particularly in rural communities where access to formal healthcare is limited. Herbal treatments derived from plants such as Artemisia annua, Azadirachta indica (neem), and Cryptolepis sanguinolenta are commonly used either as standalone therapies or in combination with allopathic drugs. These remedies are often administered based on indigenous knowledge passed down through generations. While some herbal treatments exhibit promising antiplasmodial activity, most lack rigorous clinical validation, standardization, and regulation, raising concerns over safety and efficacy. This analysis highlights the need for integrated approaches that recognize the cultural relevance of traditional medicine while reinforcing the use of evidence-based allopathic treatments. Strengthening regulatory frameworks, promoting pharmacovigilance, and fostering research on herbal therapies can enhance malaria treatment outcomes and bridge the gap between traditional and modern healthcare systems in Africa.

**Keywords:** Anti-malarial drugs, Herbal remedies, Artemisinin, Pharmacovigilance, Combination therapy.

**PL-168**

**EFFECT OF NATTOKINASE ON COGNITION AND MEMORY IN D-GALACTOSE-INDUCED ACCELERATED AGING MOUSE MODEL**

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Aging is a complex biological process commonly associated with cognitive decline, oxidative stress, and neuronal dysfunction. Despite the clear unmet medical need, few interventions have been tested for their ability to restore memory and cognitive function in preclinical models of aging. Nattokinase, a serine protease extracted from Natto (fermented soybeans), exhibits potential antioxidant, neuroprotective, and vasoprotective effects. The present study was designed to investigate the influence of Nattokinase on cognition and neurochemistry in a D-galactose–induced accelerated aging mouse model. Mice were administered D-galactose (150 mg/kg, s.c.) for eight weeks to simulate features of aging, followed by Nattokinase (50, 100, 200 mg/kg, i.p.) treatment. Cognitive performance was evaluated using the Radial Arm Maze (RAM) and the Open Field Test (OFT). Biochemical markers, including malondialdehyde (MDA), catalase, reduced glutathione (GSH), acetylcholinesterase (AChE), cholesterol, glucose, and calcium, were also measured. D-galactose administration significantly increased MDA, AChE, calcium, and cholesterol, while decreasing catalase and GSH levels, confirming oxidative damage and neurochemical imbalance. Interestingly, Nattokinase treatment reversed these alterations, restoring antioxidant defense, calcium homeostasis, and synaptic function. Behavioral analysis also demonstrated enhanced memory and reduced anxiety-like behavior in D-galactose-treated mice. In conclusion, Nattokinase intervention alleviates cognitive and biochemical deficits associated with accelerated brain aging via its potent antioxidant and neuroprotective properties, warranting further exploration for its therapeutic potential against age-related cognitive decline and memory deficits.

**Keywords:** Aging, Nattokinase, D-galactose, Cognitive impairment, Neuroprotection.

**PL-169**

**ANTI-INFLAMMATORY AND ANTIARTHRITIC POTENTIAL OF TOPICAL BOSWELLIC ACID NANOEMULGEL FORMULATION IN AN ANIMAL MODEL**

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Rheumatoid arthritis (RA) is a chronic, systemic autoimmune illness that primarily affects the elderly globally. Boswellic acid (BA), a bioactive molecule derived from Boswellia serrata (Indian frankincense), has long been used in Ayurveda and modern herbal therapy because of its potent anti-inflammatory properties. It reduces inflammation by acting as a potent 5-lipoxygenase (5-LO) inhibitor. This study examined the anti-inflammatory and anti-arthritic efficacy of BA-loaded nanoemulgel formulations in rats with arthritis caused by formaldehyde and complete Freund's adjuvant (CFA) by topical application. Nanoemulsion (BN11),




ISBN: 978-81-980623-8-3

Nanoemulgel (A10), and Argan oil-based Nanoemulgel (A11) were the three optimised BA formulations that were assessed. The results indicated that A11 had the most pronounced decrease in paw oedema and inflammation in both models relative to BN11 and A10. Daily application of BA formulations for three weeks reduced IL-6 and TNFα, indicating its anti-inflammatory action. Radiographic investigations demonstrated that BA nanoemulgel restored joint space, reduced soft tissue swelling and prevented bone erosion in CFA-induced arthritis. Histological analysis further indicated restoration of synovial hyperplasia, inflammatory infiltration, cartilage destruction and bone resorption, especially following nanoemulgel treatment. Overall, BA nanoemulgel significantly enhanced anti-arthritic efficacy, as evidenced by decreased inflammation, reduced arthritis scores, cytokine suppression, and restoration of radiological and histopathological parameters.

**Keywords:** Boswellic acid, Nanoemulgel, Anti-arthritic, CFA model, Topical Delivery

**PL-170**

## EVALUATING THE BURDEN OF ADVERSE DRUG REACTIONS IN THE GERIATRIC POPULATION: A HOSPITAL-BASED OBSERVATIONAL STUDY

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Elderly individuals are particularly vulnerable to adverse drug reactions due to factors such as multiple medications, age-related physiological changes, and chronic health conditions. This study aimed to evaluate the severity and causality of Adverse Drug Reactions in geriatric subjects. A prospective observational study was conducted over six months involving 250 patients aged 60 years and above. Data on suspected ADRs were collected through patient interviews, clinical records, and physician inputs. Each ADR was assessed using WHO-UMC Causality Assessment Scale**,** and severity was graded with the Modified Hartwig and Siegel Severity Assessment Scale**.** Among 250 patients, 40.4% were on monotherapy and 59.6% on polytherapy. A total of 62 adverse drug reactions (ADRs) were reported, with most classified as "probable" (67.7%) and mild (69.8%). At the time of assessment, 59.7% were recovering, 37.1% had recovered, and 3.2% had not recovered. ADRs remain a major concern in the elderly due to age-related changes, comorbidities, and polypharmacy. Using tools like the WHO-UMC and Hartwig scales in routine care can enhance ADR detection and management, ensuring safer medication use in geriatric patients.

**Keywords:** Adverse drug reactions, Geriatric population, Polypharmacy, Drug safety, Causality assessment

**PL-171**

## GUT MICROBIOTA: A NOVEL APPROACH IN DIABETES MANAGEMENT

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Diabetes mellitus is a complex metabolic condition that involves continuous hyperglycemia, insulin resistance, and chronic complications. The intestinal microbiota has enjoyed considerable focus in recent years, as a fundamental controller of host metabolism and immune functionality. A shift in the balance of microbes present in the gut, dysbiosis, is becoming associated with type 2 diabetes development and progression. The lack of beneficial microbes in adequate proportions (Bifidobacterium and Lactobacillus) and the rise in the number of pathogenic species can facilitate the impaired functioning of the intestinal barrier, chronicized low-grade activity and the insulin-insensitivity. Medical maintenance of intestinal microbes is a potential constructive method to enhance glycaemic regulation. Treatment with probiotics, prebiotics, synbiotics and dietary fibers improves diversity of microorganisms, short-chain fatty acid (SCFA) production and glucose homeostasis. Plant-based polyphenols and phytochemicals play an additional role as selective stimulators of good bacteria growth and the alleviation of oxidative stress. More aggressive approaches like fecal microbiota transplantation (FMT), next-generation probiotics are under testing in order to provide sustained metabolic benefits. Also, it is recommended that intestinal microbiota has the capacity to change the pharmacodynamic effect of medications such as metformin, and therefore could be utilized in individualized antidiabetic treatment. Overall, attacking gut microbiota is a new and holistic method of diabetes management. Greater comprehension of the host-microbe relationships would facilitate the creation of safe, natural and patient-specific methods to overcome the increasing global burden of diabetes.

**Keywords**: Diabetes Mellitus, Hyperglycemia, Intestinal microbiota, Dysbiosis, Intestinal barrier, Fecal microbiota transplantation (FMT), Next-generation probiotics.

**PL-172**

## TELEMEDICINE: TRANSFORMING HEALTHCARE DELIVERY IN THE DIGITAL AGE

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Telemedicine, the use of digital technologies to deliver medical services remotely, has emerged as a revolutionary tool in modern healthcare. This review explores the evolution, components, benefits, challenges, and future perspectives of telemedicine, highlighting its potential to improve accessibility, cost-effectiveness, and patient outcomes, especially in underserved regions.

**Keywords:** Telemedicine, Remote Healthcare, Digital Health, E-Consultation, Telehealth, health, Health Access

**PL-173**

## A COMPARATIVE STUDY ON EFFICACY, SAFETY AND COST EFFECTIVENESS ANALYSIS OF CEPHALOSPORINS AND CARBAPENEMS IN THE MANAGEMENT OF URINARY TRACT INFECTIONS

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Urinary Tract Infection (UTI) is defined as the presence of microorganisms in the urinary tract that cannot be accounted for by contamination. Infections of the urinary tract include urethritis, cystitis, prostatitis, and pyelonephritis. UTI is approximately 30 times higher in females than in males. The incidence of bacteriuria is 1.2% among females and 0.03% among males. To compare the efficacy and safety of Cephalosporins and Carbapenems in UTIs and to analyze cost-effectiveness between the two groups. A prospective observational study was conducted over 7 months in the Department of General Medicine, NRI General Hospital. Clinical outcomes, adverse drug reactions (ADRs), and treatment costs were assessed in patients receiving either Cephalosporins or Carbapenems. A total of 93 patients were enrolled, of whom 69 (74%) had complicated UTI and 24 (26%) had uncomplicated UTI. The relative risk for Cephalosporins versus Carbapenems in complicated UTI was 0.7460 (CI-95%, p=0.05), indicating equal efficacy. In uncomplicated UTI, the relative risk was 1.7500 (CI-95%, p=0.003), showing Cephalosporins were more efficacious than Meropenem. ADRs were reported in 3 of 32 patients treated with Meropenem for complicated UTI. The mean treatment cost of Cephalosporins (Rs. 3147.55 in complicated; Rs. 3130.37 in uncomplicated) was significantly lower than that of Carbapenems (Rs. 3724.62 in complicated; Rs. 55890.5 in uncomplicated). Both Cephalosporins and Carbapenems are efficacious in complicated and uncomplicated UTIs, but Cephalosporins are more cost-effective.

**Keywords:** Cephalosporins, Carbapenems, Urinary tract infections, Cost-effectiveness.

**PL-174**

## EFFICACY ASSESSMENT OF CART-FILL DRUG DISTRIBUTION SYSTEM IN A SOUTH INDIAN TERTIARY CARE TEACHING HOSPITAL

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This study assessed the efficacy of a cart-fill drug distribution system at a South Indian tertiary care teaching hospital. A data collection form and standard operating procedure were developed for implementation. The duty pharmacist verified e-prescriptions for transcribing errors, while the research pharmacist verified prescriptions for drug-related issues and cross-verified filled medications for accuracy. Filled medicines were provided to patients with safety instructions. Clinician and patient satisfaction was assessed using feedback questionnaires. Approximately




ISBN: 978-81-980623-8-3

2000 prescriptions were reviewed, with 502 (25.1%) errors identified and corrected. Most errors were dispensing errors (64.14%) and transcribing errors (17.52%). Significant error reduction ($p<0.01$) was observed. Drug returns decreased and average medication supply time was under 45 minutes. Both clinicians and patients expressed satisfaction. The cart-fill drug distribution system ensured medication accuracy within scheduled timeframes, decreased pharmacy returns, and increased patient satisfaction.

**KEY WORDS** Cart-fill drug distribution, Transcription errors, Dispensing errors, E-prescriptions, Drug returns

**PL-175**

## IMPACT OF PHARMACIST-MEDIATED PATIENT COUNSELLING ON KNOWLEDGE, ATTITUDE, AND PRACTICE OF TYPE 2 DIABETES MELLITUS PATIENTS: A PROSPECTIVE OBSERVATIONAL STUDY

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This prospective observational study assessed the impact of pharmacist-mediated patient counselling on knowledge, attitude, and practice (KAP) of Type 2 Diabetes Mellitus (T2DM) patients. The study was conducted in endocrinology departments of secondary care hospitals in Suryapet, Telangana, from August 2024 to February 2025. Eighty T2DM patients were enrolled. A structured 20-item KAP questionnaire was administered at baseline and after 2–3 weeks of counselling. Patients received personalized counselling on disease management, lifestyle modification, and medication adherence. Among participants, 66.25% were male, with majority aged 51–70 years. Post-intervention analysis showed significant improvements in KAP scores: knowledge (343.33 to 616.66), attitude (243.33 to 460), and practice (276.66 to 473.33). Counselling improved awareness of symptoms, dietary guidelines, medication adherence, and lifestyle adjustments. Pharmacist-led patient counselling significantly enhances diabetic patients' knowledge, promotes positive attitude, and improves self-care practices. These improvements support better glycemic control and reduce complications risk. Incorporating structured counselling programs into routine diabetic care is recommended, especially in resource-limited settings.

**KEY WORDS**: Type 2 Diabetes Mellitus, Patient Counselling, Knowledge-Attitude-Practice, Observational Study, Pharmacist Intervention

**PL-176**

## PROSPECTIVE OBSERVATIONAL RESEARCH OF CHRONIC KIDNEY DISEASE PATIENTS WITH PRE-EXISTING COMORBIDITIES INCLUDING, PRESCRIPTION PATTERN AND RISK FACTORS IN PATIENTS IN A TERTIARY CARE HOSPITAL

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Chronic Kidney Disease (CKD) is one of the major health concerns all over the world. Our study provides a clarified view for epidemiology in hospital settings identifies risk factors associated with Pre-existing co-morbidities and studies the prescribing pattern of chronic kidney disease. A prospective observational study was conducted in the inpatient general medicine department of a tertiary care hospital. Total 210 patients were studied over period of 6 months for epidemiological studies of chronic kidney disease (CKD) and existing comorbidities, the prescribing pattern of CKD and risk factors associated with comorbidities. The prescription pattern was assessed using KIDGO guidelines for the treatment of CKD and drugs are classified by ATC classification. The study included 210 patients of chronic kidney disease with comorbidities reported 62% male and 38% female. Socio-epidemiological studies show more prevalence in urban than rural and the most commonly observed risk factors associated were hyper-tension and diabetes. Laboratory reports analyzed showed fluctuation levels throughout the stages. Complications include diabetic nephropathy and hypertensive nephropathy and mostly anemia is a major concern. The total prescription contains 3360 drugs out of which 2308 were from the WHO essential drug list. The average drug prescribed to patients was 16-17 drugs. And antimicrobial drugs per prescription were found to be 3-4. In renal transplantation analysis recurrence of CKD is observed. The study concluded that results were significant and provide a precise view of the prevalence and risk factors associated with chronic kidney disease. Prescriptions pattern quantifies use of the high potential drugs.

**Keywords:** Chronic kidney disease, Complications, Prevalence of CKD, Renal replacement, Risk factors of CKD, Prescription pattern.

**PL-177**

## ESTIMATION OF HORMONE THERAPY IN BREAST CANCER PATIENTS

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The aim of the study is to evaluate hormone replacement therapy for breast cancer patients. The goals are to analyses the evaluation of progesterone and estrogen level in a breast cancer in patient, to evaluate and management of hormone therapy breast cancer and to evaluate the role of HER 2 receptors in breast cancer. For a six-month period, a prospective observational study was conducted among the patients in the oncology department at the Erode Cancer Center in Thindal. The investigation was not open to patients who were younger than 20 or who refused to participate in the trial. Reports on prescription patterns, co-morbidity, and individual demography were made available. The current study was conducted in the 100-bed inpatient oncology department. All female and male patients with breast cancer who were at least 20 years old and willing to provide consent were included in the study. The study excluded individuals who are not willing to participating in the study, severally ill patients, Patient who are below 20 years of age, Pediatrics patients. To obtain the necessary patient data, a correctly designed data collection form was utilized to gather information from patient interviews and the medical file. Clinical pharmacy services will be expanded in patient care through the use of a validated questionnaire and concluded that 70% of patients with metastatic breast cancer have hormone receptor-positive, HER2-positive illness, our study concluded that the main reason for the metastatic breast cancer is that HER-2-positive hormone levels was found to be increased.

**Keywords**: Breast Cancer, Hormone therapy, Metastatic disease

**PL-178**

## COMPARATIVE STUDY OF EFFICACY, SAFETY AND COST EFFECTIVENESS OF IV FERRIC CARBOXYMALTOSE WITH IRON SUCROSE IN ADULT PATIENTS WITH IRON DEFICIENCY ANEMIA

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Iron deficiency anemia (IDA) is a major global health concern, especially in developing countries like India. Oral iron therapy often leads to poor compliance due to gastrointestinal side effects, and blood transfusions carry risks. Intravenous (IV) iron therapy is preferred, with Iron Sucrose (IS) commonly used in multiple small doses. Ferric Carboxymaltose (FCM), a newer IV formulation, allows higher single doses with faster administration. Despite its increasing use, there is limited comparative data on the efficacy, safety, and cost-effectiveness of FCM versus IS in adult IDA patients. This study aims to evaluate and compare these two IV iron therapies. To assess the efficacy, safety and cost effectiveness of Intravenous FCM compared with IS for treating IDA. A prospective observational study was conducted over 6 months on patients over 18 years diagnosed with IDA. Patients with other types of anemia or a history of anaphylactic reactions to IV iron were excluded. Demographic data, medical history, diagnosis, and baseline hematological parameters (Hb, MCV, MCH) were collected. Participants were divided into two groups: one received intravenous IS, and the other received FCM. After 2-4 weeks, hematological parameters were reassessed to evaluate treatment efficacy. Safety was assessed through patient interviews, with adverse drug reactions (ADRs) documented and analyzed using WHO causality assessment scale. Clinical outcomes were compared using Student's t-test, and cost-effectiveness were evaluated using Incremental Cost-Effectiveness Ratio (ICER). In FCM group, Hemoglobin (Hb) increased from baseline 8.1 ± 0.75 to post- intervention 10.74 ± 0.94 g/dL, MCV from 68.68 ± 9.44 to 81.17 ± 9.92 fL, and MCH from 19.67 ±




ISBN: 978-81-980623-8-3

4.21 to 25.56 ± 4.39 pg with a p-value of <0.05. In IS group Hemoglobin (Hb) increased from baseline 8.1 ± 0.83 to post-intervention 10.24 ± 1.39 g/dL, MCV improved from 74.95 ± 10.31 to 80.63 ± 14.49 fL, and MCH also increased from 22.75 ± 5.01 to 26.47 ± 4.33 pg with a p-value of <0.05. Comparing post-intervention values between the two groups, Hb in FCM group: 10.74 ± 0.94 g/dL, IS group 10.24 ± 1.39 g/dL, with a P-value of <0.0001. Similarly, MCV in FCM group 81.17±9.92 fL. In IS: 80.63±14.49 fL with a P-value of 0.854 and MCH in FCM: 25.56±4.39 pg and IS: 26.47±4.33 pg with a P-value of 0.354.

**Keywords:** Iron deficiency anemia, Ferric Carboxymaltose, Iron Sucrose, Cost effectiveness

**PL-179**

## PHARMACOECONOMIC ASSESSMENT OF HERBAL ADAPTOGEN THERAPY (WITHANIA SOMNIFERA) COMPARED TO CONVENTIONAL ANXIOLYTICS IN THE MANAGEMENT OF GENERALIZED ANXIETY DISORDER

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Generalized Anxiety Disorder (GAD) is a psychiatric condition that imposes both clinical and economic burden, affecting nearly 7–8% of the Indian population, contributing to reduced productivity and quality of life. Conventional anxiolytics such as SSRIs and benzodiazepines are effective but associated with adverse events, dependency, and higher long-term costs. Withania somnifera a traditional adaptogen, has demonstrated anxiolytic activity in many clinical studies, yet limited evidence exists on its pharmacoeconomic relevance. The present study was designed to compare the cost-effectiveness of Ashwagandha with conventional anxiolytics. Retail market prices were analysed to estimate average monthly treatment costs: Ashwagandha capsules 500 mg BID (₹600), escitalopram 10 mg OD (₹1,200), and alprazolam 0.5 mg BID (₹900). Clinical effectiveness values were derived and expressed as mean reduction in Hamilton Anxiety Rating Scale (HAM-A) scores over 8 weeks: Ashwagandha 12 points, escitalopram 13 points, alprazolam 11 points. A decision-analytic model was constructed using TreeAge Pro. Incremental Cost-Effectiveness Ratios (ICERs) were calculated, and Monte Carlo simulations were applied for probabilistic sensitivity analysis. Results showed that Ashwagandha produced a comparable reduction in HAM-A scores at nearly 50% lower monthly cost than SSRIs, with ICER analysis indicating a saving of ₹50 per unit reduction. Sensitivity testing confirmed robustness in over 85% of simulations, supporting Ashwagandha as a cost-effective alternative for GAD management.

**Keywords:** Ashwagandha, Withania somnifera, Generalized Anxiety Disorder, Pharmacoeconomics, Cost-Effectiveness, Anxiolytics

**PL-180**

## AN OBSERVATIONAL STUDY ON THE OCCURRENCE OF DRUG INTERACTION IN THE DEPARTMENT OF PHARMACY PRACTICE IN A TERTIARY CARE HOSPITAL

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Drug interactions occur when one drug alters the effect of another in the body. These interactions can either amplify or diminish the effects of drugs. Drug interactions can occur between prescription medications, OTC drugs and even herbal supplements. To manage drug interactions, it is crucial that patients communicate about medications being taken. Aim of the study was to determine the occurrence of drug interactions in the department of pharmacy practice in a tertiary care hospital. This research determined the percentage, severity, age, gender, polypharmacy, category and major interacting drug pairs. This is an observational study done for 3 months involving 100 patients. The DDIs were identified using Lexicomp. From the 100 cases, 443 DDIs were identified. Based on severity, most interactions were found to be moderate (62.75%). The most prone age group were 41-60 (35%). Males (55%) experienced more DDIs than females. According to the study, DDIs increased with the increase in number of prescribed drugs. Polypharmacy was present in most of the cases (59%), mainly in the age group 41-60 (37%). Out of the 443 DDIs, majority of the drug interactions were in the category GI agents (17.9%) & most identified interaction was Paracetamol with Ondansetron (1.8%).

**Keywords:** Severity, gender, polypharmacy

**PL-181**

## RECENT ADVANCEMENTS AND CUTTING EDGE TECHNOLOGIES FOR LIFE THREATENING DISEASE TREATMENT

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The continuous evolution of pharmaceutical sciences has led to remarkable advancements in novel drug delivery systems and formulation strategies that address the limitations of conventional dosage forms. Cutting-edge patented technologies such as Doxil liposomes, Zoladex impants for prostate cancer, Prostep SR, Gliadel waffle for malignant glicoma, microspheres, Vivagel dendrimers for bacterial vaginosis wide variety of MRI contrasting agents like Gadolinium and Cutanova solid lipid nanoparticles, various lipid based m-RNA vaccines and gene therapies have emerged as versatile platforms for precise drug delivery. Furthermore, the integration of 3D-4D printing in personalized medicine, stimuli-responsive smart biodegradable polymers, and hybrid nanomaterial has redefined the scope of formulation design. Recent innovations focus on improving bioavailability, enhancing therapeutic efficacy, ensuring patient compliance, and achieving targeted or controlled release of drugs. Advances in biopharmaceuticals, including monoclonal antibodies, vaccines, and gene delivery vectors, also highlight the transition toward more sophisticated therapeutic approaches. Regulatory acceptance of novel excipients, the application of artificial intelligence in formulation optimization, and the adoption of green pharmaceutical technologies further accelerate progress in this domain. Collectively, these advancements not only broaden the therapeutic landscape but also pave the way for safer, more effective, and patient-centric pharmaceutical products for life threatening diseases in near future.

**Keywords:** Zoladex, regulatory, nanoparticles, dendrimers, potential

**PL-182**

## ADR AS A CONSEQUENCE OF DRUG-DRUG INTERACTION: AN OBSERVATIONAL RETROSPECTIVE STUDY

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Drug-Drug interaction is an important issue in clinical practice as management of co-morbidities necessitates polypharmacy and some of these interactions can transmute into or accentuate Adverse drug reactions. A retrospective observational study was carried out in ADR occurred in SH Medical Centre, a tertiary care hospital in Kottayam district of Kerala for a period of 3 months. The study is to determine the occurrence of Adverse drug reaction as a consequence of Drug-Drug interaction. Reported ADR forms were reviewed and data were analyzed using SPSS software. Statistical analysis was done using MS EXCEL spreadsheet. A total of 151 ADR reports were collected from the Department of Pharmacy Practice which met the inclusion criteria. 185 PDDIs were identified from reported ADRs. Of these 30 matched the description of ADRs. Among 30 DDIs, 24 (80%) were pharmacodynamic and 6 (20%) were pharmacokinetic. The study concluded that DDIs attributed to 19.86% ADRs.

**Keywords:** Adverse Drug Reaction, Drug-Drug interaction, Potential Drug-Drug interaction, Pharmacokinetic interaction, Pharmacodynamic interaction.

**PL-183**

## ASSESSMENT OF EFFICACY AND TOXICITY OF NEOADJUVANT TCHP REGIMEN IN EARLY, LOCALLY ADVANCED HER2-POSITIVE BREAST CANCER

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ISBN: 978-81-980623-8-3

HER2-positive breast cancer is an aggressive subtype where timely neoadjuvant therapy significantly improves surgical outcomes and survival. The TCHP regimen (Docetaxel, Carboplatin, Trastuzumab, Pertuzumab) has shown promise in achieving higher pathological complete response (pCR). Emerging tools such as biomarker-guided monitoring (Ki-67, HER2 copy number) and AI-assisted imaging analytics now enable precise assessment of efficacy and early detection of toxicities, offering a patient-centered approach. To evaluate the efficacy of the neoadjuvant TCHP regimen in achieving clinical and pathological response in early and locally advanced HER2-positive breast cancer. To assess treatment-related toxicities using both conventional grading and AI-supported predictive modelling. A prospective interventional study was conducted on 60 HER2-positive breast cancer patients (early and locally advanced). Patients received 6 cycles of TCHP every 21 days. Efficacy was measured by radiological tumor response (RECIST 1.1), AI-assisted MRI volumetric analysis, and pCR at surgery. Toxicity was assessed by CTCAE v5.0 and validated using an AI-based adverse event monitoring system (OncoPredict AI®). Biomarkers (Ki-67, CRP, HER2 gene amplification) were analyzed pre- and post-treatment. The TCHP regimen achieved an overall clinical response rate of 85%, with pCR in 57% of patients. AI-assisted MRI detected early tumor shrinkage trends with 92% concordance to pathological findings. Patients with high baseline Ki-67 and HER2 amplification showed better pCR rates ($p < 0.05$). The most frequent toxicities were neutropenia (42%), diarrhoea (28%), fatigue (25%), and mucositis (18%). Grade 3/4 toxicities occurred in 20% of cases, primarily neutropenia and diarrhoea, but were mitigated through proactive supportive interventions guided by AI risk alerts. Importantly, AI monitoring reduced ADR detection time by 50% and improved pharmacist intervention efficiency by 40%.

**Key Words:** HER2-positive breast cancer, Neoadjuvant TCHP, Pathological complete response, AI-assisted imaging, Biomarkers, Toxicity prediction.

**PL-184**

## ROSUVASTATIN AMELIORATES DOXORUBICIN-INDUCED CARDIOTOXICITY IN EXPERIMENTAL RATS BY MINIMIZING OXIDATIVE STRESS.

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Cardiovascular diseases (CVDs) are a global health problem, with projections suggesting 23.6 million deaths by 2030. This study aimed to examine the protective impact of rosuvastatin (RSS), an oral antihyperlipidemic drug against cardiac damage caused by doxorubicin in rats. On the 20th day of the experiment, the rats were given doxorubicin injections (10 mg/kg, i.p.), resulting in cardiac toxicity. The control group didn't receive doxorubicin, but all other groups did. Cardiac marker enzymes such as Creatine Kinase-MB (CK-MB), Lactate dehydrogenase (LDH) and liver marker enzymes such as aspartate aminotransferase (AST), Alanine aminotransferase (ALT), as well as In vivo antioxidants (superoxide dismutase, catalase), were measured to assess RSS's impact on acute treatment. Myocardial tissue histological changes were examined using haematoxylin and eosin staining. Following doxorubicin dosing, cardiac marker enzymes elevated significantly, indicative of myocardial damage, whereas with RSS (10 mg/kg, p.o.) administration, CK-MB, LDH, AST, and ALT levels all saw prominent decreases ($p<0.05$). The in vivo antioxidant levels were significantly elevated by the RSS administration. The acute administration of RSS led to a significant reduction in cardiac and liver enzymes and enhanced In vivo antioxidant activities, demonstrating its cardioprotective effect. The findings were corroborated through histopathological examinations. The cardioprotective effects of RSS in rats may be attributed to its ability to alleviate oxidative stress damage.

**Key words:** Cardioprotective, Rosuvastatin, Doxorubicin, Cardiotoxicity, Oxidative stress.

**PL-185**

## EVALUATION OF NEUROPROTECTIVE EFFECTS OF ETHANOLIC EXTRACT OF PHYLLANTHUS EMBLICA LEAVES AGAINST BEHAVIOURAL DEFICITS IN KETAMINE-INDUCED SCHIZOPHRENIA IN WISTAR ALBINO RAT: FOCUSING ON OXIDATIVE STRESS STATUS

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The present study investigates the neuroprotective effects of the ethanolic extract of Phyllanthus emblica leaves against behavioral deficits induced by ketamine in Wistar albino rats, with a focus on oxidative stress status. Rats were divided into control, ketamine-treated, standard (Haloperidol), and P. emblica extract-treated groups at doses of 200 and 400 mg/kg. Schizophrenia-like symptoms were induced by chronic ketamine administration, followed by oral treatment with vehicle, Haloperidol, or P. emblica extract. Behavioral assessments included Cook's pole climbing test, forced swimming test, Y-maze test, and open field test to evaluate positive symptoms, negative symptoms, cognitive deficits, and locomotor activity. Biochemical analyses such as superoxide dismutase (SOD), catalase, lipid peroxidation, glutathione assay, and protein assay were conducted to assess oxidative stress markers. Histopathological studies were carried out to examine neuronal integrity and structural changes. The results showed that P. emblica extract significantly improved behavioral performance and restored antioxidant enzyme levels, while histopathological evaluation revealed marked neuroprotection against ketamine-induced neuronal damage. These findings suggest that P. emblica possesses notable neuroprotective and antipsychotic-like properties, likely mediated through its antioxidant potential.

**Keywords:** Phyllanthus emblica, ketamine, schizophrenia, neuroprotection, oxidative stress, behavioral deficits, open field test, histopathology, Wistar albino rats.

**PL-186**

## ESTABLISHMENT OF VIRTUAL CLINICAL PHARMACY SERVICES (VCPS)

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In the current research it explores the feasibility of establishing Virtual Clinical Pharmacy Services (VCPS) in Indian hospitals, focusing on awareness, readiness, barriers, and potential impact. A quantitative, cross sectional survey was conducted among licensed pharmacists and Pharm.D interns using a structured questionnaire, with responses analyzes through descriptive statistics and thematic review. Findings revealed strong awareness of VCPS (76%) and high perceived importance (82%), reflecting a growing digital health momentum in India. Respondents highlighted VCPS role in reducing medication errors, enhancing patient safety, improving satisfaction, and addressing healthcare disparities, particularly for chronic, pediatric, and rural patients. However, infrastructural and financial limitations emerged as key challenges, with only 17% reporting adequate infrastructure and 72% citing setup costs as a major barrier. Despite this, 69% indicated willingness to adopt VCPS, suggesting high implementation potential and policr reform. Ethical concerns, especially data privacy (39%), alongside limited regulatory frameworks, were also identified as barriers. Respondents emphasized the need for government support, structured training, and AI integration. Overall, the findings underscore VCPS as a cost effective and scalable strategy for improving healthcare outcomes in India. Strategic priorities include infrastructure enhancement, policy clarity, and workforce development to enable successful integration into mainstream healthcare.

**Keywords:** Virtual Clinical Pharmacy Services (VCPS), Digital health, Pharmacist readiness, Healthcare barriers, Patient safety.

**PL-187**

## NEUROTROPHIC EVALUATION OF SEA ANEMONES IN IN-VITRO PARKINSON'S MODEL

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Parkinson's disease (PD) is the fastest-growing neurodegenerative disorder worldwide, projected to affect over 13 million individuals by 2040. Current pharmacotherapies, including levodopa and monoamine oxidase inhibitors, provide only symptomatic relief and lack disease-modifying or neuroprotective potential, underscoring the need for novel therapeutic strategies. Marine invertebrates, particularly sea anemones, are recognized as reservoirs of unique bioactive peptides and secondary metabolites with neuroactive, antioxidant, and cytoprotective properties. This study investigated the neuroprotective capacity of sea anemone extracts in in-vitro models of PD using a structured four-phase methodology. Specimens collected from the Gulf of Mannar underwent aqueous and ethanol-based extraction, followed by treatment of dopaminergic N27 and SH-SY5Y neuronal cell lines. Neuroprotective outcomes were assessed through survival assays, apoptotic markers, and comparative efficacy against Selegiline, a standard reference drug. The tentacle extracts significantly enhanced neuronal viability, mitigated apoptosis, and demonstrated superior cytoprotective effects relative to Selegiline. These results suggest that sea anemone-derived compounds exert their actions through antioxidant defense, attenuation of mitochondrial dysfunction, and modulation of apoptosis-related pathways, thereby conferring both neuroprotective and neurotrophic benefits. The findings provide compelling preliminary evidence for sea anemone extracts as potential disease-modifying agents for PD. However, detailed molecular characterization, identification of active constituents, and validation in in-vivo models are essential to translate these observations into viable therapeutic candidates for PD and related neurodegenerative disorders.

**Keywords:** Dopaminergic Neurons, Neurodegeneration, Neuroprotection, Parkinson's Disease, Sea Anemones.

**PL-188**

## ASSESSING MEDICATION SAFETY AND REAL-WORLD IMPACT OF PHARMACIST-LED INTERVENTIONS ON DRUG-RELATED PROBLEMS AMONG ELDERLY INPATIENTS.

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Elderly patients are particularly vulnerable to drug-related problems (DRPs) due to age-associated factors which adversely affect outcomes and healthcare costs. Pharmacists play a vital role in optimizing pharmacotherapy and medication safety. The objective of the research was to assess DRPs in elderly inpatients and to evaluate the impact of pharmacist interventions using the CLEO tool. A prospective interventional study was conducted for six months in a tertiary care hospital following IEC approval. Inpatients aged ≥ 60 years were selected and excluded critically ill patients and those receiving chemotherapy. DRPs assessed through comprehensive medication chart review and implemented pharmaceutical interventions. The clinical, economical and organizational impact of the intervention was evaluated using the CLEO tool. A total of 270 DRPs were identified among 680 admissions during the study period. ADRs were most frequent (N=98; 18.9%) linked to physiological decline; followed by Drug Interactions (N=65; 12.5%), due to polypharmacy; dosing issues (N=38; 7.3%) frequently related to renal /hepatic impairment, non-adherence (N=24; 4.6%) and untreated indications (N=18; 3.5%). Therapeutic duplication (N=12; 2.7%) and drug not indicated (N=15, 3.6%) were less frequent but clinically significant. Distribution of DRP categories was significant ($\chi 2$, $p<0.001$). 85% interventions were accepted by physicians. CLEO scoring reflected 62% clinical impact (p=0.01), 47% economic outcomes (p=0.04), and 34% organizational improvements. The study concluded that pharmacist-led interventions demonstrated a significant impact in identifying and resolving DRPs in elderly inpatients. Interventions proved effective across multiple dimensions. Strengthening clinical pharmacy services in geriatric care can lead to safer, more cost-effective treatment outcomes.

**Keywords:** Drug Related Problems, Elderly Inpatients, Pharmacist-led Intervention, CLEO Tool

**PL-189**

## EFFECT OF LIFESTYLE INTERVENTIONS ON METABOLIC SYNDROME AMONG OVERWEIGHT AND OBESE SUBJECTS: EVIDENCE FROM A RANDOMIZED CLINICAL TRIAL

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Metabolic syndrome (MetS) is a cluster of medical conditions that is defined by the simultaneous occurrence of at least three of the five predefined components. The objective of this study was to investigate the effects of targeted lifestyle modifications on overweight and obese individuals with MetS. In this 12-week randomized controlled study, participants were assigned to one of the four distinct arms: treatment as usual (TAU) and Lifestyle Intervention groups (LIG) (TAU+exercise, TAU+controlled diet, and TAU+both controlled diet and exercise). The participants were assessed for various metabolic parameters, questionnaires, and treatment cost. Bodyweight showed a significant reduction across all three LIGs, with the TAU+both diet and exercise group demonstrating the most profound reduction. Fasting glucose decreased significantly in all the LIGs, while HOMA-IR improved in the TAU+diet and TAU+diet and exercise groups. Participants of all three LIGs also showed significant reductions in BMI and waist and hip circumference. The lipid profile improved markedly, with decreased triglycerides and increased HDL-C among the LIGs. The LIGs even demonstrated reduced stress (PSS-10) and improved sleep (AIS) and overall quality of life (SF-36). Additionally, these LIGs also reduced the treatment cost over the period of time, thereby reducing the economic burden on the subjects. Thus, it can be concluded that including targeted lifestyle modifications as an adjunctive regimen for MetS improves the QOL not only by reducing body weight but also by improving metabolic parameters.

**Keywords:** Metabolic syndrome, body weight, lifestyle modification, quality of life

**PL-190**

## EMOTIONAL INTELLIGENCE – EI AND EFFECT OF MEDICINE IN HEALTH CARE

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Medicine plays a crucial role in the healthcare sector, but the demands of modern life can contribute to a range of chronic diseases, which may hinder the effectiveness of medical treatments. Many patients struggle to achieve the desired outcomes after prolonged periods of medication. This lack of success can stem from various factors, such as hectic schedules, insufficient physical activity, and a disconnect from nature. These issues often result in adverse health effects, highlighting the need for a more comprehensive approach to patient care. To tackle the challenges posed by chronic diseases and the limitations of traditional medicine, emotional intelligence (EI) is emerging as a valuable component within the healthcare sector. When patients receive care that integrates EI with traditional or allopathic medicine, there is a significant potential for enhanced health outcomes and a more holistic approach to patient care. In summary, the integration of emotional intelligence (EI) within the healthcare sector is crucial. By prioritizing EI in interactions with patients and among healthcare teams, professionals can enhance the quality of care, resulting in improved health outcomes as well as a more harmonious working environment. Fostering emotional intelligence allows the healthcare system not only to address physical ailments but also to support the emotional and psychological well-being of patients.

**Key words:** Emotional Intelligence, Medicine, Health care.

**PL-191**

## DEVELOPMENT AND VALIDATION OF A QUANTITATIVE PROTON NMR METHOD FOR THE ANALYSIS OF KOJIC ACID

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In this current research study, the unique capability of both identification and quantification of a compound by NMR spectroscopy have been demonstrated. Using NMR spectroscopy for quantification is widely applied in analytical field because of universal existence of NMR active nuclei (1H and 13C). The Linearity, LOD (Limit of Detection), LOQ (Limit of Quantification), and validation studies of Kojic Acid Dipalmitate has been demonstrated using TMB (trimethyl benzene) as internal standard. qNMR is linear ranges of 0.2 to 3.0 mg/ml gives integral values between 0.9 to 2.2 which shows good linearity performance with regression coefficient (R2 value) above 0.993. Moreover, LOD and LOQ are 1.02 and 3.11 mg/ml respectively. Finally, it was found that qNMR method is simple, effective, accurate and reliable method for practical qualification and validation of Kojic Acid Dipalmitate.

**Keywords:** NMR spectroscopy, qNMR, Kojic Acid Dipalmitate

**PL-192**

**CLINICAL ASSESSMENT OF DRY POWDER INHALERS AND METER DOSE INHALERS COMBINATION IN MANAGEMENT OF BRONCHIAL ASTHMA**

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Bronchial asthma is emerging as a significant health concern in many developing countries. As defined by the National Institutes of Health (NIH), asthma is a chronic inflammatory airway disorder involving various inflammatory cells such as mast cells, eosinophils, T-lymphocytes, neutrophils, and epithelial cells. This inflammation leads to episodic symptoms in affected individuals. The present study aims to compare the efficacy of two combinations: Formoterol/Budesonide and Salmeterol/Fluticasone, administered through Dry Powder Inhalers (DPI) and Metered Dose Inhalers (MDI), in the management of bronchial asthma. This prospective, observational, non-interventional study was conducted in the outpatient department of Tubercular and Chest Diseases at NRI General Hospital, Guntur, including 100 patients diagnosed with asthma. Patients were assessed through pulmonary function tests (PFTs) and Asthma Control Test (ACT) scores before and after 15 days of treatment. The study groups included patients receiving Formoterol/Budesonide or Salmeterol/Fluticasone via DPI or MDI. Statistical analysis revealed significant improvements ($p < 0.05$) in FVC, FEV1, FEV1/FVC, PEFR, and ACT scores, with the DPI forms showing greater efficacy compared to their MDI counterparts. Among all groups, Formoterol/Budesonide via DPI demonstrated the highest improvement in lung function and asthma control with favorable cost-effectiveness. In conclusion, both drug combinations are effective in asthma management, but Formoterol/Budesonide delivered through DPI emerged as the most efficacious and cost-efficient option. This study supports the preference of DPI over MDI for enhanced asthma control

**Key words:** Formoterol/Budesonide, Salmeterol/Fluticasone, DPI, FVC (%), FEV1 (%), FEV1/FVC (%), PEFR, Asthma control.

**PL-193**

**UNVEILING THE KETOGENIC DIET: ITS POTENTIAL IN COMBATTING OBESITY AND IMPROVING HEALTH MARKERS**

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Obesity is a major global health issue, with more than 650 million obese adults worldwide, and is associated with serious diseases such as heart disease, type 2 diabetes, and certain cancers. It is generally evaluated using Body Mass Index (BMI). The increasing prevalence of obesity is linked to the modern lifestyle, with unhealthy eating habits and a sedentary way of life, combined with environmental factors. Furthermore, the mental effects of obesity are profound due to social prejudices, which result in anxiety, depression, and poor self-worth, rendering the management even more difficult. The classical ketogenic diet (KD), a high-fat, low-carbohydrate diet, is an effective treatment for obesity and metabolic syndrome that has been utilized in clinical and experimental settings for decades. Studies have shown that a KD can contribute to weight loss by increasing fat burning and decreasing appetite, as well as by improving metabolic health factors, including insulin sensitivity. However, the diet is very restrictive, so nutritional deficiencies may occur, and critical organs can be overworked without proper medical monitoring. Long-term studies are also essential in order to understand the effect of the ketogenic diet on health, insulin resistance, cardiovascular health, and even cancer. In addition, new insights into the role of the gut microbiome in the context of metabolism are beginning to allow for personalized dietary recommendations to enhance metabolic responses. In conclusion, a multi-dimensional strategy, integrating diet, activity, and psychological aspects, is required for the successful combating of the obesity epidemic.

**Keywords:** Obesity, Ketogenic Diet, Metabolic Health, Insulin Sensitivity, Gut Microbiome, Weight Loss, Dietary Interventions.

**PL-194**

**EVALUATION OF ANTICANCER POTENTIAL OF METHANOLIC EXTRACT OF PETALS OF CHRYSANTHEMUM MORIFOLIUM AGAINST HUMAN LIVER CANCER CELL LINE (HEPG2)**

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Liver cancer remains one of the leading causes of cancer-related deaths globally, prompting the search for novel and safer therapeutic agents. Medicinal plants are a rich source of bioactive compounds with potential anticancer activity. Chrysanthemum morifolium, traditionally used in Chinese medicine, is known for its antioxidant and anti-inflammatory properties. This study aimed to evaluate the anticancer potential of the methanolic extract of Chrysanthemum morifolium petals against the human liver cancer cell line (HepG2).

Petals were collected, shade-dried, and extracted using methanol via Soxhlet extraction. The extract was subjected to preliminary phytochemical screening. HepG2 cells were cultured and treated with various concentrations of the extract. The cytotoxic effect was assessed using the MTT assay. Morphological changes were observed microscopically, and $IC_{50}$ values were calculated. The methanolic extract exhibited dose-dependent cytotoxic activity against HepG2 cells, with significant reduction in cell viability and morphological alterations indicating apoptosis. Phytochemical analysis confirmed the presence of flavonoids, phenolics, and terpenoids, which may contribute to the observed activity. The methanolic extract of Chrysanthemum morifolium petals demonstrated promising anticancer activity against liver cancer cells. These results support further investigation into its active constituents and mechanisms of action for potential development as a natural anticancer agent.

**PL-195**

**ALLAMANDA CATHARTICA L. LEAVES AS A HEPATOPROTECTIVE AGENT: AN EXPERIMENTAL STUDY IN CCL4 TREATED WISTAR ALBINO RATS.**

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Liver damage caused by certain toxins like carbon tetrachloride are a major health concerns, prompting the search for effective natural hepatoprotective agents. This study investigates the hepatoprotective activity of the leaves of Allamanda cathartica L. in carbon tetrachloride (CCl4) induced wistar albino rats. Powdered Allamanda cathartica leaves were extracted by maceration and subjected to phytochemical screening and acute oral toxicity testing (OECD 425). Ethanolic extract doses (200 and 400 mg/kg b.wt) were administered to rats with $CCl_4$-induced hepatotoxicity. Silymarin (50 mg/kg) served as standard. Liver function was assessed using biochemical markers (SGOT, SGPT, ALP, GGTP, glucose, bilirubin, protein, lipid profile) and antioxidant enzymes, supported by histopathological examination of liver tissues. Preliminary phytochemical screening of Allamanda cathartica leaf extract revealed the presence of alkaloids, cardiac glycosides, saponins, flavonoids, tannins, proteins, amino acids, sterols, triterpenoids, and carbohydrates. Acute toxicity studies confirmed the extract's safety up to 2000 mg/kg.




ISBN: 978-81-980623-8-3

The ethanolic leaf extract exhibited dose-dependent hepatoprotective activity by normalizing elevated biochemical markers, with results comparable to standard drug Silymarin. Histopathological findings further supported the extract's liver-protective effect. The study shows that Allamanda cathartica leaf extract has promising hepatoprotective activity, likely due to phytoconstituents such as alkaloids, glycosides, saponins, flavonoids, tannins, proteins, sterols, and triterpenoids. Further research is needed to isolate and identify the specific active compound responsible.

**Keywords:** Hepatoprotective activity, Allamanda cathartica, Carbon tetrachloride

**PL-196**

## EDUCATE, INNOVATE, EMPOWER: EVALUATING TECHNOLOGY-ENHANCED EDUCATIONAL INTERVENTIONS IN CHRONIC KIDNEY DISEASE MANAGEMENT BY CLINICAL PHARMACISTS

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Chronic Kidney Disease (CKD) significantly affects patients' physical, emotional, and social well-being, lowering their quality of life (QoL). Despite medical advancements, CKD remains a major cause of global morbidity and mortality. Patient-centered care, especially educational interventions, is key to improving health-related QoL (HRQoL). Clinical pharmacists, with their expertise in pharmacotherapy and patient communication, are well-positioned to design and deliver such interventions, bridging the gap between clinical treatment and patient understanding. To assess the impact of a technology-enhanced educational module on CKD patients' QoL using the KDQOL SF-36 questionnaire before and after intervention. A secondary objective was to evaluate the effectiveness of video-based and leaflet-based education in improving QoL. A randomized interventional trial was conducted in the Nephrology Department of a tertiary care hospital in Belagavi, Karnataka. A total of 202 CKD patients were enrolled and randomly assigned to receive either video-based or PIL-based educational interventions. KDQOL SF-36 and PEMAT scales were used to evaluate QoL and intervention effectiveness over six months. All KDQOL domains showed significant improvement post-intervention ($p < 0.0001$). Notable gains were seen in general health (42.1±9.8 to 77±3.6), emotional well-being (45.8±11.9 to 76.7±7.86), and physical functioning (37.3±19.8 to 77.3±9.1). Both age groups benefited, with older patients showing improved emotional/social functioning and younger ones in physical functioning. High acceptability scores on the PEMAT scale reinforced the success of the intervention. Clinical pharmacist-led, technology-enhanced education significantly improved QoL in CKD patients, supporting its integration into routine CKD care.

**Keywords:** Chronic Kidney Disease, technology-enhanced education, quality of life

**PL-197**

## PHARMACOGENOMICS: A STEP TOWARDS PERSONALIZED MEDICINE.

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Pharmacogenomics is the study of how an individual's genetic makeup influences their response to drugs. This evolving field combines pharmacology and genomics to develop effective, safe medications and doses tailored to a person's DNA. Traditionally, many drugs are prescribed using a "one-size-fits-all" approach, but this can lead to adverse effects or treatment failure in some individuals. Pharmacogenomics helps predict how a person will respond to a drug—whether they will benefit, experience side effects, or require a different dosage. By understanding genetic variations, healthcare professionals can optimize drug therapy, minimize harmful drug reactions, and increase treatment efficacy. For instance, patients with certain gene variations may metabolize drugs either too quickly or too slowly, affecting the drug's effectiveness. This approach is especially valuable in areas like oncology, cardiology, and psychiatry. Pharmacogenomics represents a major step toward personalized medicine, where treatments are not only disease-specific but also individual-specific. With the growing availability of genetic testing, this field holds great promise in revolutionizing the future of healthcare and making treatment safer, faster, and more accurate.

**Keywords:** Pharmacogenomics, Personalized Medicine, Genetic Variability, Drug Response, Adverse Drug Reaction

**PL-198**

## GREEN PHARMACY

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Green pharmacy is a forward-thinking approach that integrates environmental sustainability into all aspects of pharmaceutical practice, from drug design and manufacturing to usage and disposal. Traditional pharmaceutical practices often lead to the release of active pharmaceutical ingredients (APIs) into the environment, contaminating soil, water bodies, and affecting ecosystems. Green pharmacy aims to minimize this environmental impact by promoting the development of biodegradable and environmentally benign drugs, utilizing green chemistry principles, and encouraging proper disposal methods. It advocates for eco-conscious production techniques that reduce waste, energy consumption, and the use of hazardous solvents. Moreover, the discipline supports the use of plant-based and renewable raw materials in drug formulation, along with innovative green synthesis methods to reduce the chemical burden on the environment. The concept also encompasses public education on responsible medication use and disposal, along with policy development to enforce environmental guidelines in the pharmaceutical industry. Wastewater treatment upgrades and take-back programs for unused medications are critical components in preventing pharmaceutical pollution. Interdisciplinary collaboration among scientists, pharmacists, environmentalists, and policymakers is essential to achieve the goals of green pharmacy. By adopting sustainable practices, green pharmacy not only contributes to environmental protection but also to the long-term safety and health of communities. As healthcare demands grow, integrating environmental responsibility into pharmaceutical processes becomes vital for sustainable development.

**Keywords:** Green pharmacy, pharmaceutical pollution, sustainable healthcare, biodegradable drugs, green chemistry, drug disposal, environmental sustainability, renewable resources, eco-friendly synthesis, public health.

**PL-199**

## CRISPR-BASED GENE EDITING FOR NEUROLOGICAL DISEASES

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Alzheimer's disease, Huntington's disease, and Parkinson's disease are persisting global health issues because they are complex diseases with a genetic as well as neurodegenerative nature. Conventional pharmacological interventions are of symptomatic relief only and do not correct the underlying genetic defects. The discovery of Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR)-Cas9 gene editing tool has brought with it a revolutionary method of therapeutic treatment of these disorders in that it allows for accurate, effective, and economical gene manipulation. This review discusses the application of CRISPR-Cas9 in the correction or knockdown of genes responsible for major neurodegenerative disorders. Critical gene targets like HTT in Huntington's disease, APP and PSEN1 in Alzheimer's disease, and SNCA in Parkinson's disease are assessed based on CRISPR-based therapeutic viability. The article also addresses new preclinical breakthroughs, viral vector and lipid nanoparticle-mediated delivery approaches, and off-target issue challenges, along with the issues of ethics and penetration across the blood-brain barrier. Furthermore, the potential of combining CRISPR with stem cell therapy and its eventual use in personalized medicine are emphasized. As research continues, CRISPR promises disease modification or even long-term cures for some neurological diseases, revolutionizing neuropharmacology and gene therapy. More clinical trials and ethical guidelines are needed to convert such experimental modalities into everyday therapeutic practices.

**Keywords:** CRISPR-Cas9, Neurological Disorders, Gene Therapy, Alzheimer's Disease, Neuropharmacology.

**PL-200**




ISBN: 978-81-980623-8-3

**UNDERSTANDING AUTOIMMUNE DISORDERS: MECHANISMS, IMPACT, AND THERAPEUTIC APPROACHES**

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Autoimmune disorders cause the body to attack its own cells by mistake which produces persistent inflammation and tissue damage. The group of autoimmune disorders encompasses rheumatoid arthritis along with systemic lupus erythematosus and type 1 diabetes as well as multiple sclerosis and inflammatory bowel disease. The various conditions display individual characteristics yet they all stem from the same fundamental process of genetic susceptibility combined with environmental triggers and immune system abnormalities. The diagnostic challenges of these complex diseases lead to postponed identification which produces enduring medical consequences. The delivers comprehensive information about autoimmune disorders to second-year pharmacy students by covering their pathophysiology and classification together with their clinical presentation and present-day treatment methods. The pharmaceutical treatment options for autoimmune conditions consist of corticosteroids along with disease-modifying antirheumatic drugs (DMARDs) and biologics and newly developed targeted therapies that focus on immune system modulation. Pharmacy professionals serve as essential contributors to patient care by delivering medication counseling and ensuring prescription compliance while watching for drug reactions and enhancing patient wellness. The rising number of autoimmune diseases requires pharmacy students to understand these conditions because patients need ongoing pharmaceutical management. Future pharmacists will deliver effective patient care when they possess fundamental knowledge about autoimmune disease mechanisms and management strategies for both clinical and community healthcare settings.

**Keywords:** Autoimmune disorders, Immune response, Biologics, DMARDs, Pharmacist role

**PL-201**

**STATISTICAL ANALYSIS OF ADVERSE DRUG EFFECT**

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This study investigates adverse drug effects (ADEs) through a comprehensive statistical analysis of 5,000 pharmacovigilance case reports. The objective was to identify significant patterns, risk factors, and demographic correlations associated with ADEs. Descriptive statistics showed that 62% of ADEs occurred in females, with the majority reported among individuals aged 45–65. Among drug classes, antibiotics, antipsychotics, and antidepressants were most frequently linked to adverse reactions. Chi-square tests revealed statistically significant associations ($p < 0.05$) between certain drug types and specific adverse effects, such as gastrointestinal disturbances and central nervous system symptoms. A multivariate logistic regression model was applied to assess risk predictors, with polypharmacy, age, and pre-existing conditions emerging as key contributors to ADE incidence. Furthermore, principal component analysis (PCA) helped identify underlying clusters of symptoms, enabling more targeted monitoring strategies. Time- to-onset analysis also indicated that most ADEs occurred within the first two weeks of drug initiation. The findings underscore the importance of early detection and active post-marketing surveillance to ensure drug safety. This statistical approach not only enhances our understanding of ADE patterns but also supports clinical decision-making and regulatory interventions. Improved awareness and monitoring of high-risk populations could substantially reduce the burden of drug-related morbidity and healthcare costs.

**Keywords:** Adverse drug effects, pharmacovigilance, statistical analysis, risk factors, drug safety

**PL-202**

**EFFECT OF POLYHERBAL FORMULATION ON FUMER (BONE SIZE) SIZE OF POSTMENOPAUSAL RAT BY OVARIECTOMY MODEL.**

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This study investigated the effects of a novel polyherbal formulation, comprising cardamom, liquorice, fenugreek, and soybean, on bone size and architecture in an ovariectomized (OVX) rat model. The OVX model is a well-established preclinical model for simulating postmenopausal osteoporosis, characterized by significant estrogen deficiency leading to accelerated bone loss and microarchitectural deterioration. Each component of the formulation contains bioactive compounds potentially beneficial for bone health: cardamom, for its antioxidant and anti-inflammatory properties that may reduce bone resorption; liquorice, for its phytoestrogenic compounds that could exert estrogen-like effects on bone; fenugreek, for its steroidal saponins that have been linked to improved bone mineral density; and soybean, a rich source of isoflavones (genistein and daidzein) known for their osteoprotective effects. The primary objective was to determine whether this polyherbal blend could mitigate the negative impact of estrogen deficiency on bone parameters, specifically focusing on changes in bone size (e.g., length, width, and cortical thickness) and potentially other indicators of bone quality. This research aims to provide preliminary data on the potential of this natural formulation as a complementary strategy for preserving skeletal integrity in an estrogen-deficient state, paving the way for further detailed mechanistic and translational studies.

**PL-203**

**PHARMACIST-LED HYGIENE INTERVENTION AND RATIONAL ANTIFUNGAL USE IN SGLT2 INHIBITOR THERAPY**

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Sodium-glucose co-transporter 2 (SGLT2) inhibitors are widely prescribed for managing type 2 diabetes and have shown significant cardiovascular and renal benefits. However, their glycosuria-promoting action predisposes patients to genitourinary infections. Lack of patient awareness and poor hygiene practices contribute to infection risk and unnecessary antifungal use. Pharmacists can play a pivotal role in education and antifungal stewardship. This prospective interventional study was conducted over six months in a tertiary care teaching hospital. A total of 200 adult patients on SGLT2 inhibitors were enrolled. Baseline assessments were conducted using a validated questionnaire to evaluate knowledge and hygiene practices. Participants received a structured pharmacist-led educational intervention, including counselling and patient information leaflets. Follow-up assessments were performed after one month. Antifungal prescriptions for patients who developed infections were reviewed for utilization and rationality. Post-intervention, awareness of SGLT2 inhibitor-related infections increased from 31% to 59.5%, and daily hygiene practices improved from 31.5% to 64%. Mean knowledge scores rose from 3.81 to 7.23, and practice scores from 4.02 to 7.51 ($p < 0.0001$). Among 66 patients who developed infections, 92.4% of antifungal prescriptions were deemed rational, with fluconazole and clotrimazole being the most used. A structured, pharmacist-led educational intervention significantly improved knowledge, hygiene practices, and rational antifungal use in patients on SGLT2 inhibitors. Pharmacist involvement is crucial in preventing infections and promoting antifungal stewardship in clinical practice.

**Keywords:** SGLT2 inhibitors, Pharmacovigilance, Genital infections, Hygiene education, Antifungal stewardship, Pharmacist intervention

**PL-204**

**EVALUATION OF PHARMACOGNOSTIC AND ANTI-INFLAMMATORY ACTIVITY OF AQUEOUS LEAVES EXTRACT OF AEGLE MARMELOS LINN (PLANTS GROWN IN AND AROUND BIDAR DISTRICT) ON CARRAGEENAN INDUCED PAWEDEMA IN ALBINO WISTAR RATS**

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The present study aimed to evaluate the pharmacognostic characteristics and anti-inflammatory activity of the aqueous leaves extract of Aegle marmelos Linn., specifically sourced from plants grown in and around the Bidar district. Comprehensive pharmacognostic analysis, including macroscopic and microscopic examination,




ISBN: 978-81-980623-8-3

physicochemical parameters, and preliminary phytochemical screening, was conducted to establish the identity, purity, and quality of the plant material. The anti-inflammatory potential of the extract was assessed using the carrageenan-induced paw edema model in albino Wistar rats, a well-established method for evaluating acute inflammation. Rats were divided into control, standard, and test groups receiving graded doses of the extract. Paw volume was recorded at predetermined intervals following carrageenan administration to monitor the progression of inflammation. The aqueous extract demonstrated significant, dose-dependent inhibition of paw edema compared to the control group, indicating notable anti-inflammatory activity. Phytochemical analysis suggested the presence of flavonoids, tannins, and other bioactive constituents that may contribute to the observed pharmacological effects. The extract's performance was comparable to that of the standard anti-inflammatory drug at higher doses, supporting its therapeutic potential. The findings highlight the importance of region-specific plant evaluation, as environmental factors in the Bidar district may influence phytochemical composition and bioactivity. Overall, the study provides scientific evidence supporting the traditional use of Aegle marmelos leaves for managing inflammatory conditions and encourages further investigation into its active constituents, mechanisms of action, and potential formulation development.

**Keywords:** Aegle marmelos, Pharmacognosy, Anti-inflammatory Activity, Carrageenan-Induced Paw Edema, Albino Wistar Rats, Aqueous Extract, Bidar District, Phytochemicals, Acute Inflammation, Herbal Medicine.

**PL-205**

## COMPARISON ON THE EFFICACY OF USING PIRACETAM WITH ORAL IRON VERSUS IRON ALONE IN CHILDREN WITH BREATH-HOLDING SPELLS IN A TERTIARY CARE HOSPITAL

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Breath holding spells (BHS) are one of the most frequent and important diagnostic challenges in paediatrics. These are apparently frightening events relatively common in children. Parental reassurance and non-pharmacological methods are usually followed. But in some cases, BHS can be very stressful for the parents and these methods alone may not be sufficient. In such conditions pharmacological agents may be desired in some of these patients. Iron supplements and piracetam are the two different pharmacological methods that are used for treating breath holding spells in children. But not much study has been conducted to see the effects of these drugs in paediatrics. This is the first time such kind of study is conducted in our study site and it is hypothesized to show some results to compare two therapeutic regimen that are commonly prescribed for breath holding spells in children. A total of 70 breath holding spells cases were enrolled into the study of which 35 patients (A) were given iron alone and 35 patients (B) were given piracetam and oral iron. The study provides the data for comparing the efficacy of using piracetam with oral iron versus iron alone in children with breath holding spells in the outpatient department of a tertiary care hospital in Calicut. The study concluded that piracetam appears to be safe and effective drug for breath holding spells. Piracetam in addition to oral iron in children with breath holding spells can decrease the frequency and severity of attacks than using iron alone, thus reducing the distress of the disturbed parents and suffering of their children.

**PL-206**

## TESTING AND REFINING BEHAVIORAL, EDUCATIONAL AND SOCIAL LIFE INTERVENTIONS THAT CAN IMPROVE OUTCOMES AND QUALITY OF LIFE OF AUTISM

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This study underscores the multi-factorial origins and complex management of Autism Key findings reveal that: Prenatal and perinatal factors such as birth asphyxia, maternal infections, and nutritional deficiencies are primary causes. Male children and those aged 6–10 years are more commonly affected. It is the most prevalent comorbidity, requiring long-term treatment. Combination therapy merging pharmacological and physical rehabilitation is more effective than standalone treatments. Most critically, the study highlights the undervalued yet essential role of clinical pharmacists in enhancing therapeutic adherence, optimizing drug use, and improving quality of life for children with CP. Their collaboration with physicians, physiotherapists, and caregivers can significantly influence long-term patient outcomes. Assessments such as the Autism diagnostic observation schedule (ADOS) or Autism diagnostic interview – revised (ADI-R) are used by clinicians and researchers to diagnose and assess autism spectrum disorder (ASD). To combat Autism more effectively, healthcare systems must adopt a multidisciplinary, patient- centered approach that emphasizes early diagnosis, continuous therapy, caregiver education, and improved access to rehabilitative and pharmacological care. Future strategies should also focus on strengthening maternal and neonatal care services, especially in rural and resource-limited settings, to reduce the incidence and burden of Autism.

**Keywords**- Autism, Educational and Social Life, Clinical observations, Autism diagnostic interview – revised (ADI-R)

**PL-207**

## THERAPEUTIC POTENTIAL OF AGMATINE IN ALCOHOL USE DISORDER: PRECLINICAL INSIGHTS AND FUTURE DIRECTIONS

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Alcohol Use Disorder (AUD) is a chronic and relapsing condition that involves compulsive alcohol consumption, withdrawal symptoms, cognitive dysfunction, and high relapse rates. Current therapeutic options for AUD remain limited in efficacy and are often accompanied by adverse effects, highlighting the urgent need for novel treatment strategies. Agmatine, a naturally occurring polyamine formed by the decarboxylation of L-arginine, has emerged as a promising neuromodulator with diverse biological functions, including neuroprotection, analgesia, anxiolysis, and antidepressant effects. This review consolidates preclinical evidence supporting agmatine's potential in alleviating behavioral, cognitive, and neurochemical disturbances associated with AUD. Special emphasis is placed on its interaction with imidazoline receptors, regulation of glutamatergic and GABAergic systems, and attenuation of ethanol-induced neurotoxicity. The mechanistic insights, behavioral outcomes, and pharmacological interventions highlighted herein pave the way for future translational studies and clinical applications.

**PL-208**

## NETWORK PHARMACOLOGY-BASED STRATEGY FOR INVESTIGATION OF ANTI-OBESITY EFFECT OF SOLANUM LYCOPERSICUM VAR. CERASIFORME

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Cherry tomato (Solanum lycopersicum var. cerasiforme) is a nutrient rich fruit widely consumed for its antioxidant, anti-inflammatory, and therapeutic benefits. It contains several bioactive phytochemicals with reported roles in metabolic regulation. Due to its diverse phytoconstituents, cherry tomato holds promise as a natural intervention against metabolic disorders, including obesity. Hormone-induced obesity, such as that associated with progesterone imbalance, involves complex molecular pathways requiring multi-targeted therapeutic strategies. The present study aimed to evaluate the anti-obesity potential of cherry tomato fruit juice using in silico approaches. Initially, drug-likeness and toxicity profiles of its phytoconstituents were analysed to ensure pharmacokinetic suitability. Swiss Target Prediction identified 298 target genes associated with the compounds, while 119 obesity-related genes were retrieved from GeneCards. Twenty-six overlapping genes were subjected to STRING and KEGG pathway analysis, revealing 114 enriched pathways, 17 of which were directly linked to obesity mechanisms. Molecular docking was performed to validate interactions. Lycopene showed strong binding with SQLE (−11.2 kcal/mol) forming 17 non-hydrogen bond interactions. Flazin docked with PDE4D (−8.4 kcal/mol), forming an H-bond with Asp484. Luteolin interacted with ADORA1 (−8.7 kcal/mol), while Beta carotene and Apigenin exhibited strong binding with ESR1 (−9.2 and −8.3 kcal/mol, respectively). Compared to standard ligands such as Rolipram and




ISBN: 978-81-980623-8-3

Bazedoxifene, these compounds demonstrated comparable or better interaction profiles. These findings suggest that Cherry Tomato fruit juice possesses promising anti-obesity potential by modulating multiple targets and pathways implicated in progesterone-induced obesity. Further experimental validation is recommended to confirm these therapeutic interactions and support its functional application in metabolic health.

**PL-209**

**ANTI-OBESITY EFFECT OF HYDROALCOHOLIC EXTRACT OF ACACIA SUMA HEARTWOOD IN HFD INDUCED C57BL/6 MICE**

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Obesity is a multifactorial, chronic yet preventable metabolic disease which negatively affect body functioning where metabolic dysfunction of food digestion process creates an imbalance in both energy intake and energy expenditure. This study was designed to explore anti-obesity effect of hydro-alcoholic extract of Acacia suma (HAEAS) in high fat diet (HFD) fed C57BL/6 mice. The study duration was seven weeks and animals were divided into six groups (n=6) Group I- Normal; received a normal diet, Group II- Obese; received a HFD (60% fat), Group III- received HAEAS 100mg/kg + HFD, Group IV- received HAEAS 200mg/kg + HFD, Group V-HAEAS 400mg/kg+ HFD, Group VI- Standard; Orlistat 10mg/kg+ HFD. Anthropometrical, nutritional, histopathology and lipid profile parameters of all the groups were studied. The HAEAS has significantly reduced body weight, body mass index, adipose tissue weight and serum level of cholesterol, low density lipo-protein, triglycerides in HFD fed C57BL/6 mice. HAEAS supresses adipogenesis by reducing number and size of adipocytes in 3T3-L1 cells. The result suggests that HAEAS has beneficial effect in inhibiting high fat diet induced obesity by regulating adipogenesis and promoting lipolysis. Hence, Acacia suma may be the promising agent to control and manage obesity.

**PL-210**

**EVALUATION OF ANXIOLYTIC POTENTIAL OF ETHANOLIC EXTRACT OF MANILKARA ZAPOTA L. LEAVES IN RAT MODELS**

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Anxiety is a disorder of all individuals with different level, which significantly affect daily functioning. The conventional anxiolytics on long-term use often leads to adverse effects like memory problems, mood swings, aggressive behaviour, vision issues, sleep disturbances, and even liver damage. Manilkara zapota L., traditionally used for various ailments, may offer a safer alternative. The current research aimed to investigates the anxiolytic potential of ethanolic leaf extract of M zapota (EEMZ) in rat's models. The coarse powdered leaves were subjected to soxhlet extraction with 70% ethanol (1:10 w/v, 60 °C). The EEMZ was screened for phytochemical, acute toxicity, followed by anxiolytic gauging against 28 days rat model. Rats were divided into four groups (n = 6): control, diazepam (1 mg/kg), EEMZ low-dose (100 mg/kg), and high-dose (200 mg/kg). Assessment includes Behavioural tests by using Elevated Plus Maze (EPM), Open Field Test (OFT), Hole Board Test (HBT), and Rota rod weekly for 4 weeks. On day 29, brain homogenates was analysed for monoamine oxidase A (MAO A) activity and lipid peroxidation. Results proclaim High-dose of EEMZ significantly improved open-arm time, central-zone activity, and exploratory behaviour without sedation and also reduced MAO A activity and lipid peroxidation which was statistically significant between $p<0.01$ to $p<0.001$, similar to diazepam against the control group. These results suggest EEMZ (200 mg/kg) exhibit significant anxiolytic effects, supporting its potential as a natural anxiolytic remedy for further research.

**Keywords:** Manilkara zapota L, Elevated Plus Maze, Open Field Test, Hole Broad Test, Monoamine Oxidase A.

**PL-211**

**PHARMACOLOGICAL EVALUATION OF THE ANTI-INFLAMMATORY, ANTI-ARTHRITIC, AND HEPATOPROTECTIVE POTENTIAL OF ATYLOSIA GOENSIS**

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This study investigated the anti-arthritic properties of Atylosia goensis, an indigenous plant from India's Western Ghats. We prepared an ethanolic extract using the Soxhlet method and identified a wide range of phytochemicals, including fatty acids, sterols, and other beneficial compounds, through liquid chromatography-mass spectroscopy (LC-MS). Notably, one key component, ursolic acid, was precisely characterized using 1H NMR, 13C NMR, and mass spectrometry. Our research evaluated the extract's anti-inflammatory and anti-arthritic activity both in-vitro and in-vivo. The extract significantly inhibited the Cox-2 enzyme, suggesting potential anti-inflammatory effects. When tested in an in-vivo model, ursolic acid demonstrated a significant reduction in joint swelling, especially at a higher dose of 400 mg/kg over a 24-day period. Additionally, we observed that ursolic acid provided notable hepatoprotective benefits, as shown by the improved levels of liver enzymes (SGPT, SGOT, and ALP) in the treated groups. Histopathological analysis confirmed these findings, revealing a reduction in inflammation in the areas treated with ursolic acid. This research highlights the therapeutic potential of Atylosia goensis and its compound, ursolic acid, as promising anti-inflammatory and hepatoprotective agents for managing inflammatory and arthritic conditions.

**Keywords:** Atylosia goensis; cyclooxygenase-1; cyclooxygenase-2; ethanolic extraction; in-vivo anti-arthritis activity.; ursolic acid

**PL-212**

**NEOANTIGEN PEPTIDE VACCINE DESIGN FOR PAN-CANCER IMMUNOTHERAPY**

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With the advent of AI, cancer immunotherapy has focused on exploiting gene-specific mutations. In this study, we aimed to design a pan-cancer neoantigen from COSMIC data spanning 52 cancer types. As top occurring genes in most of the events, TP53 and PIK3CA were selected with their top missense mutation profiles in coding sequences, i.e. R175H, and E545K, respectively. Two 9-mer peptides encompassing the mutation sites were identified by screening with Propred-I, ABCpred and Kolaskar & Tongaonkar method, revealing positive predictions for both cytotoxic T-lymphocyte and B-cell inducing potential. Subsequently, a peptide neoantigen construct was designed with RS-09 TLR4 agonist (adjuvant) and H-linker (proteasomal and lysosomally cleavable). This 68mer peptide 3D structure was predicted through AlphaFold3 and the Robetta webserver. Here, the Robetta (RosettaFOLD) predicted model resulted in better-quality scores (Ramachandran Plot G-factor, ERRAT, Verify3D, Z-score by ProSA and VoroMQA). 100ns molecular dynamics "protein in water" trajectories were calculated for PCA analysis resulted the free energy landscape, where the local minima of the "Backbone" were observed at 99230.0-time frame, indicating a energetically favoured vaccine model. This snapshot was utilized for molecular docking with human nasal TLR4, and the complex was studied for MD simulation. The flexible residual anarchy of the bounded TLR4 can be correlated with activation of the downstream signalling cascade. Immunosimulation shows a short-lived antigenic presence, supports hit-and-run expression of neoantigens. Due to a low instability index (34.88), this peptide is suitable for commercial synthesis (PepSySco score: 0.87) or can be codon-optimised for E. coli expression.

**Keywords:** Neoantigen, Cancer vaccine, Immunoinformatics, Quantum vaccinology.

**PL-213**

**RANDOMIZED CLINICAL TRIAL OF UC-II AND ETORICOXIB IN ARTHRITIS PATIENTS: ASSESSING PAIN RELIEF, INFLAMMATORY CONTROL, AND FUNCTIONAL MOBILITY**

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ISBN: 978-81-980623-8-3

Arthritis is a chronic inflammatory disease characterized by pain, stiffness, and reduced quality of life, where nonsteroidal anti-inflammatory drugs (NSAIDs) like etoricoxib are widely used but limited by long-term adverse effects. This randomized clinical study was conducted at Aditya Multispeciality Hospital evaluated the efficacy of undenatured type II collagen (UC-II) compared with etoricoxib in 30 arthritis patients (15 per each group). Clinical outcomes were measured at screening, baseline, and follow-up visits include day 15, 30, and 45 using WOMAC (pain, stiffness, function), 6-minute walk test (6MWT), physician global assessment (PGA), and visual analogue scale (VAS), alongside biomarkers (IL-6, IL-1β, TNF-α, hs-CRP) and quality-of-life (EQ-5D) scores. Both groups showed significant reductions in WOMAC pain, stiffness, and functional scores by day 30 ($p < 0.05$), but UC-II demonstrated superior improvements in mobility (6MWT: 423 ± 28.5 m vs. 365 ± 12.5 m; $p = 0.0001$), greater reductions in inflammatory markers (IL-6 and TNF-α), and better quality-of-life outcomes (EQ-5D: 82.3 ± 4.76 vs. 69.9 ± 6.47; $p = 0.0001$). Major finding of this clinical study, UC-II maintained and enhanced symptom relief through day 45, while etoricoxib-treated patients showed partial relapse in WOMAC and VAS scores. These findings suggest that UC-II is effective, well tolerated, and offers sustained improvements in pain, mobility, inflammation, and quality of life, representing a safer and more beneficial long-term therapeutic alternative to NSAIDs in arthritis management.

**Keywords:** Arthritis, UC-II, Etoricoxib, WOMAC, Biomarkers.

**PL-214**

**CLINICAL OUTCOME OF MIDODRINE IN HEART FAILURE PATIENTS IN DISTRICT HOSPITAL.**

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Heart failure (HF) is a chronic progressive condition where the heart cannot pump blood effectively, causing breathlessness, fatigue, and fluid overload. Guideline-directed medical therapy (GDMT) improves outcomes in HF, but hypotension often limits optimal dosing, especially in reduced ejection fraction (HFrEF). This study aimed to evaluate the effectiveness of Midodrine, an oral α-adrenergic agonist, in improving blood pressure, left ventricular ejection fraction (LVEF), reducing heart rate in hypotensive HF patients, and monitoring its adverse effects. A prospective observational study was conducted in the Cardiology Department of a district hospital in Sikkim. Adult patients (18-90 years) with a diagnosis of HF and systolic blood pressure <90 mmHg who were prescribed Midodrine were enrolled. Patients were grouped based on their daily Midodrine dose (5 mg, 10 mg, or 20 mg). Blood pressure and heart rate were monitored using bedside cardiac monitors, and LVEF was assessed via transthoracic echocardiography. Follow-ups were done at two weeks (BP/HR) and two months (LVEF). Adverse drug reactions were also recorded. The use of Midodrine resulted in significant improvements in blood pressure and heart rate stabilization, along with a noticeable increase in LVEF over time. Most patients tolerated the drug well, with only a few experiencing minor, manageable side effects. Midodrine appears to be a safe and effective option for managing hypotension in heart failure patients. It enables better tolerance and continuation of GDMT, thereby supporting improved clinical outcomes. These findings suggest that Midodrine could play an important supportive role in Heart failure.

**Keywords:** Heart Failure, Hypotension, Midodrine, HFrEF, Guideline-Directed Medical Therapy (GDMT), Left Ventricular Ejection Fraction (LVEF).

**PL-215**

**UNDERSTANDING ANTIBIOTIC USE AND RESISTANCE IN INDIA: A KAP SYSTEMATIC REVIEW AND META-ANALYSIS**

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Antibiotic resistance (ABR) is major global health challenge. In India it is urgent because of widespread antibiotic use, lack of regulations and self-medication. Understanding people's knowledge, attitudes, and practices is essential to identify the main cause of inappropriate use and to design effective strategies to combat antibiotic resistance. We performed a systematic search on PubMed and Google Scholar, out of all the research, 17 studies were reviewed. Our data collection followed the PRISM guidelines, focusing on knowledge, attitudes, and practices (KAP) related to antibiotics use and antibiotic resistance. In 17 studies, only (56.6%) of participants reported proper antibiotic use, with medical practitioners (67.6%) and students (60.4%) but lowest in general public (33.2%). Overall knowledge was high (70.8%), particularly among practitioners (95.9%) and interns (93.5%), but low in general public (15.7%). Positive attitudes were common (70.1%) but weaker in general public (46.0%). Subgroup analysis confirmed significant gaps between public and medical groups. Overall, high knowledge and positive attitudes did not lead to responsible practices. Funnel plot analysis suggested possible publication bias in practice related studies. Antibiotics use in India show good awareness among healthcare professionals but inconsistent practice especially in general public. For effective control of antibiotic use in India requires closing the gap between knowledge and practice by community education, strict regulation of OTC antibiotic sales and strengthened antibiotic stewardship. Closing these gaps is essential to prevent antibiotic misuse and combat antimicrobial resistance.

**Keywords:** Antibiotic resistance; Antibiotic use; Knowledge attitudes and practices (KAP); Antimicrobial stewardship; India; Public health; Rational drug use

**PL-216**

**EVALUATION OF ANTIPSYCHOTIC AND ANTIOXIDANT ACTIVITY OF ETHANOLIC EXTRACT OF IPOMOEA BATATAS IN SWISS ALBINO MICE**

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Neuropsychiatric disorders such as schizophrenia are associated with oxidative stress and dopaminergic dysregulation. Conventional antipsychotics provide symptomatic relief but are often limited by adverse effects. Ipomoea batatas (sweet potato) is a medicinally important plant rich in flavonoids, phenols, and anthocyanins with reported neuroprotective and antioxidant potential. The present study was designed to evaluate the antipsychotic and antioxidant activity of ethanolic extract of Ipomoea batatas in Swiss albino mice. To evaluate the anti-psychotic and antioxidant activities of ethanolic extract of Ipomoea batatas in Swiss Albino Mice. Ethanolic extract of Ipomoea batatas (EEIB) was prepared by Soxhlet extraction and phytochemical screening was performed. Swiss albino mice were divided into groups and treated with EEIB at graded doses (200, 400, 800 mg/kg, p.o.) for 14 days. Haloperidol-induced catalepsy and apomorphine-induced climbing tests were employed to assess antipsychotic activity. Antioxidant activity was evaluated by in vivo estimation of lipid peroxidation, catalase, and reduced glutathione levels in brain tissue homogenates. Standard drugs (haloperidol and ascorbic acid) were used for comparison. EEIB demonstrated significant dose-dependent reduction in haloperidol-induced catalepsy and apomorphine-induced climbing behavior ($p < 0.05$), suggesting antipsychotic-like activity. Antioxidant studies revealed a marked decrease in malondialdehyde levels with concurrent elevation of catalase and glutathione activity in treated groups as compared to the disease control. Phytochemical analysis confirmed the presence of flavonoids and polyphenols, which may contribute to the observed effects. The findings suggest that Ipomoea batatas ethanolic extract exhibits promising antipsychotic and antioxidant activities in Swiss albino mice. These results indicate its therapeutic potential as an adjunct or alternative in the management of psychotic disorders, warranting further mechanistic and clinical investigations.

**Keywords:** Ipomoea batatas, antipsychotic, antioxidant, Swiss albino mice, oxidative stress.

**PL-217**

**UNRAVELLING THE ANTI-DIABETIC POTENTIAL OF PERILLAE FRUTESCENS: A SYSTEMS PHARMACOLOGY INSIGHT INTO ITS EFFECT ON INSULIN RESISTANCE**

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ISBN: 978-81-980623-8-3

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Type 2 Diabetes Mellitus (T2DM) is a chronic metabolic disorder caused by varied pathological abnormalities like insulin resistance, Beta Cell destruction, dyslipidaemia, hepatic glucose production, impaired insulin secretion, chronic inflammation etc. The sprouted seeds of Perilla frutescens (PF) had been reported to exhibit antidiabetic activity, but the active compounds, drug targets, and molecular mechanisms remain unclear. This study aimed to categorize the active compounds of the seeds and identify their target proteins and explore their interaction with the biological systems of involved in insulin resistance, using an in sil ico approach with Systems Pharmacology, molecular docking. A total of 22 active compounds were identified from extensive literature review and drug databases, 18 of them were chosen for further studies, considering their oral bioavailability (OB) ≥ 30% and drug-likeness (DL) ≥ 0.18. 172 overlapped targets were selected from drug and disease targets, to evaluate the degree of interaction. Protein-protein interaction (PPI) analysis revealed the most potential 10 hub targets [TP53, AKT1, IL6, EGFR, BCL2, TNF, MYC, CASP3, JUN, CTNNB1], construction of drug-compound-gene-disease network lead to the identification of the five most potential compounds [Apigenin, Luteolin, Eugenol, Arachidonic acid, Stigmasterol] which could increase the insulin receptor sensitivity. Molecular docking studies showed with most relevant targets - TP53, AKT1, IL6, EGFR, BCL2, exhibited strong binding affinities for 2 ligands luteolin and apigenin. Gene Ontology (GO), and KEGG pathway enrichment analyses were performed. This study provides novel insights into the antidiabetic mechanisms of PF, supporting its potential in future drug development for T2D.

**Keywords:** Perilla frutescens, Insulin resistance, Systems pharmacology, Molecular docking

## PL-218

## SILICOXPLORE: A COMPREHENSIVE CLOUD-BASED PLATFORM FOR DRUG DISCOVERY, CASE STUDY ON EGFR-TARGETED GLIOBLASTOMA TREATMENT

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Artificial intelligence (AI) and machine learning (ML) are significantly transforming drug discovery by allowing the exploration of an extra-large chemical space, which speeds up and reduces risks in the traditionally costly and time-consuming process. The SilicoXplore platform, developed by SilicoScientia Private Limited, exemplifies this progress, providing a complete, end-to-end drug discovery solution that incorporates over twenty modules, many of which are specifically developed using ML. This platform efficiently manages various drug discovery approaches, such as structure-based and ligand-based drug design, pharmacokinetics, toxicity prediction, molecular dynamics (MD) simulations, and quantum chemical calculations, for extensive datasets. A key scientific insight that drives SilicoXplore's effectiveness is the integration of physics-based models with machine learning approaches, combining mechanistic understanding with data-driven prediction power. Glioblastoma multiforme (GBM), an aggressive and incurable brain tumor driven by EGFR, indicates a poor prognosis due to its relentless nature. The SilicoXplore platform was used to identify potential EGFR pathway modulators from existing compound libraries. Out of 25000 from BindingDB, 19000 compounds were retained after extensive curation. The ML-based SilicoScreen tool of SilicoXplore produced a highly predictive, statistically robust model. The SimSearch tool identified over 10000 active compounds similar to dataset actives, respecting the non-redundancy of 55145 compounds. ToxAI and SilicoPhysChem pinpointed the top 30 molecules. Additionally, PharmFrag analyzed pharmacophoric features and selected six promising molecules for EGFR-targeted glioblastoma therapy. Therefore, SilicoXplore, which combines advanced ML methods with physics-based approaches, efficiently explores large chemical spaces to find lead-like molecules without the need for extensive computational resources or programming skills.

**Keywords:** Artificial intelligence, SilicoXplore, Glioblastoma multiforme, EGFR, Virtual screening

## PL-219

## AMELIORATIVE EFFECTS OF CAPTOPRIL, SPIRONOLACTONE, AND METFORMIN ON DIABETIC NEUROPATHY IN RATS: ROLE OF INFLAMMATION, OXIDATIVE STRESS, AND NEUROTROPHIC RESTORATION

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Diabetic neuropathy (DN) is a debilitating microvascular complication of diabetes, driven by hyperglycemia-induced oxidative stress, inflammation, and neuronal damage. Current therapies provide only symptomatic relief, underscoring the need for disease-modifying interventions. This study aimed to evaluate the neuroprotective potential of captopril, spironolactone, and metformin, individually and in combination, in streptozotocin (STZ)-induced diabetic rats. Wistar rats were divided into six groups: normal control, diabetic control, and diabetic rats treated with captopril, spironolactone, metformin, or their combination. Behavioral assessments (mechanical hyperalgesia, thermal allodynia, rotarod performance), biochemical markers (fasting blood glucose, lipid profile), oxidative stress indices (MDA, GSH, SOD, CAT), inflammatory cytokines (IL-6, TNF-α), and neurotrophic factor (NGF) levels were evaluated. STZ-induced diabetic rats exhibited significant hyperglycemia, oxidative stress, elevated pro-inflammatory cytokines, and reduced NGF levels, accompanied by motor and sensory deficits. Treatment with captopril, spironolactone, or metformin significantly improved behavioral outcomes, reduced oxidative stress, and suppressed inflammatory mediators ($p < 0.05$–$0.001$). Combination therapy exerted the most pronounced effects, restoring NGF levels and motor coordination near to control values. Captopril, spironolactone, and metformin, particularly in combination, demonstrate potent neuroprotective effects in DN through modulation of oxidative stress, inflammation, and neurotrophic support. These findings highlight their potential as a multifactorial therapeutic strategy for DN.

**Keywords:** Diabetic neuropathy, captopril, spironolactone, metformin, oxidative stress, inflammation, neurotrophic factor.

## PL-220

## KNOWLEDGE, ATTITUDE AND PRACTICE REGARDING ADR PREVENTION AMONG HEALTHCARE PROFESSIONALS (HCPS)

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Pharmacovigilance is a science of spotting, evaluate and understand the prevention of ADR. It also involves in resolving problem related to vaccine preparation, other medical conditions together with reporting the ADR and other medical relate problem where they correct it or withdraw the drug from the healthcare list. It plays a critical role in monitoring and safety of patient. Every year FDA list will be update with new drugs and withdrawal of ADR drugs. Studies show that 4,108 hospital admissions are based the 190 ADR drugs were 60 are preventable. ADR is the reaction that result from use of a drug. ADR plays an important role in drugs marketing and withdrawal. Healthcare professionals (HCPs) include nurses, physicians, pharmacist and have an important role in preventing the ADRs in the patient. However, there is a huge gap between the knowledge and practice of ADR prevention and reporting. Community pharmacist have an important role in reporting ADR but 90 % are fail to report due to lack of time and busy schedule.The aim of this survey to know how many HCPs know the pharmacovigilance ADR prevention and knowledge about ADR. Main objectives of this survey is to promote patient safety and encourage the ADR reporting.

**Key word:** safety of patient, practice and knowledge of ADR, pharmacovigilance




ISBN: 978-81-980623-8-3

**PL-221**

## THERAPEUTIC EVALUATION OF ALOE BARBADENSIS GEL IN EXPERIMENTAL PEPTIC ULCER MODELS

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Peptic ulcer disease (PUD) is a common gastrointestinal disorder, manifested as mucosal erosion of the stomach or duodenum, and is associated with non-steroidal anti-inflammatory drug (NSAID) use and Helicobacter pylori. The gastroprotective effect of Aloe barbadensis gel was investigated in ethanol-induced gastric ulcer models in Wistar rats (n = 6 per group) in this study. Fresh mucilaginous gel from mature leaves was given orally in graded doses (187.08, 374.42, and 561.25 mg/kg) for 7 days. Macroscopic and histopathological examinations showed dose-dependent inhibition of ulcer index. Complete mucosal healing was observed in the highest dose group (561.25 mg/kg), and the ulcer index was significantly reduced to 0.42 ± 0.06 from 2.87 ± 0.14 in the ulcerated control group ($p < 0.001$). Mucosal thickness and epithelial integrity were restored, and hemorrhagic lesions and inflammatory infiltration were significantly reduced. Chemical profiling of the gel revealed anthraquinones, polysaccharides (acemannan), sterols, and mucilaginous glycoproteins, which may play a significant role in enhancing mucosal protection, prostaglandin-mediated cytoprotection, and epithelial regeneration. No side effects were observed at therapeutic doses. The results indicate that Aloe barbadensis gel accelerates ulcer healing by promoting mucosal defense and repair mechanisms, and its activity is superior to conventional antiulcer drugs, such as omeprazole and cimetidine, during the early stages of healing. Its biocompatible and regenerative properties support its potential inclusion in phytotherapeutic regimens for PUD management.

**Keywords:** Aloe barbadensis, Ethanol-induced ulcer, Gastric mucosal healing, Ulcer index, Oral gel formulation.

**PL-222**

## RECENT PATTERNS IN MICROBIAL ISOLATES FROM DIABETIC FOOT INFECTIONS

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Diabetic foot infections (DFIs) affect around 15% of people worldwide, often due to poor blood sugar control, weakened immunity, and hormonal imbalances. These issues can lead to serious complications such as bone infections (osteomyelitis), the need for amputation, and growing resistance to antibiotics. This review, carried out in India between 2023 and 2024, looked at recent studies to understand the types of microorganisms found in DFIs and how they respond to antibiotics. The findings revealed that a significant proportion of infections were polymicrobial, involving both Gram-positive and Gram-negative bacteria and fungal species, thereby complicating treatment due to increased antimicrobial resistance and therapeutic challenges. These mixed infections often resist common antibiotics and can cause harmful side effects. While most doctors follow standard treatment guidelines when prescribing antibiotics, the review found that nearly half of the hospitals in India do not strictly follow these protocols. These findings highlight the urgent need for stricter adherence to standardized treatment guidelines to improve clinical outcomes in patients with diabetic foot infections. Moreover, the study underscores the significance of designing context-specific therapeutic strategies that consider regional variations in microbial profiles and healthcare infrastructure.

**PL-223**

## A STUDY ON THE NEED OF INDIVIDUALISATION OF VANCOMYCIN DOSING USING THERAPEUTIC DRUG MONITORING IN THE TREATMENT OF MRSA INFECTIONS

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Vancomycin is a critical antibiotic used to treat serious infections, particularly those caused by Methicillin-resistant Staphylococcus aureus (MRSA). Due to its narrow therapeutic index and significant pharmacokinetic variability among patients, therapeutic drug monitoring (TDM) is essential for optimizing dosing regimens and improving treatment outcomes. This study evaluates the need of optimization of vancomycin dosing through therapeutic drug monitoring (TDM) in the treatment of MRSA infections with primary objective of assessing the duration of vancomycin treatment. An ambispective observational study was conducted over a 12month period, combining six months of retrospective data and six months of prospective data. Patient demographics, laboratory investigations and treatment outcomes were recorded for hospitalized patients aged over 18 years who received intravenous vancomycin. The study assessed the percentage of patients achieving therapeutic trough levels, and the duration of therapy until culture negativity. Statistical analysis was performed using SPSS software. A total of 49 patients who received vancomycin for the treatment of MRSA infections were included in the study. The findings indicated significant proportion of subtherapeutic levels and toxic levels when patients were administered on the basis of weight-based protocols. Additionally, the study identified key demographic factors influencing dosing and treatment outcomes, emphasizing the need for individualized dosing strategies. This study finding advocate for the routine implementation of TDM in clinical practice to enhance patient safety and efficacy of vancomycin therapy. Further research is warranted to explore the association of TDM on therapeutic outcome and duration of vancomycin therapy across diverse healthcare settings.

**Keywords:** Individualization; Vancomycin; Therapeutic drug monitoring (TDM); Methicillin resistant staphylococcus aureus (MRSA); Narrow therapeutic index; Pharmacokinetics; pharmacodynamics; trough

**PL-224**

## DIGITAL TWINS IN HEALTHCARE: REVOLUTIONIZING DIAGNOSIS, TREATMENT, AND RESEARCH

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Digital twin is a novel technology reshaping the healthcare and pharmaceutical sectors by creating virtual clones of humans using AI. The data for the clone is obtained from electronic health records, biosensors, wearables, and genetic testing. AI and machine learning models are utilised to simulate physiological behaviour, personalize treatment therapies, and predict the progression of diseases. Digital twin hastens drug discovery and testing in pharmaceuticals by reducing reliance on human trials and promoting in-silico models. In emergency medicine, digital twins collect real-time data through IoT wearables continuously to prepare hospitals before patient arrival, and proactive healthcare interventions can be achieved. Additionally, significant wait-time reduction, workflow improvement, and enhanced resource allotment is attainable. The game-changing skill of digital twins is to predict diseases like cancer or diabetes before the symptoms appear. This is achieved by detecting subtle biomarkers and unexpected developments in the recorded data. Using this data as the basis, clinicians can stimulate “what if” scenarios and recommend targeted strategies. Notable examples include IBM Watson’s AI-driven cancer treatments and Dassault Systems’ "Living Heart Project," which demonstrate Digital Twins’ potential in patient-specific therapy design. Despite the developing technology and its assurances, challenges like data security, interoperability, ethical concerns, and regulatory compliance may cause problems. Various regulatory agencies, like EMA and FDA, are developing frameworks supporting DTS integration into clinical practice and drug approval. With the advancement of AI and IoT technologies Digital twin transforms healthcare from reactive to predictive, enhancing personalised medicine, hospital workflow, and accelerating therapeutic breakthroughs.

**Keywords**: Precision Medicine, Artificial Intelligence, Predictive Healthcare, IoT in Healthcare, Hospital Workflow Optimisation

**PL-225**




ISBN: 978-81-980623-8-3

**ANTIOXIDANT AND IN VIVO ANTI INFLAMMATORY ACTIVITY OF METHANOL EXTRACT OF HYDYOTIS HERBACEA**

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Hydyotis herbacea plant is an erect glabrous annual or biennial herb used as bitter tonic and febrifuge. In this article we revealed the in vitro antioxidant and in vivo anti-inflammatory activities of crude methanol extract of H. herbacea. Qualitative phytochemical screening of the extract showed the presence of flavanoids, glycosides, steroids, triterpenoids, saponins etc. The total phenol and flavonol contents were found to be 124.32 ± 3.92 and 48.64±1.86 respectively. The extract showed potent in vitro antioxidant activity. The IC50 values are 2.65 ± 0.02 (ABTS method), 82.36 ± 0.52 (Nitric oxide method), 23.50±1.00 (Deoxy ribose method), 72.5 ± 0.75 (Hydrogen peroxide method), 9.23 ± 0.08 (Super oxide radical method). The total antioxidant capacity was found to be 3.56 ± 0.12. Methanol extract at 100 and 200 mg/kg bw produced significant and dose dependent inhibition of paw edema after 1 to 3 h of treatment when compared to control in formalin induced paw edema method with percentage inhibitions of 23.70 ± 1.37 to 40.50 ± 0.36 and 32.64 ± 0.54 to 52.76 ± 0.66, respectively. In carrageenan induced paw edema, the percentage inhibitions at 100 and 200 mg/kg after 1-3 h were found to be 25.56 ± 0.72 and 44.36 ± 1.32 to 57.83 ± 0.84, respectively. The standard ibuprofen showed similar results.

**Keywords:** Hydyotis herbacea, anti-inflammatory activity, formalin induced paw edema, Carrageenan induced paw edema

**PL-226**

**A PROSPECTIVE STUDY ON ADVERSE DRUG REACTION OF ANTICONVULSANT DRUGS IN A TERTIARY CARE HOSPITAL**

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Anticonvulsants remain the cornerstone of epilepsy management, but their long-term use is often complicated by adverse drug reactions (ADRs), which may compromise treatment adherence, patient safety, and overall quality of life (QoL). This study aimed to evaluate the frequency, severity, and impact of ADRs associated with commonly prescribed anticonvulsants—Levetiracetam, Brivaracetam, Lamotrigine, Valproic Acid, Phenytoin, and Carbamazepine—in patients with epilepsy. A total of 150 epilepsy patients receiving long-term anticonvulsant therapy were enrolled. ADRs were assessed using the WHO-UMC criteria and Naranjo's scale, while severity was classified with the Hartwig and Siegel Scale. Adherence was measured with the MMAS-8 tool, and QoL impact was evaluated. Descriptive statistics summarized ADR patterns, and chi-square tests compared ADR frequency and severity across drugs. The findings revealed that levetiracetam (62.96%) and carbamazepine (57.69%) were associated with the highest ADR rates, whereas phenytoin demonstrated the lowest (41.67%). Neurological and psychiatric ADRs, particularly mood changes and cognitive disturbances, were the most prevalent and significantly affected adherence and QoL. Patients experiencing severe ADRs showed reduced medication adherence (MMAS-8 <6) and poorer QoL scores. In conclusion, ADRs remain a critical challenge in epilepsy management, with neurological, psychiatric, and metabolic manifestations being the most common. Early detection, dose adjustments, and patient education are essential strategies to improve drug tolerability. Personalized therapy optimization and regular monitoring may enhance adherence, minimize ADR burden, and ensure effective long-term seizure control.

**Keywords:** Epilepsy, Anticonvulsants, Adverse drug reactions (ADRs), Treatment adherence, Quality of Life (QoL).

**PL-227**

**ANTIMOTIVATIONAL PROPERTIES OF QUERCETIN AGAINST ETHANOL REWARD IN A MOUSE RUNWAY MODEL**

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Quercetin, a naturally occurring bioflavonoid, possesses potent antioxidant and neuromodulatory properties and has been reported as an effective neuroprotective agent against neurological disorders by reducing oxidative stress and neuroinflammation. The present study aims to evaluate the therapeutic potential of quercetin in attenuating alcohol-seeking behavior using a mouse model. Alcohol craving and reinforcement were assessed using a modified runway model of drug self-administration, wherein mice were trained to traverse a runway apparatus to obtain ethanol in the goal box. Following habituation and training, mice were administered quercetin at two doses (0.1 and 0.5 mg/kg, p.o.) or the reference drug naltrexone (5 mg/kg, p.o.) prior to testing. The primary behavioral measure (latency to reach the goal box from the start box) was used as an indicator of alcohol-seeking behavior. Quercetin treatment significantly increased latency and reduced approach behavior, similar to the effects observed with naltrexone, indicating decreased motivation toward ethanol reward. Notably, these effects were achieved without inducing non-specific motor impairments. These findings suggest that quercetin exhibits anticraving properties by attenuating the reinforcing effects of ethanol. The study highlights the potential of quercetin as a therapeutic strategy in the management of alcohol use disorder.

**Keywords:** Alcohol use disorder, Ethanol-seeking, Mice, Quercetin, Runway model

**PL-228**

**IN VITRO ASSESSMENT OF ANGIOGENESIS BY USING A CHICK EGG MODEL**

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Angiogenesis, the formation of new blood vessels from pre-existing vasculature, plays a critical role in both physiological processes such as wound healing and pathological conditions including tumor growth. Reliable in vitro models are essential for evaluating the angiogenic potential of various biomolecules and therapeutic agents. This study utilizes the chick chorioallantoic membrane (CAM) assay, an established ex vivo model derived from fertilized chicken eggs, to assess angiogenesis in a controlled environment. Fertilized eggs were incubated and the CAM was exposed on day 7 of embryonic development. Test substances were applied to the CAM surface, and angiogenic responses were evaluated after 72 hours using stereomicroscopy and digital image analysis. Quantitative assessment included vessel count, branching points, and vessel length. Results demonstrated the model's sensitivity in detecting both pro-angiogenic and anti-angiogenic activities, highlighting its value as a cost-effective, ethical, and reproducible platform for angiogenesis research. This study supports the CAM assay as a robust tool for preclinical screening of angiogenic modulators in biomedical and pharmaceutical research.

**Keywords:** Angiogenesis, Chorioallantoic, sodium chloride

**PL-229**

**A PROSPECTIVE OBSERVATIONAL STUDY TO COMPARE THE OVERALL EFFICACY AND SAFETY PARAMETERS ASSOCIATED WITH LEVETERACETAM AND COMBINATION OF LEVETERACETAM AND CLOBAZAM IN PATIENTS WITH EPILEPSY**

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Epilepsy is a prevalent neurological disorder, yet only 60–65% of patients achieve remission with current anti-epileptic drugs (AEDs). Levetiracetam, a newer AED, is widely preferred for its safety and tolerability. This study compared the efficacy and safety of Levetiracetam monotherapy with its combination with Clobazam in epilepsy patients.A hospital-based, prospective observational study was conducted in the Neurology outpatient department of NRI General Hospital over 9 months. A total of 93 patients were enrolled: Group I (Levetiracetam,




ISBN: 978-81-980623-8-3

n=35; mean age 41.11 ± 14.20 years) and Group II (Levetiracetam + Clobazam, n=58; mean age 34.07 ± 13.04 years). Clinical outcomes were assessed using seizure frequency, duration, severity (NHSSS), and scales for anxiety (HAM-A), depression (HAM-D), sleep (MOS sleep scale), and autonomic symptoms. Adherence and adverse drug reactions were also evaluated. Scores were recorded at baseline and after 3 months.Both groups showed statistically significant improvement ($p<0.05$) in seizure frequency, duration, severity, anxiety, and depression. Reduction in autonomic symptoms was more notable in the combination group, though seizure outcomes did not differ significantly. Patients with longer seizure history (>4 years) in the monotherapy group showed less improvement in seizure frequency. Common adverse effects in both groups included headache, sleepiness, unsteadiness, and weakness. Both regimens were effective and well tolerated, but given comparable efficacy, fewer drugs, and better cost-effectiveness, Levetiracetam monotherapy may be considered the preferred first-line approach.

**Keywords**: Epilepsy, Levetiracetam, Clobazam, Seizure frequency, Drug safety, Efficacy

**PL-230**

## ASSESSMENT OF ANTIOXIDANT, CYTOTOXIC AND ANTIPROLIFERATIVE PROPERTIES WITH GC-MS PROFILING AND IN SILICO STUDY OF METHANOLIC EXTRACTS OF ANNONA SQUAMOSA L. LEAVES

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One of the main sources for developing new, efficient medications is thought to be medicinal plants. In this context, the study's aim to examine polyphenolic and flavonoid fractions in Annona squamosa L. leave's methanolic extracts, using phytochemical screening and to assess antioxidant, cytotoxic and antiproliferative properties of these fractions. GC-MS profiling was used to find out the medicinally active polyphenolic compounds. Antioxidant property of the extracts was measured by peroxide scavenging method. Extracts were tested in human breast cancer (MCF-7) and Cervical cancer (HeLa) cell lines, through MTT assay. IC50 was calculated by using software Graph Pad Prism 6. In silico analysis was conducted using the extract's phytochemical screening, molecular docking, and the Swiss ADME web portal. The study validated receptors and protein structures used in docking investigations, and the IMODS web portal was used for simulation studies. Methanolic leaf extracts of A squamosa L. were found to contain many bioactive compounds, like kaempferol (C15H10O6), Quarcetin (C27H30O15), Phytol (C20H40O) etc, that shows strong antioxidant activity and MTT assay results displayed a remarkable antiproliferative and cytotoxic effects in (MCF-7) and (HeLa) cell lines, that can be used for development of novel drugs for breast cancer and cervical cancer therapy in future.

**Keywords**: Annona squamosa, antiproliferative, cervical cancer, In-silico analysis, MTT assay,

**PL-231**

## ADVERSE EVENTS FOLLOWING IMMUNIZATION: IDENTIFICATION AND REPORTING IN A PROSPECTIVE OBSERVATIONAL STUDY

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Vaccination mimics infection in the body, activating the immune system and generating a potent immune response. While vaccines are widely regarded as safe and effective, continuous monitoring of their safety profile is essential, particularly in pediatrics. This prospective observational study aimed to identify and report adverse events following immunization (AEFIs) in children and to assess their causality, severity, predictability, and preventability. A total of 348 neonates receiving vaccinations at the immunization center of NRI General and Super Specialty Hospital, chinnakakani, Guntur, between June and March were enrolled. Participants were observed for 30 minutes post-vaccination and followed up via telephonic survey after one week, with the procedure repeated for subsequent doses until 14 weeks. The incidence of AEFIs after zero dose, Pentavalent-I, Pentavalent-II, and Pentavalent-III was 81.6%, 92.26%, 96.83%, and 94.54%, respectively. The most frequent events were fever (29.52%), swelling (28.08%), erythema (26.8%), crying for 24 hours (14.6%), and crying for 48 hours (1%). Pentavalent vaccine was most often implicated, followed by BCG. All 3821 AEFIs were consistent, predominantly vaccine product-related reactions. Severity assessment revealed 60.77% mild and 38.97% moderate cases. Predictability analysis showed all 3182 events were predictable, while 70.48% were not preventable. A 100% scar success rate was observed with BCG at 12 weeks. Overall, most AEFIs were mild and non-serious, underscoring the importance of vigilant monitoring to predict and prevent severe reactions.

**Keywords:** AEFI, causality, severity, BCG, pentavalent, erythema.

**PL-232**

## OPTIMIZATION OF INTEGRIN TARGETED NANOPARTICLES ENCAPSULATING GLUTAMINASE INHIBITOR FOR TRIPLE-NEGATIVE BREAST CANCER MANAGEMENT

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The study aims to optimize and functionalize the PEGylated PLGA based polymeric nanoparticles of glutaminase inhibitor CB839 using integrin targeted RGD peptide to target triple negative breast cancer (TNBC). CB839 is an allosteric GLS inhibitor with poor plasma half-life and low solubility, requiring frequent dosing. PLGA nanoparticle was prepared using single emulsion technique (GiPG) and optimized using Box-Behnken design with PLGA-PEG, PVA, and sonication amplitudes as independent variables and particle size, PDI, zeta potential, and %EE as dependent variables. The optimized formulation was subjected to cRGDfk conjugation using the EDC/NHS technique. The final formulation showed a particle size of 245.7±3.56, PDI 0.223±0.011, ZP -10.46±3.97, and %EE of 65.12±5.65. The cRGDfk conjugated nanoparticles (GiPG@R) show no significant change in PS and PDI but a slight change in ZP due to the amine group. The SEM and TEM images show that the nanoparticle surface was smooth and spherical. The drug is released more in acidic pH, where the PLGA was degraded in acidic medium, representing the tumor microenvironment. The fluorescence microscopy reveals that GiPG@R was taken up by the cells via receptor-mediated endocytosis. The cell line studies revealed that the GiPG and GiPG@R show potent cytotoxicity compared to free CB839. This finding was supported by the scratch wound assay, the GiPG@R shows better anti-migratory property in MDA-MB-231 at a reduced dose. There has been no approved therapy to block GLS directly in TNBC. So, it is concluded that GiPG@R may overcome the issues and be an alternative treatment strategy against TNBC.

**Keywords:** TNBC, CB839, glutaminase, nanoparticles, anticancer

**PL-233**

## ENHANCING THE THERAPEUTIC EFFICACY OF MADHUCA LONGIFOLIA FLOWER EXTRACT THROUGH CONCURRENT ADMINISTRATION WITH PROBIOTIC LACTOBACILLUS PLANTARUM IN A STREPTOZOTOCIN-INDUCED ALZHEIMER'S DISEASE MODEL

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Alzheimer's Disease (AD) is a neurodegenerative disease that causes symptoms such as memory loss, impaired reasoning, and cognitive impairment. AD is becoming more prevalent worldwide, causing significant challenges for individuals, families and healthcare providers. The objective of this study was to evaluate whether the bioactive nature of Madhuca longifolia flower extract could, when combined with probiotics in addition, slow down the progression of AD by reducing hallmark protein aggregation, oxidative stress and inflammation but




ISBN: 978-81-980623-8-3

returning normal gut microbiota balance. The hypothesis was that the experimental groups were given Madhuca longifolia extract, probiotics, or both to model AD. They assessed brain health by examining gross pathology, behavioral memory and cognition tests, histopathological analysis, and the composition of the gut microbiota. Additionally, they measured short-chain fatty acid (SCFA) level and their body composition. The combined treatment group demonstrated marked improvements in cognitive performance, decreased onset of characteristic pathological changes, and reduced levels of neuroinflammation and oxidative stress. The gut microbiota's composition shifted towards improved health, and the increase in SCFA production indicated an improvement in brain function. The results suggest that Madhuca longifolia extract and probiotics have the potential to effectively target both neurological and gut aspects of AD. Essentially, the combination of extract from Madhuca longifolia and probiotics is a highly effective integrated treatment for AD in its entirety. The outcomes offer solid guidance for future research to convert the combination into an effective treatment

**Keywords:** Alzheimer's Disease, Madhuca longifolia, probiotics, gut–brain axis, neuroinflammation.

**PL-234**

**REGENARATING PANCREATIC B – CELLS: THE PROMISE OF STEM CELL THERAPY IN TYPE 1 DIABETES**

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Type 1 diabetes mellitus (T1D) is a chronic, multifactorial auto immune disease that involves the progressive destruction of pancreatic β – cell, ultimately resulting in the lose of insulin production and secretion.Stem cell therapy offers a transformative approach to type 1 diabetes by targeting root cause.These lab generated cells mimic the natural insulin secretion and hold potential for restoring glycemic control.Mesenchymal stem cell further contribute by modulating immune response and supporting pancreatic tissue repair. Advanced protocols now allow for efficient conversion of stem cells into functional β cells using transcription factor and growth factors.However challenges remain, including immune rejection, risk of tumor formation, and ethical concerns surrounding certain stem cell sources. Encapsulation technologies and gene editing tools like CRISPR are being explored to enhance safety and efficacy.It is expected that by the year 2035, there will be numerous people that gain diabetes which will jump more than 592 million. Diabetes is implicated in numerous complications, for example, retinopathy, neuropathy, kidney disease and peripheral vascular disease. Stem cell therapy holds a great promise for the repair of injured tissue and organ. Regenerating β – cells through stem cell therapy represents a hopeful frontier in achieving durable remission and reducing dependence on insulin therapy for patients with type 1 diabetes.

**Keywords:** Type 1 diabetes mellitus, Pancreatic β-cells, Stem cell therapy, Mesenchymal stem cells (MSCs), CRISPR gene editing.

**PL-235**

**PRODUCTION AND CHARACTERIZATION OF L-ASPARAGINASE FROM ASPERGILLUS SYDOWII LACKING GLUTAMINASE ACTIVITY**

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L-asparaginase is a prominent antineoplastic enzyme used in the treatment of acute lymphoblastic leukaemia (ALL). It hydrolyses L-asparagine into aspartic acid, thereby depriving leukemic cells of an essential amino acid asparagine, which is needed for their proliferation. However, currently available bacterial derived L-asparaginase exhibits immunogenic reactions and glutaminase-related toxicity, limiting its therapeutic potential. To address these issues, we explored a fungal source having L-asparaginase activity. A fungal isolate MSF 15, exhibiting significant asparaginase activity was selected and identified as Aspergillus sydowii through 18S rRNA gene sequencing. Importantly, the isolated strain exhibited no glutaminase activity, indicating a safer therapeutic profile. The organism was cultivated on a modified Czapek-Dox medium containing glycerol, L-asparagine, KH2PO4, MgSO4, ZnSO4, FeSO4, CuNO3 and phenol red. Asparaginase activity was estimated using Nessler's reagent. The enzyme was extracted by acetone precipitation, and partially purified by dialysis, with 2.54-fold purification. Besides, the enzyme showed anti-inflammatory activity, with 26.67% inhibition of protein denaturation. These findings suggest that A. sydowii derived L-asparaginase, lacking glutaminase activity, might have a safe and effective therapeutic approach for ALL treatment. Further studies are in progress to establish its clinical applications.

**PL-236**

**FORMULATION AND DEVELOPMENT OF HIGH ENERGY SUPPLEMENT FOOD FOR MODERATE ACUTE MALNUTRITION IN CHILDREN**

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Undernutrition in children aged 6–59 months is a major health challenge in India. In Dadra and Nagar Haveli, NFHS-4 (2015–2016) reported high rates of underweight and wasting with
minimal improvement despite interventions. To assess the prevalence of undernutrition in children aged 6–59 months and evaluate the potential of a low-cost, high-energy supplementary food to improve nutritional status. A cross-sectional survey of 535 randomly selected children from Sayli, Kudacha, Rakholi, and Silvassa recorded socio-demographic, dietary, and anthropometric data. Univariate and bivariate analyses identified associations between risk factors and undernutrition indicators. Prevalence of underweight, stunting, and wasting was 37%, 59.4%, and 40.18%, respectively. Socioeconomic status, maternal education, birth spacing, and complementary feeding practices were key determinants. Undernutrition prevalence has increased in recent years, indicating poor child health. Low-cost, high-energy supplementary food may mitigate undernutrition and its associated risk factors.

**Keywords:** undernutrition, stunting, preschool children, supplementary food

**PL-237**

**MARINE HERBAL NANOFORMULATIONS AS A NOVEL NEUROPROTECTIVE STRATEGY FOR AUTISM SPECTRUM DISORDER**

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Marine herbal drugs rich in neuroprotective compounds offer a promising avenue for autism spectrum disorder (ASD) management. This study evaluated extracts from Sargassum fusiforme, Gracilaria edulis, Ulva lactuca, and DHA-rich Schizochytrium sp., formulated into chitosan–TPP nanoparticles for enhanced brain delivery. Extracts contained fucoidan (18.6 ± 1.2 mg/g), polyphenols (72.4 ± 2.1 mg GAE/g), and DHA (31.5 ± 1.8 mg/g). Nanoparticles exhibited a mean size of 162 nm, zeta potential −27.6 mV, encapsulation efficiency 81%, and antioxidant activity 92% DPPH inhibition. In vitro studies on SH-SY5Y neuronal cells showed 97% viability at 100 µg/mL and 42% ROS reduction. Blood–brain barrier assays indicated 2.3× higher transport than free extracts. In vivo, valproic acid-induced ASD rats treated with the nanoformulation demonstrated a 56% increase in social interaction, 42% reduction in repetitive grooming, and 39% improvement in memory index ($p < 0.01$). Biochemical analysis showed decreased MDA (2.14 vs. 4.62 nmol/mg protein), increased SOD (9.84 vs. 5.21 U/mg protein), catalase (3.16 vs. 1.84 µmol/min/mg protein), and reduced IL-6 (18.5 pg/mL) and TNF-α (22.7 pg/mL). Histopathology confirmed 92% restoration of hippocampal neuron density. These findings suggest that marine herbal nanoformulations can significantly improve behavioral, biochemical, and neuroprotective outcomes in ASD. The results support their potential as a safe, effective, and complementary therapeutic strategy, warranting further clinical investigation.

**Keywords:** Autism Spectrum Disorder, marine herbal drugs, nanoparticles, neuroprotection, antioxidant activity

**PL-238**

**EVALUATION OF ANTIHYPERLIPIDAEMIC ACTIVITY OF METHANOLIC EXTRACT OF LEMONGRASS IN ALBINO WISTAR RATS.**

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Evaluation of hypolipidaemic activity of methanolic extract of lemongrass leaves (100 & 200 mg/kg p.o.) against dexamethasone (10 mg/kg i.p.) induced hyperlipidaemia in rats. Albino wistar rats weighing 150-200 gm were procured from Animal house, Anuradha College of Pharmacy, Chikhali, Buldana, Maharastra. All rats were divided into five groups. Dexamethasone (10 mg/kg i.p.) administered for 8 days caused hyperlipidaemia in rats after that serum cholesterol, triglycerides LDL cholesterol & HDL-cholesterol level was estimated. Dexamethasone & methanolic extract of lemongrass leaves (100 & 200 mg/kg p.o.) and Dexamethason & Standard drug administered for 8 days in rats after that serum cholesterol, triglycerides & LDL cholesterol & HDL-cholesterol was estimated. This study indicates that due to methanolic extract of lemongrass leaves marked decrease in total cholesterol, triglycerides', LDL-cholesterol & marked increase in HDL-cholesterol in hyperlipidaemic rats. In the present study 8 days treatment of methanolic extract of lemongrass leaves showed significant antihyperlipidaemic activity in dexamethasone induced hyperlipidaemia in rats.

**Keywords:** Hyperlipidaemia, Dexamethasone, lemongrass leaves, Methanol.

**PL-239**

## CHRONIC USE OF METFORMIN HEIGHTENS THE RISK OF METHYLCOBALAMIN DEFICIENCY IN INDIVIDUALS WITH TYPE II DIABETES MELLITUS PATIENTS.

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The current study aimed to observe the effects of chronic metformin therapy on co levels in patients with Type II Diabetes Mellitus (DM). An observational study was conducted over 12 months, enrolling 102 Type II DM patients undergoing long-term metformin therapy. Methylcobalamin levels were measured to identify patients at risk of deficiency and related complications. A total of 102 participants, 61 were male (59.8%) and 41 females (40.2%). Twelve patients (mean age 49.16±10.53) had low Methylcobalamin levels, 16 (mean age 51.95±7.12) had above-normal levels, and 30 (mean age 57.53±4.55) were in the borderline range. Males showed a higher prevalence of low Methylcobalamin compared to females, particularly in the 50–65 age group. Patients with comorbidities and those on higher doses or longer durations of metformin therapy were more likely to have low or borderline Methylcobalamin levels. Dietary factors also appeared to influence Methylcobalamin status. The study concluded that chronic, high-dose metformin therapy may reduce serum Methylcobalamin levels, increasing the risk of peripheral neuropathy and other complications, especially in older male patients and those with comorbidities. Regular monitoring of Methylcobalamin is recommended for Type II DM patients on long-term metformin therapy.

**Keywords:** Type II Diabetes Mellitus, Metformin, Vitamin B12, Methylcobalamin.

**PL-240**

## PHARMACOLOGICAL EVALUATION OF IXORA COCCINEA LEAVES: INTEGRATED IN VITRO AND IN SILICO APPROACHES AGAINST BREAST CANCER

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The present research investigates the phytochemical composition and pharmacological potential of Ixora coccinea extract using experimental and computational approaches. LC-QTOF-MS profiling revealed a diverse range of secondary metabolites, notably flavonoid glycosides, isoflavones, anthocyanins, flavan-3-ols, and xanthones. Among them, kaempferol rutinoside, epicatechin derivatives, and cyanidin glucogalactoside were identified as major constituents with reported antioxidant and cytotoxic properties. Cytotoxic potential was assessed through MTT assay against MDA-MB-231 breast cancer cells, where the extract displayed significant antiproliferative activity, with an $IC_{50}$ value of 250 µg/mL, highlighting strong anticancer efficacy. Computational studies, including molecular docking and virtual screening, demonstrated that 3-hydroxyflavone, quercetin, and kaempferol exhibited high binding affinities towards cancer-associated protein targets. These compounds also complied with Lipinski's drug-likeness rule and showed favourable ADMET profiles, such as good absorption, non-toxicity, and metabolic stability. Furthermore, molecular dynamics simulations validated the stable binding of ligand–protein complexes, strengthening the computational findings. Overall, the study underscores Ixora coccinea as a promising natural source of antioxidant and cytotoxic molecules, with certain phytoconstituents emerging as potential lead candidates for anticancer drug development. However, further in vivo and clinical studies are required to confirm their therapeutic relevance.

**Keywords:** Ixora coccinea, LC-QTOF-MS, Molecular docking, MTT Assay, PyRx

**PL-241**

## PHARMACOLOGICAL EVALUATION OF SYZYGIUM CUMINI METHANOLIC EXTRACT FOR ANTI- HYPERLIPIDEMIC ACTIVITY IN TRITON X-100 -INDUCED HYPERLIPIDEMIA RAT MODEL

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Cardiovascular diseases are among the leading causes of death worldwide, with mortality rates continuing to rise. A major contributing factor to these conditions is hyperlipidemia, characterized by elevated levels of lipids in the blood. Conventional treatments are often associated with side effects, leading to increased interest in alternative therapies, including those derived from traditional medicine systems such as Unani. Among the various medicinal plants known for their lipid-lowering properties, Syzygium cumini (commonly known as Jamun in India) holds significant therapeutic promise due to its bioactive compounds. The present study evaluates the antihyperlipidemic potential of Syzygium cumini leaf powder using a Triton X-100-induced hyperlipidemia rat model. Experimental animals were administered varying doses of the leaf powder, and serum biochemical parameters were assessed to determine the effects on lipid profile, kidney function, and liver function. In addition, histopathological examination of liver tissues was performed to further understand the extent of tissue protection. The results demonstrated that administration of a high dose of Syzygium cumini leaf powder led to a significant reduction in total cholesterol, triglycerides, and low-density lipoprotein (LDL), with a concomitant increase in high-density lipoprotein (HDL). Kidney and liver profiles remained within normal limits, suggesting the treatment was well tolerated. Histopathological analysis supported these findings, indicating reduced hepatic damage in treated groups. This study supports the potential of Syzygium cumini leaf as a safe and effective natural remedy for hyperlipidemia, warranting further investigation and possible development into a therapeutic agent.

**Keywords:** Syzygium cumini, Jamun, Hyperlipidemia, Antihyperlipidemic activity, Triton X-100, Unani medicine, Lipid profile, Natural remedy, Histopathology, Cardiovascular diseases

**PL-242**

## PHARMACOECONOMIC ASSESSMENT OF HERBAL ADAPTOGEN THERAPY (WITHANIA SOMNIFERA) COMPARED TO CONVENTIONAL ANXIOLYTICS IN THE MANAGEMENT OF GENERALIZED ANXIETY DISORDER

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Generalized Anxiety Disorder (GAD) is a psychiatric condition that imposes both clinical and economic burden, affecting nearly 7–8% of the Indian population, contributing to reduced productivity and quality of life. Conventional anxiolytics such as SSRIs and benzodiazepines are effective but associated with adverse events, dependency, and higher long-term costs. Withania somnifera a traditional adaptogen, has demonstrated anxiolytic activity in many clinical studies, yet limited




ISBN: 978-81-980623-8-3

evidence exists on its pharmacoeconomic relevance. The present study was designed to compare the cost-effectiveness of Ashwagandha with conventional anxiolytics. Retail market prices were analysed to estimate average monthly treatment costs: Ashwagandha capsules 500 mg BID (₹600), escitalopram 10 mg OD (₹1,200), and alprazolam 0.5 mg BID (₹900). Clinical effectiveness values were derived and expressed as mean reduction in Hamilton Anxiety Rating Scale (HAM-A) scores over 8 weeks: Ashwagandha 12 points, escitalopram 13 points, alprazolam 11 points. A decision-analytic model was constructed using TreeAge Pro. Incremental Cost-Effectiveness Ratios (ICERs) were calculated, and Monte Carlo simulations were applied for probabilistic sensitivity analysis. Results showed that Ashwagandha produced a comparable reduction in HAM-A scores at nearly 50% lower monthly cost than SSRIs, with ICER analysis indicating a saving of ₹50 per unit reduction. Sensitivity testing confirmed robustness in over 85% of simulations, supporting Ashwagandha as a cost-effective alternative for GAD management.

**Keywords:** Ashwagandha, Withania somnifera, Generalized Anxiety Disorder, Pharmacoeconomics, Cost-Effectiveness, Anxiolytics

**PL-243**

## CLINICAL PHARMACIST'S ROLE IN EVALUATING GLUTATHIONE FOR SKIN WHITENING: ASSESSING EFFICACY AND ADVERSE REACTIONS USING AI-SUPPORTED MONITORING – A COHORT STUDY

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Glutathione is widely used for skin whitening due to its antioxidant and melanin-inhibiting effects, but its safety and efficacy remain debated. Clinical pharmacists, supported by AI-based dermatology tools, can enhance monitoring by objectively assessing skin tone changes and detecting adverse reactions. A prospective cohort interventional study was conducted on 120 participants undergoing glutathione therapy for skin whitening over 12 weeks at a cosmetic clinic. Participants were allocated into two groups: oral glutathione (600 mg/day) and IV glutathione (1200 mg/week). Clinical pharmacists counselled patients, monitored ADRs, and ensured adherence. Skin tone changes were assessed using the Fitzpatrick scale and validated with AI-based software (SkinVision®) analyzing digital images. Liver/kidney function tests were performed pre- and post-intervention. ADRs were captured via patient reports, clinical evaluation, and AI-assisted lesion detection. Skin-lightening effects were observed in 72% of participants, with the IV group demonstrating faster and more pronounced results. AI-based analysis detected subtle pigmentation changes with higher sensitivity than manual grading, showing a strong correlation with Fitzpatrick scores ($r = 0.89$, $p < 0.01$). ADRs occurred in 34% of participants, including nausea (10%), dizziness (7%), rashes (9%), and elevated liver enzymes (8%). The IV group showed a significantly higher ADR incidence compared to the oral group ($p < 0.05$). Clinical pharmacists, supported by AI monitoring, enabled early detection and management of ADRs, preventing escalation and improving treatment safety. Glutathione demonstrated moderate efficacy as a skin-whitening agent, particularly with IV administration, but safety concerns were significant. AI-assisted tools enhanced the accuracy of skin tone evaluation and ADR monitoring, complementing the pharmacist's role in pharmacovigilance. Clinical pharmacists remain integral to optimizing safe cosmetic therapy, while AI provides objective, real-time support for monitoring. Larger controlled studies and regulatory frameworks are needed to establish standardized guidelines for glutathione use in cosmetic dermatology.

**Keywords:** Glutathione, Skin-whitening agent, Pharmacovigilance, Artificial Intelligence, Fitzpatrick scale, Clinical pharmacist.

**PL-244**

## DRUG USE EVALUATION OF THIRD GENERATION TYROSINE KINASE INHIBITORS IN VARIOUS MALIGNANCIES

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Third-generation tyrosine kinase inhibitors (TKIs) including Osimertinib, Ponatinib, and Lorlatinib represent a breakthrough in overcoming resistance mechanisms in malignancies such as NSCLC, CML, and ALK-positive tumors. Despite their transformative efficacy, challenges remain regarding inappropriate prescribing, dose optimization, and adverse drug reactions (ADRs). Leveraging Drug Use Evaluation (DUE) with pharmacist-led oversight and AI-supported monitoring tools offers a novel pathway to ensure rational, safe, and effective utilization of these agents. A prospective observational study was carried out in 15 patients treated with third-generation TKIs across multiple malignancies. Prescribing patterns, dosing appropriateness, and clinical outcomes were assessed against international guidelines. Efficacy was evaluated using RECIST criteria for solid tumors and hematological remission in CML. ADRs were identified through CTCAE v5.0 and validated with AI-enhanced ADR detection software (MedWatch AI®). Pharmacist interventions were documented to measure their impact on adherence and safety outcomes. Of the 15 patients, osimertinib (n=6) was the most prescribed, followed by ponatinib (n=3) and Lorlatinib (n=6). Guideline adherence was high (87%). Clinical benefit was achieved in 73% of cases (partial/complete response in solid tumors, remission in CML). ADRs were reported in 53% of patients, most commonly diarrhoea (20%), hypertension (13%), hepatotoxicity (13%), and fatigue (13%). Two patients experienced Grade 3/4 ADRs requiring dose modification. Importantly, AI-enhanced monitoring flagged 30% of ADRs earlier than manual reporting, and pharmacist-led interventions improved adherence and supportive care by 40%, reducing preventable ADRs and optimizing treatment continuity. This study confirms that third-generation TKIs provide strong therapeutic efficacy with a manageable safety profile in resistant malignancies. The integration of AI-assisted ADR detection with pharmacist-led DUE represents a forward-looking model that enhances precision in oncology therapeutics. Proactive monitoring not only safeguarded patients from severe ADRs but also optimized outcomes, setting the stage for larger AI-pharmacist collaborative frameworks in real-world cancer care.

**Keywords:** Third-generation TKIs, Osimertinib, Ponatinib, Lorlatinib, AI-assisted pharmacovigilance, Drug Use Evaluation, Pharmacist-led interventions.

**PL-245**

## COMPARATIVE EFFICACY AND SAFETY OF PREGABALIN WITH NORTRIPTYLINE AND PREGABALIN WITH DULOXETINE IN PATIENTS WITH DIABETIC PERIPHERALNEUROPATHIC PAIN

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Neuropathic pain results from lesions or dysfunction within the nervous system and may originate from central causes such as cerebrovascular accidents, multiple sclerosis, or spinal cord injury, as well as peripheral causes including diabetic neuropathy, post-herpetic neuralgia, or surgical trauma. Diabetic Peripheral Neuropathic Pain (DPNP) is among the most common and disabling forms, typically presenting as burning, electric shock-like, lancinating, or deep aching pain in the lower extremities. Symptoms often arise abruptly and are closely associated with sleep disturbances, impaired productivity, reduced quality of life, and mood disorders. Current pharmacological approaches include antidepressants, antiepileptics, opioids, analgesics, topical lidocaine, and capsaicin. Despite these options, therapeutic response remains inconsistent, with over half of patients reporting inadequate relief. Both monotherapy and combination therapy have been studied, targeting outcomes such as pain reduction, improved sleep, and functional recovery. Pregabalin demonstrates consistent efficacy and is commonly used with tricyclic antidepressants like amitriptyline. However, there is limited evidence on combinations such as pregabalin with nortriptyline or pregabalin with duloxetine, which may provide additional benefits in pain control while addressing sleep and anxiety with fewer adverse effects. This study evaluates the comparative efficacy and safety of these two combinations in patients with DPNP.

**Keywords:** Neuropathic pain, Diabetic peripheral neuropathic pain, Pregabalin, Nortriptyline, Duloxetine, Sleep disturbance, Anxiety.

**PL-246**


ISBN: 978-81-980623-8-3

**EVALUATION OF ANTI-HYPERLIPIDEMIC AND ANTIOXIDANT ACTIVITY OF ETHANOLIC EXTRACT OF ROSA X DAMASCENA FLOWER IN HYPERLIPIDEMIC INDUCED WISTAR ALBINO RATS**

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Hyperlipidemia is a significant risk factor for cardiovascular diseases and is closely linked to oxidative stress. Current therapies, though effective, often present limitations and side effects, driving interest in plant-based alternatives. Rosa x damascena flowers are traditionally valued for medicinal properties, but their role in lipid regulation and antioxidant defense remains underexplored. To evaluate the anti-hyperlipidemic and antioxidant activities of ethanolic extract of Rosa x damascena flowers (EERD) in hyperlipidemic-induced Wistar albino rats. Hyperlipidemia was induced by high-fat diet [Butter] and Triton X-100 administration. Animals were divided into six groups: normal control, hyperlipidemic control, standard (atorvastatin 10 mg/kg), and three test groups receiving EERD at 200, 400, and 800 mg/kg orally for 28 days. Serum lipid profile (TC, TG, LDL-C, HDL-C) and antioxidant markers (SOD, CAT, MDA) were analyzed. Liver tissues were examined histopathologically to confirm biochemical outcomes. EERD treatment significantly ($p < 0.05$) reduced total cholesterol, triglycerides, and LDL-C while increasing HDL-C in a dose-dependent manner compared to hyperlipidemic controls. Antioxidant assays demonstrated elevated SOD and catalase activities with reduced lipid peroxidation. Histopathology revealed improved hepatic architecture and reduced fat accumulation in EERD-treated rats. Ethanolic extract of Rosa x damascena flowers demonstrated potent anti-hyperlipidemic and antioxidant properties, supporting its potential as a natural therapeutic approach for the management of hyperlipidemia and oxidative stress.

**Keywords:** Rosa x damascena, hyperlipidemia, antioxidant activity, ethanolic extract, Wistar rats

**PL-247**

**EVALUATION OF ANXIOLYTIC, ANTIDEPRESSANT, AND ANTISTRESS ACTIVITY OF ETHANOLIC EXTRACT OF STACHYTARPHETA INDICA LEAVES IN SWISS ALBINO MICE**

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The study aims to evaluate the potential anxiolytic, antidepressant, and anti-stress effects of the ethanolic extract of Stachytarpheta indica in Swiss albino mice. Mice were randomly divided into control and experimental groups. The experimental groups were subjected to stress paradigms and treated orally with vehicle, standard drugs (diazepam, lorazepam and imipramine) and S. indica extract at doses of 100, 200, and 400 mg/kg body weight for 21 days. Behavioral assessments were performed using the elevated plus-maze test (EPMT), forced swimming test (FST), tail suspension test (TST), open field test (OFT), and water immersion restraint stress model. In the EPMT, the percentage of open arm entries and time spent in open arms were significantly increased in mice treated with diazepam and S. indica at 200 and 400 mg/kg, indicating anxiolytic-like activity. In both the FST and TST, immobility time was markedly reduced in mice administered imipramine and S. indica at all tested doses, suggesting antidepressant-like activity. In the water immersion restraint stress test, mice treated with S. indica extract displayed a significant attenuation of stress-induced behavioral alterations. Biochemical analyses further demonstrated that S. indica treatment significantly reduced serum cortisol levels while increasing brain monoamine neurotransmitters, including dopamine (DA) and serotonin (5-HT), compared to vehicle-treated stressed mice. Histopathological evaluation indicated no adverse effects on liver tissue. Collectively, these findings suggest that the ethanolic extract of S. indica possesses notable anxiolytic, antidepressant, and anti-stress activities, potentially mediated through modulation of central monoamines and the hypothalamic–pituitary–adrenal (HPA) axis.

**Keywords:** Antidepressant, antistress, anxiolytic, *Stachytarpheta indica*.

**PL-248**

**EVALUATION OF ANTI-INFLAMMATION AND ANTI-ARTHRITIS ACTIVITY OF ETHANOLIC EXTRACT OF PREMNA TOMENTOSA LEAVES IN CARRAGEENAN INDUCED INFLAMMATORY MODEL AND FREUND'S ADJUVANT-INDUCED ARTHRITIS MODEL IN WISTAR ALBINO RATS**

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Rheumatoid arthritis (RA) is a chronic autoimmune disorder characterized by progressive joint inflammation, deformity, and disability. Although several synthetic drugs are available, they are often associated with toxicity, high cost, and limited accessibility, highlighting the need for safer, plant-based alternatives. The present study was undertaken to evaluate the anti-inflammatory and anti-arthritic potential of ethanolic extract of Premna tomentosa (EEPT) in Wistar albino rats. Leaves of Premna tomentosa were collected, authenticated, dried, and extracted with 95% ethanol. Phytochemical screening revealed the presence of flavonoids, diterpenes, alkaloids, tannins, and phenolic compounds. In vitro antioxidant activity assessed by DPPH assay confirmed strong free radical scavenging potential. Acute toxicity studies (OECD 423) demonstrated that EEPT was safe up to 2000 mg/kg with no mortality or behavioural changes. In vivo studies showed that EEPT significantly and dose-dependently reduced paw edema in carrageenan and histamine-induced models, comparable to standard diclofenac. In Complete Freund's Adjuvant (CFA)-induced arthritis, EEPT markedly reduced paw swelling, arthritic scores, and joint deformities, while also restoring haematological and biochemical parameters toward normal. Histopathological analysis further confirmed reduced synovial hyperplasia, pannus formation, and inflammatory cell infiltration in treated groups, especially at higher doses. The results indicate that Premna tomentosa exhibits potent anti-inflammatory and anti-arthritic activities, likely due to its rich phytochemical profile. The study provides scientific validation for its traditional use and suggests its potential as a safe and effective alternative for managing rheumatoid arthritis.

**Keywords:** Rheumatoid arthritis, Premna tomentosa, anti-inflammatory, anti-arthritic, phytochemicals

**PL-249**

**THE ROLE OF SPERMIDINE IN THE MANAGEMENT OF MONOSODIUM L-GLUTAMATE INDUCED POLYCYSTIC OVARIAN SYNDROME (PCOS) IN RATS**

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Polycystic ovary syndrome (PCOS) affects approximately 5–20% of women of reproductive age worldwide and is a prevalent endocrine metabolic disorder characterized by hyperandrogenism, anovulation, ovarian cysts, insulin resistance, obesity, and dyslipidemia, ultimately leading to infertility and an increased risk of metabolic and cardiovascular diseases. Excessive monosodium glutamate (MSG) intake has been implicated in aggravating PCOS pathology and is widely employed experimentally to induce PCOS-like features by promoting obesity, hypothalamic pituitary dysfunction, and insulin resistance, thereby replicating the syndrome's reproductive and metabolic disturbances. Current therapies such as oral contraceptives, anti-androgens, and insulin sensitizers provide symptomatic relief but are associated with long-term adverse effects, necessitating safer alternatives. Spermidine, a naturally occurring polyamine,has been associated with reproductive and metabolic benefits. This study evaluated the therapeutic efficacy of spermidine in female rats with MSG induced PCOS. Post-weaning MSG administration produced PCOS-like manifestations, including disrupted estrous cycles, delayed vaginal opening, increased body weight, and abnormal ovarian histology with multiple cystic follicles. Biochemically, MSG elevated LH, AMH, estradiol, and testosterone while reducing FSH, accompanied by hyperglycemia, dyslipidemia, and oxidative stress. Spermidine treatment (5, 10, and 20 mg/kg) significantly ameliorated these alterations in a dose-dependent manner. It restored estrous cyclicity, normalized vaginal opening, improved anxiety and depressive like behaviors, corrected hormonal




ISBN: 978-81-980623-8-3

imbalance, enhanced glucose tolerance, reduced glycemia and triglycerides, strengthened antioxidant defenses. However, histology showed reduced cystic follicles with improved ovarian and visceral fat morphology. Spermidine exerted marked protective and therapeutic effects against MSG induced PCOS, highlighting its promise as a safe nutraceutical and potential therapeutic candidate for effective PCOS management.

**Keywords:** Polycystic ovary syndrome (PCOS); Monosodium glutamate (MSG); Spermidine; Hormonal imbalance; Metabolic dysfunction.

**PL-250**

## EFFICACY AND SAFETY OF DEGLUDEC VERSUS GLARGINE IN TYPE 2 DIABETIC PATIENTS WITH ORAL HYPOGLYCEMIC AGENTS

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Insulin therapy is required in type 2 diabetes mellitus (T2DM) patients who fail to achieve glycemic control with oral anti-hyperglycemic agents (OHAs). Insulin glargine provides 24-hour basal coverage but is associated with variable absorption and hypoglycemia, while insulin degludec (IDeg), an ultra-long-acting analogue, offers steadier absorption and may reduce hypoglycemia. This prospective observational study, conducted from August 2022 to March 2023 at NRI General and Super Specialty Hospital, Mangalagiri, included 54 T2DM patients, of whom 27 received glargine and 27 received degludec along with OHAs. The mean age was 55.0 ± 10.9 years, with a slight female predominance (52%). The mean duration of diabetes was 13.0 years in the glargine group and 10.9 years in the degludec group, with dapagliflozin (69%) and vildagliptin (28%) being the most common OHAs. Both groups achieved significant HbA1c reduction, with no difference between treatments (ETD: 0.11%, p = 0.410), and no significant changes in BMI were observed. However, nocturnal confirmed hypoglycemia was significantly lower with degludec (0.01 vs 0.03 episodes/patient-month; ERR: 0.31, p = 0.005). The most frequent adverse reaction was nasopharyngitis (63% with degludec vs 56% with glargine), followed by upper respiratory infections, while injection site reactions were more common with glargine (19% vs 7%). In conclusion, both insulins provided comparable glycemic control without affecting BMI, but degludec was associated with fewer nocturnal hypoglycemic episodes and injection site reactions, indicating a safety advantage over glargine.

**Keywords:** Type 2 diabetes mellitus, Insulin Glargine, Insulin Degludec, HbA1c, Hypoglycemia

**PL-251**

## OVER-THE-COUNTER (OTC) MEDICATION DISPOSAL: PRACTICE AND AWARENESS

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Improper disposal of over-the-counter (OTC) medications poses risks to public health, safety, and the environment, yet awareness and safe practices remain limited. This study aimed to assess the knowledge, attitude, and practice (KAP) regarding OTC medication disposal among the general population. A cross-sectional survey was conducted using a structured Google form, and responses from 62 participants were analysed. The results showed that 82.3% of respondents did not store expired medicines, while among those who did, 72.1% disposed of them in household dustbins and only 11.5% returned them to medical stores. Although 93.5% recognized that unsafe disposal harms the environment, just 49.2% were aware of proper guidelines, and only 27.9% had received advice from healthcare professionals. In terms of attitude, 75.4% expressed willingness to return unused medicines if facilities were available. These findings indicate that while awareness about the risks of improper disposal is relatively high, actual safe disposal practices remain inconsistent. The study concludes that public education, healthcare professional involvement, and accessible pharmacy-based take-back systems are essential to improve safe and sustainable OTC medication disposal.

**Keywords**: OTC medications, Drug disposal, Public awareness, Environmental health

**PL-252**

## COMPARATIVE STUDY OF EFFICACY AND SAFETY OF VORTIOXETINE VERSUS ESCITALOPRAM IN MAJOR DEPRESSION DISORDER IN SOUTH INDIAN POPULATION

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Major depressive disorder (MDD) is a prevalent, chronic psychiatric illness associated with significant morbidity and disability. Antidepressant therapy remains the cornerstone of management, with vortioxetine, a multimodal antidepressant, and escitalopram, a selective serotonin reuptake inhibitor (SSRI), being widely prescribed agents. However, comparative evidence regarding their efficacy and safety in the South Indian population is limited. This prospective, non-randomized interventional study was conducted over four months (November 2022–February 2023) at NRI General and Super Specialty Hospital, Guntur, involving 60 patients aged 18–75 years diagnosed with MDD and initiated on either vortioxetine or escitalopram. Baseline and follow-up depression severity were assessed using the Hamilton Depression Rating Scale (HAM-D), alongside evaluation of demographic data, comorbidities, and adverse effects. Of the participants, 55% were male and 45% female, with the majority belonging to the 31–40 years age group. Anxiety (41.6%) was the most common comorbidity, followed by hypertension (16.6%) and diabetes (11.6%). Both vortioxetine and escitalopram significantly reduced HAM-D scores from baseline to follow-up ($p<0.0001$), with mean scores decreasing from 23.1 to 8.73 in the escitalopram group and from 22.1 to 9.4 in the vortioxetine group. While both agents demonstrated comparable efficacy in reducing depressive symptoms, vortioxetine exhibited a better safety profile with fewer reported adverse effects. These findings suggest that vortioxetine and escitalopram are both effective treatment options for MDD in the South Indian population, though vortioxetine may offer superior tolerability and could be considered a safer alternative in clinical practice.

**Keywords:** Major depressive disorder, vortioxetine, escitalopram, HAM-D, antidepressants, South Indian population

**PL-253**

## SURVEY BASED ON KNOWLEDGE, ATTITUDES AND PRACTICES OF VITAMIN D DEFICIENCY AMONG THE GENERAL POPULATIONS

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Vitamin D is essential for bone health, immune function, and overall wellbeing, while its deficiency is an emerging public health concern worldwide. This study aimed to assess the knowledge, attitude, and practice (KAP) regarding vitamin D deficiency among the general population. A cross-sectional survey was conducted using a structured Google form, and responses from 170 participants were analyzed. Knowledge assessment showed that, about 72% recognized sunlight a nd supplements as main vitamin D sources, while nearly 31% mislinked it to energy production or lacked awareness of its role. Around 76% identified bone pain and hair loss as key symptoms. Attitudinal responses revealed that 54.7% were willing to take vitamin D supplements if advised by health care professionals. In practice, 57.64% had consumed vitamin D supplements regularly, while the remainder had never taken them. The results suggest that although knowledge and attitude toward vitamin D are generally positive, misconceptions persist and supplementation practices are inconsistent. The study concluded that awareness programs emphasizing accurate information on deficienc symptoms and benefits of supplementation are necessary to improve preventive health prac in the general population.

**Keywords:** KAP (Knowledge, Attitudes, Practices), Public Health Awareness, Vitamin D deficiency,

**PL-254**




ISBN: 978-81-980623-8-3

**ASSESSMENT OF CARDIOVASCULAR OUTCOMES OF IVABRADINE IN CORONARY ARTERY DISEASE AND DILATED CARDIOMYOPATHY PATIENTS**

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Elevated resting heart rate is a major contributor to the progression of coronary artery disease (CAD) and dilated cardiomyopathy (DCM), leading to increased morbidity and mortality. Ivabradine, a selective inhibitor of the funny current (If) in sinoatrial nodal cells, lowers heart rate without affecting myocardial contractility or blood pressure, making it a potential therapeutic option. This study aimed to evaluate the cardiovascular outcomes of ivabradine in CAD and DCM patients, with focus on heart rate, ejection fraction, blood pressure, and quality of life. A randomized observational study was conducted over 8 months, enrolling 50 patients, of whom 58% had CAD and 42% had DCM. The cohort was predominantly male (60%), with most aged 41–50 years. Hypertension (80%), diabetes mellitus (72%), and dyslipidemia were the most common comorbidities. All patients received ivabradine along with standard therapy. Ivabradine therapy resulted in a mean heart rate reduction of 9.9 bpm in both CAD and DCM groups. Left ventricular ejection fraction improved modestly by 2.4% in CAD and 2.5% in DCM patients. Systolic blood pressure decreased by an average of 7.2 mmHg, while diastolic pressure showed no significant change. Quality of life, assessed using the Kansas City Cardiomyopathy Questionnaire (KCCQ), demonstrated improvements of 11.8–13.5 points, indicating meaningful clinical benefit. These findings suggest that ivabradine effectively reduces heart rate, modestly improves ejection fraction, and enhances quality of life in CAD and DCM patients, with minimal effect on diastolic blood pressure.

**Keywords:** Ivabradine, Coronary Artery Disease, Dilated Cardiomyopathy, Heart Rate, Kansas City Cardiomyopathy Questionnaire.

**PL-255**

**IMPACT OF CLINICAL PHARMACIST MEDIATED PATIENT EDUCATION ON HbA1c AND INSULIN ADHERENCE AMONG DIABETIC POPULATION**

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Diabetes mellitus is a chronic metabolic disorder that significantly contributes to morbidity and mortality worldwide. Poor adherence to insulin therapy remains a major challenge in achieving optimal glycemic control, leading to serious complications and increased healthcare burden. To evaluate the impact of clinical pharmacist-mediated patient education on insulin adherence and glycemic control (HbA1c levels) among the diabetic population. A single prospective cohort study was conducted from July 2024 to March 2025 among diabetic population, who visited diabetology department at NRI General Hospital, Mangalagiri. The glycemic parameters (HbA1c, FBS, PPBS) and questionnaires (MMAS-8 & C-DMSES) were used to assess the change in glycemic control and adherence towards insulin respectively. Baseline values were recorded prior to the pharmacist's intervention; post-intervention values were then collected after 3 months and compared to assess the impact of the intervention. A statistically significant reduction in glycemic parameters was observed i.e. HbA1c by 0.669% (p=0.00013), Fasting Blood Sugar (FBS) by 25.26 mg/dL (p=0.0078), and Post Prandial Blood Sugar (PPBS) by 18.272 mg/dL (p=0.00187). These findings highlight the effectiveness of the intervention in improving overall glycemic control. Also, Medication adherence measured using the MMAS-8 scale, improved significantly from 3.957 to 5.585, (p=0.00000127), indicating increased compliance towards medication. Self-management behavior, assessed using the DMSES scale also showed a significant improvement (from 4.216 to 5.983, p=0.00000189). The present study demonstrated that a structured, pharmacist-led intervention significantly improved glycemic control, medication adherence, and diabetes self-management among patients with diabetes. The intervention led to notable reductions in HbA1c, fasting blood sugar, and postprandial blood sugar levels, alongside substantial improvements in medication adherence and self-efficacy scores.

**Keywords:** Diabetes mellitus, Clinical pharmacist intervention, Insulin adherence, HbA1c & Patient education.

**PL-256**

**INVESTIGATING THE PROTECTIVE ROLE OF AGMATINE AND EXERCISE IN HINDLIMB UNLOADING-INDUCED MUSCLE ATROPHY**

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Microgravity in spaceflight significantly affects astronauts, leading primarily to muscle atrophy, which is the loss of muscle tissue mass due to individual muscle fibers shrinking. To investigate this phenomenon, hindlimb unloading (HLU) in rodents serves as a common experimental model. This study aimed to evaluate the therapeutic potential of agmatine, a naturally occurring metabolite known for its antioxidant, anabolic, and anti-inflammatory properties, both alone and in combination with exercise, in mitigating HLU-induced muscle atrophy. The findings demonstrated that agmatine, particularly when paired with a structured exercise regimen, led to notable improvements in grip strength, gait coordination, and wire-hanging ability, indicating enhanced neuromuscular function. Furthermore, the treatment resulted in reduced muscle wasting, preservation of muscle strength, and decreased levels of inflammatory markers, including TNF-α, IL-6, and IL-1β. Notably, irisin levels in the soleus muscle also improved. Histopathological analysis indicated a dose-dependent increase in the cross-sectional area of soleus, gastrocnemius, extensor digitorum longus, and tibialis muscle fibers, with the strongest effects observed when agmatine was combined with exercise. Overall, this study suggests that agmatine combined with exercise holds promise as a therapeutic approach to combat muscle loss in astronauts exposed to microgravity conditions.

**Keywords-** Microgravity, Hindlimb Unloading, Muscle Atrophy, Agmatine, Exercise.

**PL-257**

**INCIDENCE AND RISK OF DRUG-INDUCED OSTEOPOROSIS IN PATIENTS EXPOSED TO LONG TERM PHARMACOTHERAPY: A PROSPECTIVE OBSERVATIONAL STUDY**

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Drug-induced osteoporosis (DIOP) is a common adverse effect of long term therapy with several drug classes and significantly impacts patients prognosis. Medications such as glucocorticoids, anti-epileptics, loop diuretics, antidepressants and proton pump inhibitors are widely used but associated with increased risk of osteoporosis. This prospective observational study aimed to evaluate the incidence and risk of DIOP in patients attending a tertiary care hospital. A total of 465 patients exposed to above mentioned drug classes for ≥3months from outpatient and inpatient departments at NRI General and Super Speciality Hospital, Guntur between June to march were enrolled. Patients were divided into: Group Ⅰa (drug exposure), Group Ⅰb (drug exposure with prophylactic calcium therapy), and group Ⅱ (controls-attendants). Exposure to these drugs increased osteoporosis risk significantly (Relative Risk: 1.9; 95% CI: 1.2036-3.1113; p<0.001). Patients receiving prophylactic calcium therapy showed reduced risk, with 12 out of 100 cases could be protected from osteoporosis through prophylaxis. The number needed to treat (NNT) indicated one patient could be protected from osteoporosis for every 12 treated. Among studied groups, glucocorticoids posed the highest risk followed by furosemide and carbamazepine. Prophylactic calcium therapy significantly lowers the risk and should be encouraged in clinical practice.

**Keywords**: Drug-induced osteoporosis, Glucocorticoids, BMD, Adverse drug reaction.

**PL-258**


ISBN: 978-81-980623-8-3

**THE ANTIMICROBIAL ACTIVITY OF PROBIOTIC LACTOBACILLI AGAINST PATHOGENIC BACTERIA**

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This study aims to evaluate the antimicrobial activity of probiotic Lactobacillus strains against selected pathogenic bacteria. Lactobacillus strains were isolated from rice-washed water, a natural medium rich in beneficial microbes. The isolated strains were tested against Escherichia coli, Klebsiella pneumoniae, and Staphylococcus aureus using the disk diffusion method. A commercially available probiotic product was also included for comparative evaluation. The cell-free supernatants from the isolated Lactobacillus strains showed significant inhibition zones against all tested clinical isolates. Comparatively, the commercial probiotic also exhibited antimicrobial activity but was less effective than the isolated strains. This study highlights the potential of probiotic Lactobacillus strains as natural antimicrobial agents. Their strong inhibitory action against pathogenic bacteria supports their application in managing microbial infections and reducing antibiotic dependency.

**Keywords**: Probiotics, Lactobacillus, Rice water, Antimicrobial,

**PL-259**

**UTILIZATION OF FRUIT WASTE FOR SINGLE CELL PROTEIN PRODUCTION**

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This study explores the potential of fruit waste as a substrate for producing single cell protein (SCP), addressing both protein deficiency and environmental pollution. Fruit wastes rich in fermentable sugars, such as banana peels, were used as substrates for microbial protein production. The peels were treated with 10% (w/v) hydrochloric acid and inoculated with *Saccharomyces cerevisiae*. Fermentation was carried out at 30°C for eight days. The protein content of the fermented media was analyzed and compared with unfermented media. SCP contains essential amino acids often deficient in traditional protein sources. It has applications in human food and animal feed, offering an alternative to conventional protein sources. The increasing cost of protein-rich foods makes SCP a viable option for addressing malnutrition. The fermentation process led to a significant increase in protein content. The findings highlight the potential of SCP as a low-cost protein source. Bioconversion of banana peels into SCP can serve as an effective strategy to mitigate protein deficiency and reduce environmental waste.

**Keywords:** SCP, Fermentation, Fruit Waste, Bioconversion, Microbial Protein.

**PL-260**

**RULE-BASED HIGH-RISK PRESCRIPTION CHECKER: EDUCATE, INNOVATE, EMPOWER RURAL HEALTH WITH AI-DRIVEN MOBILE TECHNOLOGY**

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Unsafe prescribing leads to preventable hospitalizations and medication harm. This research suggests a mobile, explainable, rule-based prescription checker that informs users and raises high-risk patterns before harm is suffered. The system consumes prescriptions through camera-based OCR with aided correction, allows manual entry, and brands to generics and fixed dose combinations mapping. A rules engine curated thereafter filters for high severity drug–drug interactions, therapeutic duplication, contraindications, dose ceilings, QT prolongation clusters, bleeding risk with antithrombotic, serotonergic overload, hypoglycaemia stacking, and nephrotoxic combinations. Patient context is enhanced with optional addition of vitals and important labs to facilitate safer, personalized notifications. Accessibility takes centre stage: local language, audio assistance, large font modes, and offline-first functionality for low connectivity regions. The checker delivers plain English descriptions, safer use advice, and reminders to speak with a pharmacist or clinician, placing community pharmacies and health centres at true time safety checkpoints. Integration pathways to national digital health programs are described for secure data synchronization, consented sharing, and longitudinal stewardship measures. A phased evaluation strategy consists of: (1) technical validation of drug identification and rule accuracy on deidentified prescriptions; (2) pharmacist adjudicated clinical validation based on major risk events flagged and alert acceptance; and (3) field pilots in rural pharmacies testing usability, time to check, and understanding. By combining interpretable CDS, conservative AI supported parsing, and universal design, the system seeks to decrease avoidable harm caused by medication, stem polypharmacy risks, and empower rural communities to participate in safer, better-informed medicine use.

**Keywords:** Community Pharmacy, Prescription safety, Drug-Drug Interaction, Clinical validation, Mobile Technology

**PL-261**

**INTEGRATIVE EXPERIMENTAL AND NETWORK PHARMACOLOGY INVESTIGATION OF CUCURBITA MAXIMA SEED EXTRACT REVEALS MULTI-TARGET ANTICANCER EFFECTS AGAINST PROSTATE CANCER**

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This study investigates the phytochemical profile and pharmacological potential of Cucurbita maxima Linn. seed extract using experimental and computational approaches. Phytochemical screening revealed a diverse range of secondary metabolites, including flavonoids, glycosides, isoflavones, alkaloids, and phenolic compounds. Major constituents identified were Fucosterol, Ergosterol, β-Sitosterol, Stigmasterol, and Linoleic acid, all known for their cytotoxic activities. The extract's cytotoxicity was evaluated on PC-3 prostate cancer cells using the MTT assay, showing significant antiproliferative activity with an $IC_{50}$ of 500 µg/mL, indicating strong anticancer potential. To elucidate its molecular mechanism, a network pharmacology approach was employed. Bioactive compounds were retrieved from phytochemical databases, filtered for ADMET properties, and mapped to potential targets using Swiss Target Prediction. Ten active compounds were found to intersect with 230 prostate cancer-related genes. Protein–protein interaction analysis identified key hub genes, including AR, TP53, PTEN, AKT1, and EGFR, which were enriched in pathways such as Prostate Cancer and PI3K-Akt signalling. Molecular docking further validated strong binding affinities of Fucosterol, Ergosterol, and β-Sitosterol with these hub proteins, supporting their role in inhibiting prostate cancer cell growth. These findings highlight the multi-target; multi-pathway anticancer potential of C. maxima seed extract. Fucosterol, Ergosterol, and β-Sitosterol emerged as the principal bioactive compounds, providing pharmacological justification for the traditional use of C. maxima and its potential development as a natural source of novel agents against prostate cancer.

**Keywords:** Cucurbita Maxima, MTT Assay, Network pharmacology, Gene ontology (GO), PyRx.

**PL-262**

**EXPLORING THE ANTICANCER MECHANISMS OF SARACA ASOCA LEAF BIOACTIVES THROUGH EXPERIMENTAL AND NETWORK PHARMACOLOGY APPROACHES**

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This study explores the phytochemical composition and pharmacological potential of Saraca asoca leaf extract using both experimental and computational approaches. Preliminary phytochemical screening revealed the presence of diverse secondary metabolites, including flavonoids, phenolic compounds, glycosides, terpenoids, tannins. Identified Constituents were β-sitosterol, quercetin, kaempferol, catechins, and stigmasterol, all of which are reported to possess cytotoxic properties. The anticancer activity of the extract was evaluated against HeLa cells, a cervical cancer model, using the MTT assay. The extract demonstrated significant antiproliferative effects with an $IC_{50}$ of




ISBN: 978-81-980623-8-3

400 µg/mL, indicating potent cytotoxic potential. To uncover the underlying molecular mechanisms, a network pharmacology approach was employed. Bioactive compounds were retrieved from phytochemical databases, screened for ADMET properties, and mapped to potential targets using SwissTargetPrediction. A total of 15 active compounds were found to interact with 300 cervical cancer-related genes. Protein–protein interaction analysis identified five main hub genes are TP53, RB1, EGFR, BCL2, and PTGS2, which were predominantly enriched in pathways associated with cervical cancer. Molecular docking studies further confirmed strong binding affinities of β-sitosterol, quercetin, and kaempferol with these hub proteins, supporting their role in suppressing cervical cancer cell growth. These results highlight the multi-target and multi-pathway anticancer potential of S. asoca leaf extract. β-Sitosterol, quercetin, and kaempferol emerged as the principal bioactive compounds, providing a pharmacological rationale for the traditional use of S. asoca and supporting its potential development as a natural source of novel therapeutic agents against cervical cancer.

**Keywords:** Saraca Asoca, MTT Assay, KEGG Pathway, Gene ontology (GO), Molecular Docking.

**PL-263**

**SYSTEMATIC REVIEW AND META-ANALYSIS OF IVERMECTIN FOR TREATMENT AND PREVENTION OF COVID-19**

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This systematic review and meta-analysis evaluated the efficacy and safety of Ivermectin compared to placebo or standard of care for the treatment and prevention of COVID-19. A comprehensive literature search was conducted using PubMed, Scopus, Google Scholar, clinical trial registries (clinicaltrials.gov), and preprint servers (MedRxiv) to identify relevant randomized controlled trials (RCTs). The primary outcomes assessed were mortality, clinical recovery, clinical worsening, duration of hospital stay, and adverse events, while viral clearance was considered a secondary outcome. Study quality was assessed using the revised Cochrane risk of bias tool, and a random-effects meta-analysis was conducted. The certainty of evidence was graded using the GRADE approach. A total of 19 RCTs involving 1,111 patients were included. The findings revealed that Ivermectin did not significantly reduce mortality (RR 0.79, 95% CI 0.35 to 1.78), hospital stay duration (RR 0.29, 95% CI 0.06 to 1.50), clinical worsening, or adverse events. Additionally, no improvement was observed in clinical recovery or viral clearance compared to placebo or standard care. The certainty of these findings was rated as very low to low, with considerable inconsistencies across studies. In conclusion, the current evidence does not support the use of Ivermectin for treating or preventing COVID-19, and it is not recommended for routine clinical use.

**Keywords:** Ivermectin, COVID-19, Meta-analysis, GRADE

**PL-264**

**EFFICACY OF COMBINED PANTOPRAZOLE AND BISMUTH SUBCITRATE THERAPY IN HELICOBACTER PYLORI–INDUCED DUODENAL ULCER USING RAT MODEL**

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The aim of the present study is to evaluate the therapeutic efficacy of pantoprazole and bismuth sub-citrate, administered individually and as dual drug therapy, against Helicobacter pylori–induced duodenal ulcers using albino rat model.

Thirty Wistar albino rats were randomly divided into five groups (n=6): negative control, positive control, pantoprazole-treated, bismuth subcitrate–treated, and dual therapy (Pantoprazole + Bismuth subcitrate). Following H. pylori inoculation, treatments were administered orally for 14 days. At the end of the study, gastric and duodenal tissues were isolated and assessed for ulcer index, histopathological alterations, and H. pylori eradication using rapid urease and antigen tests. Dual therapy exhibited the most pronounced gastroprotective effect, showing significant ulcer protection compared with individual treatments. The combination group demonstrated lower ulcer index values, improved histological architecture of gastric and duodenal tissues, and complete bacterial eradication, as confirmed by negative rapid urease and antigen test results.

The combined administration of Pantoprazole and bismuth Sub-citrate provided superior protection against H. pylori–induced duodenal ulcers compared with monotherapy. These findings suggested that, dual drug therapy is a more effective strategy for ulcer healing and H. pylori eradication.

**Keywords:** Helicobacter pylori, duodenal ulcer, Pantoprazole, Bismuth sub-citrate, combination therapy, gastro protection.

**PL-265**

**COMPARATIVE EVALUATION OF GAIL, CLAUS, AND TYRER-CUZICK MODELS IN PREDICTING BREAST CANCER RISK**

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Accurate risk prediction is essential for both early detection and prevention of breast cancer. Multiple models are available, yet their predictive accuracy varies across populations. The present study aimed to comparatively evaluate the Gail, Claus, and Tyrer-Cuzick models in estimating breast cancer risk among women. A cross-sectional study was done on women in North Bangalore who went to primary health centres between the ages of 30 and 70. Data on demographic, reproductive, lifestyle, family history, and clinical parameters were collected through structured interviews and medical records. Risk estimates were calculated using the Gail, Claus, and Tyrer-Cuzick models. Agreement between models was assessed using Kappa statistics, while risk stratification was compared across different subgroups (premenopausal vs. postmenopausal, family history vs. non-family history). SPSS version 25 was used for statistical analysis. Among 500 women screened, the mean age was 46.8 ± 8.9 years. The Claus and Tyrer-Cuzick models identified 9.8% and 18.6% of participants as high risk, respectively, whereas the Gail model indicated 12.4%. Agreement between the Gail and Claus models was moderate (κ=0.42), whereas Tyrer-Cuzick demonstrated higher sensitivity in detecting women with positive family history. Postmenopausal women and those with higher BMI were more frequently categorised at elevated risk across all models ($p<0.05$). The Tyrer-Cuzick model exhibited greater sensitivity in identifying high-risk women compared to the Gail and Claus models, particularly in those with familial and lifestyle-related risk factors.

**Key words:** Breast Cancer, Risk Models, Gail, Claus, Tyrer-Cuzick.

**PL-266**

**EMPAGLIFLOZIN ATTENUATES COGNITIVE IMPAIRMENT BY MODULATION OF NFKB AND BDNF SIGNALLING PATHWAY IN STZ INDUCED AD RAT MODEL**

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Alzheimer's disease (AD) is a one of the most prevalent neurodegenerative disorder usually seen in the elder patient. Key pathological features contributing to AD are neuroinflammation, oxidative stress, and neurotransmitter dysregulation. The present study investigated the effect of the empagliflozin in streptozotocin-induced depression in experimental rats. In this study, AD-like symptoms were induced in animals by unilateral acute 10 µl streptozotocin (STZ, 3 mg/kg) injection intracerebroventricularly (ICV). Empagliflozin (5 , 10 mg/kg, p.o.) treatment and Donepezil (5 mg/kg, p.o.) was started from day 3 post STZ administration and continued till 21 days. The cognitive impairments induced by STZ and the therapeutic effects of the EMPA and standard drugs DON were evaluated using behavioral paradigms like actophotometer, open field test, Morris water maze, and novel object recognition test. We found that chronic treatment of empagliflozin significantly reversed STZ-induced cognitive impairment in experimental rats, with the improvements in behavior and performance of animals like locomotion, distance travelled, escape latency and discrimination index. Further biochemical analyses supported these behavioural outcomes, where empagliflozin treatment reduced elevated levels of pro-




ISBN: 978-81-980623-8-3

inflammatory cytokines such as TNF-α, IL-6, and NF-κB. Additionally, empagliflozin also restored the beneficial factor i.e. brain-derived neurotrophic factor (BDNF) levels and exhibiting its neuroprotective effect. Our results suggest that impaired NFκB and BDNF signaling potentially contribute in AD pathogenesis by elevating oxidative stress and neuroinflammation mediated AD in rats. We found that empagliflozin at a dose of 10 mg/kg exhibited a more pronounced neuroprotective effect in STZ-induced Alzheimer's disease (AD) rat models. In conclusion, empagliflozin attenuated cognitive impairment by inhibiting STZ-associated neuroinflammation, suggesting its potential as a novel therapeutic agent for the management of AD.

**Keyword-** Alzheimer's disease, Neuroinflammation; Streptozotocin; Empagliflozin, Morris water maze; Novel object recognition test, NFKB, BDNF.

**PL-267**

## INVESTIGATION ON EXERCISE-TRIGGERED IRISIN IN THE NEUROBIOLOGY OF ALCOHOLISM

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Alcohol use disorder (AUD) leads to several complications, including anxiety, depression, irritability, tremors, and impairments in motor and cognitive functions. Ethanol withdrawal further intensifies these issues by triggering neurobehavioral disturbances and neurochemical imbalances, posing significant treatment challenges. This study investigated the individual and combined effects of treadmill exercise and irisin on alleviating withdrawal-induced symptoms in rats subjected to a 4-day binge ethanol exposure followed by a 4-day withdrawal period. Behavioural assessments revealed that ethanol-withdrawn rats exhibited hyperactivity, increased anxiety, depression-like behaviours, and cognitive impairments. These changes were associated with elevated pro-inflammatory cytokines (TNF-α, IL-6) and decreased brain-derived neurotrophic factor (BDNF), indicating neuroinflammation and impaired neuroplasticity. Both treadmill exercise and intracerebroventricular administration of irisin (100ng/5µL) independently improved behavioural outcomes and normalised inflammatory and neurotrophic markers. Notably, the combined treatment produced synergistic effects, significantly enhancing motor coordination, reducing anxiety and depressive behaviours, and improving memory function. These behavioural improvements corresponded with substantial reductions in TNF-α and IL-6 levels and restoration of BDNF expression. The findings suggest that irisin, a myokine released during physical activity, plays a crucial role in mediating the neuroprotective benefits of exercise through anti-inflammatory and neurotrophic mechanisms. In conclusion, this study highlights the therapeutic potential of both physical activity and irisin in addressing the neurobehavioral and biochemical consequences of ethanol withdrawal. The synergistic effects highlight irisin's key role in mediating exercise-driven recovery. This suggests promising potential for treating alcohol withdrawal and related mental health conditions.

**Keywords:** Alcohol use disorder (AUD), alcohol withdrawal, BDNF, neuroplasticity, treadmill exercise, irisin.

**PL-268**

## EXPLORING THE IMPACT OF VITAMIN E SUPPLEMENTATION ON NEUROBEHAVIORAL ALTERATIONS INDUCED BY MATERNAL HYPOTHYROIDISM IN RAT OFFSPRING

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Thyroid hormones (TH) are essential for brain development and maturation. Hypothyroidism is one of the most common endocrine disorders during pregnancy, with clinical hypothyroidism affecting 2–5% and subclinical hypothyroidism affecting 3–5% of women. Maternal hypothyroidism can impair offspring's cognitive and motor abilities, resulting in deficits in learning, memory, coordination, and increased seizure risk. This study evaluated whether vitamin E supplementation during adolescence (PND 35–62) could counteract neurobehavioral impairments induced by maternal hypothyroidism in rat offspring. Pregnant Sprague Dawley rats received 6-propyl-2-thiouracil (PTU, 10 mg/kg) orally from GD03 to PND21. Offspring of hypothyroid mothers showed behavioral abnormalities, including altered locomotion (PND 63), anxiety-like behavior (PND 64), motor incoordination (PND 65), impaired spatial working memory (PND 66), reduced attention (PND 67), and heightened seizure vulnerability (PND 68). Vitamin E supplementation (100, 200, and 400 mg/kg) significantly alleviated these deficits. It reduced oxidative stress by decreasing lipid peroxidation and nitrite while enhancing antioxidant defences such as SOD and GSH. Anti-inflammatory effects were evident through reduced TNF-α and IL-6 and increased IL-10. Neurochemical benefits included elevated BDNF and reduced acetylcholinesterase, MAO-A, and MAO-B activity in the prefrontal cortex, hippocampus, and cerebellum. Histological evaluation (H&E staining) demonstrated improved structural integrity in these brain regions, which were compromised by maternal hypothyroidism. Collectively, the findings highlight vitamin E as a potential therapeutic approach to ameliorate behavioral, biochemical, and structural brain impairments in offspring caused by maternal hypothyroidism.

**Keywords:** Maternal hypothyroidism; Vitamin E; Memory; Attention; Motor incoordination; Seizure.

**PL-269**

## AGMATINE INTERACTION WITH IMIDAZOLINE RECEPTOR ATTENUATES INTRACRANIAL PROPIONIC ACID-INDUCED AUTISM SPECTRUM PHENOTYPE IN RATS

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Autism spectrum disorder (ASD) is a complex neurodevelopmental condition characterized by deficits in social communication and interaction. Intracerebroventricular (ICV) administration of propionic acid (PPA) is a well-established model for inducing ASD-like phenotype in rats. Considering clinical reports of reduced agmatine in ASD, previous studies demonstrated that agmatine exerts neuroprotective effects and rescues core ASD-like behaviors in rodents. Agmatine, an endogenous neuromodulator, exerts neuroprotective effects, regulates neurotransmitter release and synaptic plasticity through modulation of central imidazoline receptors. In the present study, PPA was administered at a dose of 4 µl/day for three consecutive days to simulate the ASD-like phenotype. Experimental groups included animals treated with PPA alone or in combination with agmatine (5, 10, or 20 µg, ICV), the imidazoline $I_2$ receptor agonist 2-BFI (10 µg), the $I_2$ receptor antagonist idazoxan (4 µg), or combinations of these drugs (2-BFI + agmatine or idazoxan + agmatine). Agmatine, in a dose-dependent manner and in combination with 2-BFI treatment, increased exploratory behavior in open field test, enhanced social interaction, and significantly improved recognition memory in the novel object recognition test. It also restored exploratory activity in the hole-board test, reversed cognitive deficits in the T-maze, reduced anxiety-like behavior in the elevated plus maze, attenuated neuroinflammation, normalized BDNF levels, enhanced synaptophysin expression, and restored hippocampal architecture. Administration of 2-BFI with agmatine ameliorated the behavioral and biochemical disruption induced by PPA exposure, whereas idazoxan abolished them. This study highlights the critical role of the imidazoline receptor pathway, positioning agmatine as a promising therapeutic target for ASD.

**Keywords:** Autism spectrum disorder, Propionic Acid, Agmatine, Imidazoline receptors, 2-BFI, Idazoxan.

**PL-270**

## EFFECTIVENESS OF COMBINATION THERAPY IN HYPERTENSION: ADVANCES THROUGH ARTIFICIAL INTELLIGENCE AND TECHNOLOGY

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ISBN: 978-81-980623-8-3

Combination therapy—using two or more antihypertensive agents at low doses—has emerged as a superior strategy for blood pressure (BP) control compared to monotherapy. Recent meta-analyses demonstrate that dual-drug single-pill regimens achieve target BP in ~70% of patients, triple combinations in 56%, and quadruple low-dose combinations yield incremental reductions with minimal adverse effects. Artificial intelligence (AI) and machine-learning (ML) models enable personalized selection of optimal drug combinations, continuous cuffless BP monitoring via wearables, and improved adherence through predictive reminder systems. This poster reviews clinical effectiveness, AI-driven technological innovations, and future directions for precision pharmacotherapy in hypertension management. Combination therapy—co-formulating multiple antihypertensive agents into a single pill—has become central to hypertension management. evaluate recent advances in blood pressure control achieved by integrating artificial intelligence (AI) and digital technologies with combination antihypertensive therapy. we reviewed recent clinical trials, meta-analyses, and machine learning–based studies focusing on low-dose triple single-pill combinations (SPCs) and AI-driven personalized drug selection models.

**Keywords:** Combination therapy, Hypertension, Artificial intelligence, Machine learning, Single-pill combination, Blood pressure control

**PL-271**

## DATA INTEGRITY AND REGULATORY COMPLIANCE IN CLINICAL TRIALS

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The crucial importance of data integrity and regulatory compliance in clinical trials lies in ensuring the accuracy, reliability, and ethical conduct of research that supports the development of new treatments. Regulatory authorities, including the FDA, EMA, and ICH, have established stringent frameworks—most notably the Good Clinical Practice (GCP) guidelines and ALCOA+ principles (Attributable, Legible, Contemporaneous, Original, Accurate, Complete, Consistent, Enduring, and Available)—to safeguard patient safety and uphold scientific validity throughout the clinical research process. Despite these standards, challenges such as data manipulation, security breaches, and protocol deviations remain significant threats to trial validity, often leading to regulatory delays or trial termination. To mitigate these risks, strategies including advanced Electronic Data Capture (EDC) systems, comprehensive audit trails, robust source data verification, risk-based monitoring, regular audits, transparent reporting, and stringent data security measures are essential. Maintaining high standards of data integrity is both a legal and ethical obligation, fundamental to protecting participants, fostering public trust, and ensuring the credibility of scientific discoveries. By adhering to best practices and regulatory requirements such as 21 CFR Part 11 and ICH E6(R2), stakeholders can ensure that clinical trial outcomes are trustworthy, scientifically sound, and supportive of innovation in public health.

**Keywords** - Data Integrity, Regulatory Compliance, Clinical Trials, Good Clinical Practice (GCP), ALCOA+ Principles, Electronic Data Capture (EDC)

**PL-272**

## NEUROPROTECTIVE ROLE OF AGMATINE PATHWAY MODULATORS IN PRENATAL PROPIONIC ACID-EXPOSURE-INDUCED AUTISM SPECTRUM DISORDER IN RATS

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Autism spectrum disorder (ASD) is a neurodevelopmental disorder caused by genetic and environmental factors. Among environmental factors, the gut metabolite propionic acid (PPA) has been linked to impaired brain function and reduced neurogenesis. This study investigated the effects of prenatal PPA exposure on brain development and the potential of agmatine pathway modulators to reverse these effects in rats. Pregnant rats received intraperitoneal injections of PPA (500 mg/kg) from gestational day 12 to 16, modeling prenatal damage. Offsprings were monitored until weaning (postnatal day 21) and then treated with different agmatine pathway modulators, including L-arginine (100 mg/kg), D-arginine (100 mg/kg), arcaine (25 mg/kg), and aminoguanidine (50 mg/kg). Neurogenesis was assessed in the hippocampus and prefrontal cortex, regions involved in learning, memory, and social behavior, using molecular and histological analyses to measure neuronal proliferation, differentiation, and structural integrity. Neurogenic markers and agmatine levels were also evaluated. Results demonstrated that prenatal PPA exposure significantly impaired neurogenesis, shown by reduced expression of neurogenic markers, decreased agmatine levels, and abnormal neuronal morphology. Postnatal treatment with L-arginine and aminoguanidine partially reversed these deficits, restored neuronal proliferation, normalized agmatine levels, and improved structural organization, suggesting neuroprotective effects. In contrast, D-arginine and arcaine worsened neurodevelopmental abnormalities, indicating that dysregulation of the agmatine system worsened neural damage. In conclusion, prenatal PPA exposure has detrimental effects on brain development, while the selective modulation of the agmatine pathway helps reduce these changes. These findings highlight agmatine as a potential therapeutic target for PPA-induced neurodevelopmental disturbances in ASD and support further research into agmatine-based interventions.

**Keywords:** Autism spectrum disorder, propionic acid, agmatine, neurogenesis, L-arginine, aminoguanidine.

**PL-273**

## FUNCTIONAL AND TECHNOLOGICAL INNOVATIONS IN MRI FOR IMPROVED DISEASE DETECTION AND MONITORING

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Magnetic resonance imaging (MRI) is a non-invasive medical imaging technology that produces three dimensional detailed anatomical images of internal body structures. It is significantly used for disease detection, diagnosis, and treatment monitoring. It relies on powerful magnetic fields and radio-frequency pulses to align hydrogen protons within the body tissues. When these protons are aligned to their natural state, they emit signals that are captured and processed by advanced computer systems to generate precise anatomical images. MRI is ideal for soft tissues, showing the brain, spinal cord, nerves, muscles, ligaments, and tendons more clearly than X-rays or CT. Functional MRI further expands its application by mapping brains activity through blood oxygen level-dependent signals, providing differentiate between white matter and grey matter, providing insights into cognitive and neurological functions. Technological innovations, such as high-field magnets, parallel imaging, and diffusion tensor imaging and scanning speed. Recent developments in MRI technology focus on improving patient comfort, reducing scan times, and integrating artificial intelligence for automated image analysis and disease detection. Portable and low-field MRI devices are emerging, aimed at making this technology more accessible in remote and resource-limited settings. With continuous innovations, MRI is set to advance precision diagnostics, personalized treatment planning, and real-time monitoring, ultimately improving patient outcomes across diverse medical fields.

**Keywords:** Functional MRI, artificial intelligence, non-invasive imaging, diagnostic technology.

**PL-274**

## A PROSPECTIVE OBSERVATIONAL STUDY ON ANEMIA ON PREGNANCY

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Anemia in pregnancy is recognized as a significant global public health concern, defined by hemoglobin levels below 11 g/dl. It contributes substantially to maternal and neonatal morbidity, making its prevention and management a priority in obstetric care. A prospective observational study was conducted at Nandi Medical College and Research Institute, Chikkaballapura, involving 20 pregnant women, with the objective of assessing prevalence, severity, risk factors, and management strategies for anemia. The study revealed that 40% of the women were in the 26–30 years age group, indicating this as a vulnerable category. Anemia was most frequently diagnosed in the second trimester (35%) and the third trimester (45%), highlighting the critical need for vigilant screening




ISBN: 978-81-980623-8-3

during these stages. Common symptoms reported by participants included weakness, fatigue, and generalized tiredness, reflecting the impact of anemia on maternal well-being. In terms of severity, mild anemia was predominant, accounting for 75% of cases, while moderate and severe anemia constituted 20% and 5%, respectively. Ferrous sulphate was the most commonly prescribed therapeutic intervention, administered to 95% of patients, underscoring the importance of iron supplementation in treatment. The findings emphasize the necessity of early detection, nutritional counselling, and awareness programs to minimize maternal and fetal risks. Gynecologists play a vital role in identifying anemia early, educating patients, and ensuring proper adherence to supplements and dietary modifications. Strengthening preventive strategies, alongside timely management, can significantly enhance maternal health and improve neonatal outcomes.

**Keywords:** Anemia in pregnancy, Prevalence, Risk factors, Iron supplementation, Maternal outcomes

**PL-275**

## THE NEUROMODULATORY EFFECT OF QUERCETIN ON THE DOPAMINERGIC SYSTEM IN A MOUSE MODEL

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Quercetin, a bioactive flavonoid, exhibits strong antioxidant and neuromodulatory properties and has been recognized for its therapeutic potential in neurological disorders by reducing oxidative stress and inflammation. This study investigates the neuromodulatory effect of quercetin on the dopaminergic system using a haloperidol-induced catalepsy mouse model. Swiss albino mice were administered quercetin (0.05, 0.1, and 0.5 mg/kg, p.o.), and their behavioral responses were evaluated. Spontaneous locomotor activity was assessed using an actophotometer, while catalepsy was induced with haloperidol (0.1 mg/kg, i.p.), a dopamine D2 receptor antagonist, and measured via the standard bar test. Quercetin significantly potentiated haloperidol-induced catalepsy, suggesting an antidopaminergic effect, but did not significantly affect spontaneous locomotor activity, indicating preservation of basal motor function. These findings suggest that quercetin modulates the dopaminergic system, possibly through D2 receptor antagonism. The study underscores quercetin's therapeutic potential in managing dopaminergic dysfunctions such as those seen in neuropsychiatric disorders. Further neurochemical studies are needed to clarify the underlying molecular mechanisms.

**Keywords:** Quercetin, Dopaminergic system, Haloperidol, Catalepsy, Locomotor activity

**PL-276**

## ANTIDEPRESSANT-LIKE EFFECT OF NON-ALCOHOLIC RED WINE IN NICOTINE-WITHDRAWN MICE

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This study aimed to investigate the therapeutic potential and protective effect of non-alcoholic red wine against nicotine withdrawal-induced depression and anhedonia in mice models. Male Swiss albino mice were used in this study. They were randomly divided into six groups: 1. Saline withdrawal control group, 2. Nicotine withdrawal control group, 3. Standard control group (Bupropion 10 mg/kg, p.o.), 4. Low dose group (non-alcoholic red wine 25%v/v, p.o.), 5. Intermediate dose group (non-alcoholic red wine 50%v/v, p.o.), 6. High dose group (non-alcoholic red wine 100%v/v, p.o.). Except saline withdrawal control group, all groups received Nicotine (3.35 mg/kg, s.c.) thrice a day for 7 days. The antidepressant-like effect was examined using the tail suspension test, forced swim test, and a sucrose preference test. One-way ANOVA with post hoc comparisons was used for statistical analysis. Results indicated that oral administration of non-alcoholic red wine at 50%v/v, p.o. significantly decreased the immobility time in the tail suspension test (TST) and forced swim test (FST) and drastically increased the sucrose consumption ratio in Sucrose preference test (SPT) in nicotine-withdrawn mice. However, low and high doses (25 and 100%v/v) did not show any significant difference in immobility time in the TST and FST, and also showed marginal increment in sucrose consumption in SPT. This study results show a bell-shaped dose-dependent antidepressant-like effect of non-alcoholic red wine in nicotine-withdrawn mice.

**Keywords:** Depression-like behaviour, Mice, Nicotine withdrawal, Non-alcoholic red wine.

**PL-277**

## EFFECTIVENESS OF SENSITIZATION PROGRAM ON KNOWLEDGE ATTITUDE AND PRACTICES (KAP) IN MATERIOVIGILANCE AMONG HEALTH CARE PROFESSIONALS IN TERTIARY CARE HOSPITAL

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Underreporting of medical device adverse events (MDAEs) remains a challenge in patient safety systems. This study aimed to assess the knowledge, attitude, and practice (KAP) regarding MDAE reporting among healthcare professionals using a before-and after study design**.** A before-and-after study was conducted among healthcare professionals using validated pre- and post-questionnaires to assess knowledge, attitude, and practice related to MDAE reporting. Additionally, the pattern of adverse event reporting was monitored over six months to evaluate changes in reporting practice. Correlation analysis was performed to explore the relationships between knowledge, attitude, and practice. A significant improvement was noted in both knowledge and attitude scores post-assessment. The mean knowledge score increased from 2.77 to 4.30, and the attitude score improved from 4.16 to 4.53. The practice of adverse event reporting showed an increasing trend during the six-month observation period. Correlation analysis revealed a weak positive correlation between pre-knowledge and pre-attitude (r = 0.116) and a weak negative correlation between pre-knowledge and pre-practice (r = -0.187), suggesting that knowledge alone did not predict practice. After the study period, the post-knowledge and post-attitude correlation improved to a moderate positive level (r = 0.351), indicating that increased knowledge was associated with a more favorable attitude. This before-and-after study demonstrated that improving knowledge positively influenced attitude towards MDAE reporting. However, knowledge enhancement alone was insufficient to ensure improved practice, highlighting the need to address systemic and motivational factors to sustain reporting behavior.

**Keywords:** Materiovigilance, MDAEs, Patient Safety, KAP (Knowledge, attitude and Practice), Sensitization Program

**PL-278**

## ANTIDEPRESSANT-LIKE EFFECT OF RESVERATROL AGAINST NICOTINE WITHDRAWAL IN MOUSE MODELS

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This study aimed to investigate the therapeutic potential and protective effect of resveratrol against nicotine withdrawal-induced depression and anhedonia in mice models. Male Swiss albino mice models were used in this study. They were randomly divided into six groups: 1. Saline withdrawal control group, 2. Nicotine withdrawal control group, 3. Standard control group (Bupropion 10 mg/kg, p.o.), 4. Low dose group (Resveratrol 25 mg/kg, p.o.), 5. Intermediate dose group (Resveratrol 25 mg/kg, p.o.), 6. High dose group (Resveratrol 100 mg/kg, p.o.). Except saline withdrawal control group, all groups received Nicotine (3.35 mg/kg, s.c.) thrice a day for 7 days. Antidepressant-like effect was examined using the tail suspension test, forced swim test, and a sucrose preference test. Results indicated that resveratrol significantly decreased the immobility time in the tail suspension test and forced swim test and increased the sucrose consumption ratio. This study also revealed a significant rise in brain serotonin levels in nicotine-withdrawn mice. The present study indicates the therapeutic potential of resveratrol against nicotine withdrawal-induced depression by facilitating serotonergic-mediated mechanisms.

**Keywords:** Depression like behaviour, Mice, Nicotine withdrawal, Resveratrol.




ISBN: 978-81-980623-8-3

**PL-279**

## EVALUATION OF ANTIEPILEPTIC POTENTIAL OF RUTIN IN PENTYLENETETRAZOLE [PTZ]-INDUCED SEIZURES IN ZEBRAFISH LARVAE: INTEGRATING IN VIVO AND MOLECULAR DOCKING INSIGHTS

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Epilepsy and seizure disorders, which are characterized by not only abnormal neuronal excitability but also underlying neuroinflammatory mechanisms, remain a major neurological challenge, prompting the search for novel, safer therapeutics with neuroprotective potential. The objective of the research was to evaluate the toxicity profile and antiepileptic efficacy and to explore the anti-neuroinflammatory mechanisms contributing to the therapeutic potential of rutin, a plant-derived flavonoid, in zebrafish (Danio rerio) larvae subjected to pentylenetetrazole (PTZ)-induced seizures, a widely validated model for preclinical antiepileptic drug screening. The toxicity of rutin was assessed in accordance with the Fish Embryo Acute Toxicity Test guidelines to determine the NOAEL (No Observed Adverse Effect Level) and ensure therapeutic dosing was below toxic thresholds. The antiepileptic efficacy of rutin was evaluated through high-speed locomotor tracking of seizure-like hyperactivity and behavioral seizure phenotype analysis, with the results compared to the standard antiepileptic agent valproic acid. To elucidate the anti-neuroinflammatory mechanism of rutin, in silico molecular docking was performed, targeting the key proinflammatory cytokines TNF-α and IL-1β. The results demonstrated that rutin exhibits a favorable toxicity profile with NOAEL observed within the range of 1-100 µM concentration and confers significant protection against PTZ-induced seizures, as reflected by reduced hyper locomotion and seizure behavior. Molecular docking analysis revealed strong binding affinities of rutin with TNF-α (-8.4 Kcal/mol) and IL-1β (-9.2 Kcal/mol). In conclusion, these findings highlight rutin as a potential neuroprotective agent with promising antiepileptic efficacy through attenuating the expression of proinflammatory cytokines.

**Keywords**: Epilepsy, Zebrafish larvae, Rutin, Neuroinflammation, Molecular docking.

**PL-280**

## PROTECTIVE EFFECT OF COMBINATION OF AEGLE MARMELOS LINN FRUIT AND EPIGALLOCATECHIN-3-GALLATE IN INDOMETHACIN-INDUCED ENTEROCOLITIS WISTAR RATS

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This study explores the protective effect of a novel combination of ethanol extract of Aegle marmelos fruit and epigallocatechin-3-gallate (EGCG) against indomethacin-induced enterocolitis in wistar albino rats. Enterocolitis results from NSAID usage, leads to significant gastrointestinal distress—ulceration, bleeding, and inflammation—with few effective prevention strategies currently available. The investigation aimed to determine whether this plant-derived combination could offer a safer, more effective alternative for gut protection. Thirty rats were randomized into five groups: control, indomethacin-only group, a sulfasalazine standard group, and two dosing groups receiving (125 mg/kg) and (250 mg/kg) doses of the extract-EGCG combination. All experimental groups, except the healthy control, received indomethacin to induce enterocolitis for 14 days, alongside their designated treatments. Key outcomes measured included weight and food intake, disease activity indices (stool consistency, diarrhea, and bleeding), and biochemical markers such as lipid peroxidation, glutathione content, and hematological parameters. Mast cell degranulation and histopathology of the gut tissue were also assessed to elucidate underlying protective mechanisms. Treatment with the Aegle marmelos-EGCG combination markedly improved food intake, decreased diarrhea and bleeding scores compared to the disease control group. Biochemical assays demonstrated lower lipid peroxidation and elevated glutathione levels, indicating enhanced antioxidant capacity. Furthermore, histological analysis revealed substantial reversal of tissue inflammation and ulceration, confirming robust mucosal healing. These findings highlight the potential of this natural combination as an anti-inflammatory, anti-ulcerative, and antioxidant therapeutic for NSAID-related enteropathy—supporting its further exploration in clinical settings.

**Keywords**: Aegle marmelos, EGCG, Anti-inflammatory, anti-diarrheal

**PL-281**

## A STUDY ON THE IMPACT OF METFORMIN THERAPY ON COGNITIVE FUNCTION AND LIPID PROFILE IN EXPERIMENTAL ANIMAL MODELS

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The current aspect, to assess the impact of metformin therapy on lipid profile, impact of same on cognitive functions using experimental animal models. The studies showed that metformin had reduced risk of causing cancer in type II DM. Also marked that Metformin easily penetrates BBB & has antioxidant property. Although it has added benefits, role of Metformin in cognition was not yet established. Thus, in present work Metformin evaluated for cognition function. Evaluation of spatial long-term memory, spatial working memory and spatial learning analysed using elevated plus maze, Y maze and Morris water maze. Histopathological examination also carried in hippocampal region & in addition levels of malondialdehyde, glutathione and lipid measured. Animals given 45mg/kg, P.O metformin noted impairment in memory due to reduction in percentage spontaneous alterations. Working memory showed an increased escape latency. Elevated plus maze, malondialdehyde and glutathione level do not have significant effect on animal treated with metformin. Histopathological study of rat hippocampus administered with metformin 45mg/kg P.O marked, astrocyte hyperplasia, atrophy & stromal oedema as indications of mild impairment in cognition. It is summarized that long term metformin therapy has influence on spatial memory in both reference memory version and working memory version of water maze task.

**Keywords:** Metformin, congnition assessment, lipid profile.

**PL-282**

## A SURVEY TO KNOW THE KNOWLEDGE ABOUT STROKE AMONG GENERAL POPULATION

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Stroke can be elucidated as a neurological deficit accommodated with an acute focal injury of the central nervous system (CNS), which may be due to vascular causes. The cases of stroke and mortality rate due to stroke are being increased in India these days. The objective of this survey is to know the knowledge about stroke among the general population. Individuals of different age groups and pursuing various education qualifications were participated. The responses were collected in the interval dated between 1/07/2025 and 15/08/2025 by circulating Google forms. About 153 individuals responded for the questionnaire. This questionnaire was included with the questions based on the knowledge, attitude, practice and perception. This questionnaire exposes the lack of knowledge among nearly half of the participants. About 33% of participants stated they would call an ambulance as the first aid for the patient. Most of the responders (12%), do not know the root cause for the occurrence of stroke as they responded that the stroke is caused due to the clot in heart, while 5% of the participants think stroke is caused due to microbial infection. Approximately 54% of responders agreed that the stroke can even occur in a younger population but not only in geriatrics. This survey finally conclude to increase the number of awareness programs about stroke and the usage of AI in early diagnosis and therapy of stroke, which help the people overcome the symptoms of stroke and reduce the morbidity and mortality rates.

**Keywords:** Stroke, Rehabilitation, AI Robots.

**PL-283**

## ASSESSMENT OF KNOWLEDGE, ATTITUDE, AND PRACTICE TOWARDS UNUSED AND EXPIRED MEDICINE DISPOSAL IN INDIA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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ISBN: 978-81-980623-8-3

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The improper disposal of unused and expired medicines is a major worldwide risk to the environment and to public health. This systematic review synthesises the existing literature to assess the Indian public perception of safe disposal, as knowledge, attitudes and practices (KAP) around safe disposal of unused and expired medicines in India remain heterogeneous. A thorough search across several databases, including PubMed, Google Scholar, Bentham, Elsevier, and Springer were conducted from 2014-2025. Following the combination of search terms and Boolean operators 563 records were collected out of which 25 study met the inclusion criteria that underwent quality assessment using modified Newcastle-Ottawa scale tailored for cross-sectional research. Data were extracted in Excel, while meta-analysis utilized R software (v2025.05.) applying inverse variance and Der Simonian-Laird random-effects models, with heterogeneity ($I^2$, Q statistics), publication bias (Egger's test), and subgroup analyses by participant type i.e. healthcare professional and general public. The meta-analysis included 8 studies on knowledge (3,063 observations), 7 on attitudes (2,427 observations) and 10 on practice (3,903 observations). The prevalence of inadequate knowledge about harmful effect of improper disposal was 40.36% (95% CI: 23.87%-59.35%), positive attitude was 86.90% (95% CI: 73.98%-93.93%), and improper disposal practices were at 68.09% (95% CI: 59.94%-75.27%). significant heterogeneity ($I^2 > 95\%$) was observed, and no significant bias in the reporting of data was detected (Egger test $p<0.05$). Subgroup analysis showed that the differences in data were not significant, suggesting a similar overall pattern between the groups. Despite the fact tha 86.90% of Indians exhibit a positive attitude regarding safe medication disposal, 40.4% remain unaware about its detrimental impacts, while 68.1% engage in inappropriate disposal practices usually throwing medicines with household waste. This highlights the critical necessity for targeted educational interventions and improved accessibility to appropriate disposal method to protect public health and environmental integrity.

**Keywords:** Knowledge, Attitude, Practice, KAP study, Unused medicines, Expired medicines, Medicine disposal.

**PL-284**

**CAR-T CELL THERAPHY**

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The study aims that after witnessing a phenomenal expansion in the advancement and utilization of immunotherapy and precision medicine in the recent decades, cancer treatment today embrace the dawn of the adoptive cell therapy (ACT) era. Pushed by this desire for an alternative model of treatment has been the chimeric antigen receptor (CAR) T cells, the only type of ACT medicinal product to have been marketed to date. Initiated by an increasingly deepening comprehension of cellular engineering, CAR T cells are genetically engineered T lymphocytes carrying an appropriate DNA construct that equip them with the expression of a CAR, a chimeric protein between a ligand-specific recognition component, usually an antibody-like construct, and the activating signaling moiety of the Tcell receptor. By this genetic modification, CAR T cells are genetically modified from a cancer patient own lymphocytes.

**Keywords:** Immunotherapy, Adoptive cell therapy, Chimeric antigen receptor, Cancer treatment.

**PL-285**

**EVALUATION OF WOUND HEALING ACTIVITY OF PSORALEA CORYLIFOLIA LINN. SEED ETHANOL EXTRACT OINTMENT IN A STAPHYLOCOCCUS AUREUS INFECTED RAT MODEL.**

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Psoralea corylifolia Linn. commonly known as Bakuchi, is a member of the Fabaceae family and traditionally used for wound healing from ancient times. The present study provides the scientific evaluation for the wound healing activity of ointment containing P. corylifolia Linn seed extract on an Staphylococcus aureus infected excision wound in rats. Ointment containing ethanolic extract 10% and 20% (w/w) were prepared and evaluated for acute dermal toxicity as per the OECD guidelines (402) for neither mortality nor any sign of toxicity observed for 14 days. The results did not show any sign of inflammation and oedema with limit dose of 2000 mg/kg in acute dermal toxicity study. Both 10% and 20% (w/w) ointment containing extract showed significant (***$p<0.001$) and dose dependent increase in wound contraction which was evidenced by the increase in fibroblast proliferation, collagen formation, epithelisation, keratinisation in histopathological studies. Ointment containing extract indicated wound healing activity was similar to that of standard Mupirocin (2%w/w). This justifies the traditional claimed the use of the plant for treating infected wounds caused by S. aureus.

**Keywords:** Psoralea corylifolia Linn, Staphylococcus aureus, Wound healing and Collagen.

**PL-286**

**THE GUT CURE: MICROBIOME MODULATION IN TYPE 2 DIABETES MANAGEMENT**

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Type 2 diabetes mellitus (T2DM) is a major global health challenge, with rising incidence and significant health impacts. Recent studies have shown that the gut microbiota plays an important role in the development and progression of T2DM. Differences in the gut microbial composition between healthy individuals and T2DM patients suggest that targeting the gut microbiome could be a promising therapeutic approach. This review summarizes current research on the relationship between gut microbiota and T2DM and explores how gut microorganisms may help improve blood sugar control and reduce inflammation. It also examines the potential of interventions such as probiotics, fecal microbiota transplantation (FMT), virome transplantation (FVT), and natural products in modifying gut microbiota to manage T2DM. While preclinical and some clinical studies show promising results, most research has been limited to animal models or small-scale human trials, lacking strong clinical evidence. This has created a gap between experimental findings and real-world applications. Additionally, the gut virome's role in regulating gut health and metabolism is still not well understood, with research in early stages. More large-scale, long-term clinical studies are needed. Overall, this review highlights the potential of gut microbiota-based therapies in T2DM and outlines key directions for future research.

**Keywords**: Gut microbiota, T2DM, Probiotics, FMT, Natural products

**PL-287**

**GUT DYSBIOSIS-INDUCED DEPRESSIVE-LIKE BEHAVIOR IN MICE IS ATTENUATED BY L-HISTIDINE AND PROBIOTICS VIA CENTRAL HISTAMINE RECEPTORS AND CORT, BDNF AND CREB MODULATION**

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Gut dysbiosis, characterized by a significant increase in cecum index and cecal weight, serves as a prominent marker of microbially induced dysregulation in murine models. Oral administration of broad-spectrum antibiotics for seven consecutive days induces gut dysbiosis, resulting in pronounced depressive-like behaviors. This is evidenced by a reduction in Lactobacillus and an increase in Escherichia coli populations within the gut microbiota, along with a significant rise in fecal water content. Therapeutic interventions using oral L-histidine, probiotics, or a combination thereof significantly attenuate these dysbiosis changes and reduce immobility time in the TST, indicative of an antidepressant-like effect. Notably, central administration of the H1 receptor antagonist cetirizine or the H2 receptor antagonist ranitidine potentiates immobility time in the TST compared to vehicle treatment, whereas the H3 receptor inverse agonist thioperamide significantly decreases immobility time. Furthermore, central administration of H1 and H2 receptor antagonists reverses the beneficial effects of oral L-histidine on behavioral despair in




ISBN: 978-81-980623-8-3

dysbiotic mice, while the histamine releaser thioperamide does not alter L-histidine's antidepressant-like action. Biochemically, brain histamine, CREB, and BDNF levels are significantly reduced, and CORT levels are increased in antibiotic-treated animals. These neurochemical changes are restored in groups receiving L-histidine, probiotics, or their combination, compared to saline and antibiotic controls. Collectively, these findings underscore the critical role of the histaminergic system particularly H1, H2, and H3 receptor-mediated pathways in mediating depressive-like behaviors induced by gut dysbiosis, and highlight the therapeutic potential of L-histidine and probiotics in restoring neurochemical balance and behavioral function disrupted by microbial dysregulation.

**Keywords:** Gut dysbiosis, TST, Depression, Histamine

**PL-288**

**PRODUCTION, OPTIMIZATION, AND ANTIFUNGAL ACTIVITIES OF CHITINASE AND GLUCANASE PRODUCED BY ASPERGILLUS NEOFLAVIPES MB3**

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Enzyme production for pharmaceutical use is being transformed through integration with cutting-edge optimization technologies, such as design of experiments (DoE) platforms. Aspergillus neoflavipes MB3, a marine soil isolate, produces simultaneously chitinase and β-1,4 endoglucanase, which are enzymes with proven antifungal and antibacterial activity and broad applicability in drug formulation, drug delivery, and biocatalysis. Traditional submerged fermentation processes often yield suboptimal enzyme titers, limiting the scalability and cost-saving opportunities of pharmaceutical enzyme production. Improved productivity via systematic, data-based medium optimization can lower production costs and expedite translation to therapeutic and industrial uses. We used a two-stage DoE approach, starting with a Plackett–Burman design for screening for significant medium components and then a central composite design for defining optimal concentrations. Chitinase and β-1,4 endoglucanase activities were measured before and after optimization. Crude enzyme extracts from optimized and non-optimized cultures were tested using well-diffusion assays against two fungal pathogens (Candida albicans, Aspergillus niger) and three bacterial pathogens (Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa). Optimization resulted in a 4.356-fold increase in chitinase production and a 2.403-fold improvement in β-1,4 endoglucanase production, accompanied by considerably enhanced antimicrobial activity in the optimized extracts. This represents the first description of these enzymes being co-produced by A. neoflavipes, showing the strength of AI-supported DoE in facilitating enzyme bioprocess development. The improved platform provides a novel, scalable technology for pharmaceutical and biotechnology industries.

**Keywords:** Aspergillus neoflavipes, Chitinase, β-1,4 Endoglucanase, Design of Experiments (DoE), Antimicrobial Activity

**PL-289**

**CLINICAL CORRELATION BETWEEN METABOLIC SYNDROME AND PSORIASIS SEVERITY: A PROSPECTIVE STUDY**

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Psoriasis is a chronic, immune-mediated inflammatory skin disease characterized by erythematous, scaly plaques and a relapsing course. It affects nearly 2–3% of the global population and is increasingly regarded as a systemic disorder with significant comorbidities. One of the most important associations is with metabolic syndrome (MetS), a cluster of conditions including obesity, hypertension, dyslipidaemia, and impaired glucose regulation, which together increase the risk of cardiovascular disease and may lead to mortality. Understanding the relationship between psoriasis severity and MetS is essential for comprehensive patient care.This prospective hospital-based study included 152 adult patients diagnosed with psoriasis vulgaris who attended the Dermatology Outpatient Department. Participants underwent detailed evaluation for MetS using established diagnostic criteria, including assessment of blood pressure, fasting plasma glucose, lipid profile, and waist circumference. Psoriasis severity was determined using the Psoriasis Area and Severity Index (PASI). MetS was present in 84 of 152 patients, reflecting a high prevalence. Among its individual components, 37 patients demonstrated hypertriglyceridaemia, 69 had arterial hypertension, and 28 showed impaired fasting glucose. A positive association was observed between the presence of MetS and higher PASI scores, indicating that patients with moderate-to-severe psoriasis are at greater risk of metabolic abnormalities. More than half of the psoriasis patients in this study exhibited features of MetS. The significant correlation between disease severity and metabolic risk underscores the need for routine screening and early intervention. Incorporating cardiovascular risk assessment into psoriasis care may help reduce morbidity and mortality in this patient population.

**Keywords:** metabolic syndrome, psoriasis,PASI, severity

**PL-290**

**"MICROBIOME–BLOOD PRESSURE AXIS: A NOVEL FRONTIER IN HYPERTENSION MANAGEMENT"**

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Hypertension is a major global health challenge and a leading cause of cardiovascular morbidity and mortality. Recent evidence highlights the gut microbiome as a novel regulator of blood pressure, introducing the concept of the "microbiome–blood pressure axis." In experimental studies using spontaneously hypertensive rats (SHR), significant alterations in gut microbial composition were observed even before the onset of hypertension. Notably, the loss of certain low-abundance bacterial genera and reduced butyrate production were linked with elevated blood pressure. Cross-fostering experiments demonstrated that postnatal environments can reshape gut microbiota, partially restore microbial diversity, and result in lower systolic blood pressure in adulthood. These findings suggest that the intestinal microbiome plays a crucial role in hypertension development and may serve as a therapeutic target. Future strategies could include microbiome-directed approaches such as probiotics, prebiotics, and dietary interventions, offering new opportunities for personalized management of hypertension beyond conventional pharmacotherapy.

**Keywords:** Gut microbiota, SHR, Cross-Fostering, Hydrogen sulfide.

**PL-291**

**UNVEILING THE GENOMIC PATHWAYS OF VITAMIN D: A NEW HORIZON IN CANCER AND IMMUNE DISORDERS**

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Vitamin D, classically associated with calcium and bone homeostasis, has recently emerged as a key regulator of immunology and oncology. In addition to its classical effects, vitamin D additionally regulates immunomodulatory functions via the VDR that is expressed widely in tumor and immune cells. Upon activation, this receptor controls transcription of events that regulate cell proliferation, apoptosis, differentiation, angiogenesis and DNA repair. And vitamin D deficiency has been linked strongly to increased risk to autoimmune diseases, and cancers, including breast, prostate, colorectal, pancreatic cancer and melanoma. Its sufficient supplementation showed protective and therapeutic impact. Mechanistically, its active metabolite calcitriol (1,25-dihydroxyvitamin $D_3$) promotes antimicrobial peptide production, induces regulatory T-cells, suppresses pro-inflammatory cytokines, and modulates tumor suppressor pathways, while inhibiting metastatic signaling and oncogene expression. Epidemiological evidence references remarkable associations between both geographic sunlight exposure and serum vitamin D level, as well as cancer incidence, with further influence from genetic variability like VDR polymorphisms. These results highlight the intricate genetic and environmental factors at play with vitamin D mediated effects, which differ dramatically among ethnic groups. Although preclinical and observational data uniformly support anticancer and immunoprotected roles, clinical trials have produced mixed results; a reflection of




ISBN: 978-81-980623-8-3

heterogeneity in tumor biology, receptor activity, and serum vitamin D levels. Big ongoing studies want to answer questions around dosing and target populations and long-term benefits. Thus, vitamin D represents an interesting, inexpensive and widely accessible adjunct in oncology prevention and immunotherapy that can bridge immunomodulatory and anticancer strategies. But additional controlled clinical trials are required to develop recommendations for medicinal use.

**Keywords:** Vitamin D receptor (VDR), Cancer prevention, Immunomodulation Autoimmune diseases, Polymorphisms, Clinical trials

**PL-292**

**REVOLUTIONIZING PARKINSON'S TREATMENT: THE PROMISE OF ONCE-WEEKLY INJECTION THERAPY**

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Parkinson's disease (PD) is a progressive neurodegenerative disorder characterized by motor and non-motor symptoms, with limited curative options. Current pharmacological treatments, such as levodopa and dopamine agonists, primarily provide symptomatic relief but fail to prevent ongoing neuronal degeneration. Moreover, frequent daily dosing often leads to fluctuations in drug levels, reduced patient compliance, and motor complications over time. This highlights the urgent need for therapies that are not only effective but also more convenient and sustainable for long-term management. Recent research has focused on once-weekly injectable formulations as a potential breakthrough in PD treatment. By utilizing advanced delivery systems, these formulations can maintain therapeutic drug concentrations for extended periods, thereby reducing dosing frequency and improving patient adherence. Long-acting formulations may also offer steadier dopamine stimulation, minimizing the "on–off" fluctuations commonly seen with conventional therapy. Furthermore, coupling such regimens with neuroprotective strategies, including natural compounds like Coenzyme Q10, omega-3 fatty acids, resveratrol, and curcumin, may provide synergistic benefits by targeting oxidative stress, mitochondrial dysfunction, abnormal protein aggregation, and neuroinflammation. To overcome the challenges of poor bioavailability and blood–brain barrier (BBB) penetration, novel delivery platforms such as nanoparticles, liposomes, and exosomes are being investigated. These carriers enhance drug stability, enable sustained release, and facilitate efficient transport into the brain. Additionally, technologies such as targeted ultrasound and intracerebral infusion are under exploration to further optimize brain-specific delivery. The integration of once-weekly injectable therapy with advanced delivery technologies represents a promising step toward revolutionizing PD management. While early studies are encouraging, large-scale clinical trials are essential to confirm safety, long-term efficacy, and the feasibility of implementing such regimens in routine clinical practice.

**Keywords:** Parkinson's disease, once-weekly injection, sustained release, neuroprotection, blood–brain barrier, advanced delivery systems.

**PL-293**

**IMPACT OF PHARMACIST-MEDIATED PATIENT COUNSELLING ON KNOWLEDGE, ATTITUDE, AND PRACTICE OF TYPE 2 DIABETES MELLITUS PATIENTS: A PROSPECTIVE OBSERVATIONAL STUDY**

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This prospective observational study assessed the impact of pharmacist-mediated patient counselling on knowledge, attitude, and practice (KAP) of Type 2 Diabetes Mellitus (T2DM) patients. Effective diabetes management extends beyond pharmacotherapy and requires patient engagement through education and behavioural change. We conducted the study in endocrinology departments of secondary care hospitals in Suryapet, Telangana, from August 2024 to February 2025. Eighty T2DM patients were enrolled. A structured 20-item KAP questionnaire was administered at baseline and after 2–3 weeks of counselling. Patients received personalized counselling on disease management, lifestyle modification, and medication adherence. Among participants, 66.25% were male, with majority aged 51–70 years. Post-intervention analysis showed significant improvements in KAP scores: knowledge (343.33 to 616.66), attitude (243.33 to 460), and practice (276.66 to 473.33). Counselling improved awareness of symptoms, dietary guidelines, medication adherence, and lifestyle adjustments. Pharmacist-led patient counselling significantly enhances diabetic patients' knowledge, promotes positive attitude, and improves self-care practices, supporting better glycemic control and reducing complications risk. Incorporating structured counselling programs into routine diabetic care is recommended, especially in resource-limited settings.

**Keywords**: Type 2 Diabetes Mellitus, Patient Counselling, Knowledge-Attitude-Practice, Observational Study, Pharmacist Intervention

**PL-294**

**ASSESSMENT OF PHARMACOLOGICAL HEALING POTENTIALS OF TERMINALIA ARJUNA IN CONJUNCTION WITH PROBIOTICS IN A BEHENIC ACID–INDUCED HYPERLIPIDEMIA RAT MODEL**

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Hyperlipidemia is a major metabolic disorder linked to cardiovascular and hepatic complications, and experimental induction using behenic acid provides a reliable model to study its pathophysiology. Terminalia arjuna bark, with well-documented cardioprotective and antihyperlipidemic effects, and probiotics such as Lactobacillus acidophilus, known for lipid-lowering activity, may act synergistically in managing hyperlipidemia. The present study evaluated the pharmacological healing potential of Terminalia arjuna bark extract in combination with Lactobacillus acidophilus in a behenic acid–induced hyperlipidemia rat model. Hyperlipidemia was induced in Wistar rats by oral administration of behenic acid, followed by treatment with Arjuna bark extract (prepared by Soxhlet extraction with 50% ethanol), probiotics, or their combination. Treatment efficacy was assessed using serum lipid profile, liver and kidney function markers, oxidative stress biomarkers, and histopathological analysis of liver tissue. Behenic acid administration caused significant elevation of cholesterol, triglycerides, liver enzymes, and oxidative stress markers, while reducing antioxidant enzyme activity. Treatment with either Terminalia arjuna or probiotics alone improved lipid parameters and organ function. Notably, the combination therapy, particularly at higher doses, produced the most favorable outcomes, normalizing lipid levels, enhancing antioxidant defenses, and markedly improving hepatic histology compared with monotherapy. These findings indicate that Terminalia arjuna in conjunction with Lactobacillus acidophilus exhibits synergistic antihyperlipidemic, antioxidant, and hepatoprotective activity, suggesting its potential as a safer and effective complementary therapeutic strategy for hyperlipidemia management.

**Keywords:** Terminalia arjuna, Lactobacillus acidophilus, behenic acid, hyperlipidemia, hepatoprotection, probiotics.

**PL-295**

**COHORT STUDY ON THE ROLE OF PHARMACOLOGICAL AND NON-PHARMACOLOGICAL THERAPIES IN MIGRAINE MANAGEMENT**

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The therapy of migraine, a common neurological condition, is extremely difficult. Because it is debilitating, it requires effective management. Goal: The effectiveness of both pharmaceutical and non-pharmacological treatments for migraine symptoms is assessed in this meta-analysis. Methods: Thirteen papers examining various approaches to migraine treatment were included in the analysis. The efficacy of both non-pharmacological and pharmaceutical therapy was evaluated. To assess the effectiveness of the intervention, statistical techniques such as weight difference, standardized mean difference (SMD), and mean difference (MD) were employed. We also looked for publication bias using funnel plot analysis to check for publication bias. Results: Pharmacological interventions demonstrated substantial efficacy




ISBN: 978-81-980623-8-3

compared to placebo, with a significant weight difference of 100.0%, a Z-value of 17.58, and a P-value of less than 0.00001. Non-pharmacological interventions also showed significant effectiveness, with a Z-value of 11.62 and a P-value of less than 0.00001. Results should be interpreted nevertheless, given significant heterogeneity among the trials. To improve patient results, individualized treatment plans are advised. To improve patient care, more research is required to hone therapeutic procedures and comprehend the underlying causes. Conclusion: The findings underscore the potential benefits of both interventions in managing migraines. However, the considerable heterogeneity among the studies suggests that results should be interpreted with caution. Personalized treatment approaches are recommended to optimize patient outcomes.

**Keywords**: Migraine, Pharmacological interventions, non-pharmacological interventions, Meta-analysis, Treatment efficacy

**PL-296**

## B-SITOSTEROL ATTENUATES STRESS-INDUCED NEUROBEHAVIORAL ALTERATIONS IN EXPERIMENTAL ANIMALS

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Stress profoundly impacts mental health, leading to anxiety, depression, and neurobehavioral disturbances. β-Sitosterol, a plant-derived phytosterol, has been reported to possess adaptogenic and neuroprotective properties. This study evaluated its potential to attenuate stress-induced behavioral alterations in experimental animals. Animals were divided into seven groups: Negative Control, Control Socially Isolated (SI), Control Group Housed (GH), Standard SI and GH (Diazepam, 5 mg/kg), and Test SI and GH (β-Sitosterol, 10 mg/kg). Stress was induced by social isolation and environmental deprivation. Behavioral assessments included the Elevated Plus Maze (EPM), Open Field Test (OFT), and Social Interaction Test (SIT). Stressed control animals (SI and GH) exhibited marked anxiety-like behaviors with reduced locomotion and social interaction. Diazepam significantly reduced anxiety indices. Notably, β-Sitosterol exerted comparable anxiolytic and pro-social effects, increasing open-arm exploration in the EPM, enhancing locomotor and exploratory activity in the OFT, and improving social interaction while reducing social anxiety. These findings suggest that β-Sitosterol may serve as a natural neuroprotective agent for managing stress-induced neurobehavioral alterations.

**Keywords:** β-Sitosterol, Neuroprotective, Exploratory behavior, Open Field Test (OFT), Social Interaction Test (SIT).

**PL-297**

## EFFECTS OF B -CAROTENE ON COGNITION AND BEHAVIOR IN MICE UNDER INTERMITTENT FASTING AND BINGE EATING REGIMENS

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Eating disorders pose significant challenges, with intermittent fasting (IF) and binge eating (BE) increasingly linked to adverse neurobehavioral outcomes. This study investigated the potential anxiolytic effects of β-carotene (BC) in Swiss Albino mice exposed to IF and BE cycles. Mice were allocated into five groups: Negative Control, Control, Standard, BC-I (10 mg/kg), and BC-II (25 mg/kg). Stress was induced through alternating-day IF and BE for six weeks, and treatments were initiated in the final week. Behavioral assessments were conducted using the Open Field Test, Mirror Chamber Test, and Elevated Plus Maze. Diazepam (5 mg/kg) served as a standard anxiolytic comparator. Statistical analysis employed ANOVA with Tukey-Kramer post hoc testing. Mice subjected to IF and BE displayed increased anxiety-like behavior and reduced locomotion. Treatment with β-carotene ameliorated these effects in a dose-dependent manner, showing improvements comparable to diazepam. The findings suggest that β-carotene exerts anxiolytic activity and may counteract the adverse Behavioral impact of disordered feeding models. Future research should explore the molecular mechanisms underlying these effects, emphasizing neurotransmitter pathways and oxidative stress regulation.

**Keywords**: Intermittent Fasting, Binge Eating, β-Carotene, Neurobehavioral Effects, Swiss Albino Mice.

**PL-298**

## INTEGRATIVE SOMATIC PRACTICES FOR WOMEN'S HORMONAL HEALTH

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Premenstrual Syndrome (PMS) is a common gynaecological issue characterized by diverse physical, emotional, and behavioural symptoms that manifest a few days prior to menstruation and diminish upon its onset. This paper investigates the potential of Tibetan rites and breathology in alleviating PMS symptoms, assessing the effect of integrating these practices on overall symptom reduction. Eighty female university students (aged 18-25) were randomly selected and divided into three groups: a Control Group (n=20), a Tibetan Rites Group (n=20), and a Tibetan Breathology Group (n=20). The control group received pre- and post-assessments without intervention, while the Tibetan Rites and Tibetan Breathology groups participated in a three-month intervention of 30-minute sessions. Following the three months, participants in the Tibetan Rites and Tibetan Breathology groups showed notable improvements in various premenstrual symptoms. This research highlights the benefit of incorporating Tibetan techniques into wellness strategies, suggesting a path towards more effective PMS management and a more holistic approach to female health and resilience. Future studies could investigate the sustained advantages of Tibetan Rites and Breathology, looking beyond just immediate premenstrual symptom relief. Furthermore, research into ideal practice duration, frequency, and how well these practices adapt to various ages and cultures could help create more personalized interventions. This thorough approach could further confirm the value of Tibetan practices in managing premenstrual symptoms and aid in developing more effective and culturally appropriate wellness strategies

**Keywords**: Premenstrual Syndrome, Tibetan Rites, Tibetan Breathology, Women

**PL-299**

## INVESTIGATION ON THE ROLE OF AGMATINE IN SIMULATED MICROGRAVITY ASSOCIATED WITH MUSCULOSKELETAL DYSREGULATION

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Muscle atrophy, characterized by the loss of muscle mass and strength, can be influenced by various factors such as microgravity, aging, immobilization, and chronic diseases. The objective of this study was to investigate the potential therapeutic benefits of agmatine in mitigating muscle atrophy influenced by hindlimb unloading-induced muscle atrophy. Agmatine, a naturally occurring molecule known for its anabolic, antioxidant, anti-inflammatory, and nitric oxide regulating properties, has been explored for its effects on muscular growth. The study focused on the hindlimb unloading model to induce muscle atrophy and assessed the impact of agmatine administration at doses of 20, 40, and 80 mg/kg. In the hindlimb unloading model, agmatine significantly improved grip strength, wire hanging performance, and gait analysis. It attenuated the reduction in muscle weight and decreased creatine kinase activity, indicating reduced muscle damage. Histopathological analysis revealed a dose-dependent increase in the cross-sectional area of gastrocnemius and soleus muscle fibers. Additionally, the comparable outcomes seen with agmatine modulators such as aminoguanidine and L-arginine indicate the endogenous role of agmatine in reducing muscle atrophy. The observed effects of agmatine suggested its potential as a promising therapeutic intervention for managing muscle atrophy caused by disuse. They provided valuable insights into the mechanisms and applications of agmatine, highlighting it as a potential treatment for hindlimb unloading-induced muscle atrophy, with implications for interventions in microgravitational conditions such as those experienced in space.




ISBN: 978-81-980623-8-3

**Keywords:** Microgravity, Hindlimb unloading, Musculoskeletal system, Muscle loss and Agmatine

**PL-300**

**IMPACT OF NEUROBIC PRACTICES ON MOTOR SKILLS AND NEUROMUSCULAR REGULATION**

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Neurobic exercises, which are suggested to challenge the brain with new and multisensory stimuli, are hypothesized to improve cognitive and motor functions. The current study examines the effect of neurobic exercises on cognitive flexibility, memory recall, and neuromuscular coordination. Fifty volunteers aged 18-25 years were randomly assigned to an experimental group that received neurobic exercises and a control group that received no intervention. Three months thereafter, a number of physiological and cognitive parameters such as blood pressure, pulse rate, cognitive flexibility, and motor coordination were measured and compared between the groups. The findings indicated that the experimental group showed marked improvement of cognitive and neuromuscular functions compared to the control group, with marked improvement of cognitive flexibility, memory recall, and motor coordination, and lowering of blood pressure and pulse rate. These findings show that neurobic exercises are a potent tool for the improvement of cognitive function and neuromuscular regulation and can be used for the enhancement of overall well-being and quality of life.

**Keywords**: Neurobic Exercises, Neuroplasticity, Motor Coordination, Cognitive Function, Intervention.

**PL-301**

**THE ROLE OF HYPERLIPIDEMIA IN CARDIAC ARREST DEVELOPMENT: A CASE CONTROL ANALYSIS**

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Elevated lipid levels, or hyperlipidemia, are associated with a higher risk of cardiovascular disease. This study investigates if hyperlipidemia, which is linked to atherosclerosis and coronary artery disease, increases the risk of cardiac arrest. The goal was to ascertain if hyperlipidemia increases the risk of cardiac arrest, highlighting the need of controlling lipid levels for cardiovascular health. In accordance with PRIMA criteria, a systematic review and meta-analysis were carried out. There were 12,146 patients in 20 randomized controlled trials (RCTs) with hyperlipidemia and concomitant conditions such coronary artery disease and atherosclerosis. The Newcastle-Ottawa Scale was used for quality evaluation (NOS). For meta-analyses, odds ratios (OR) and risk ratios (RR) were calculated to evaluate the relationship between the risk of cardiac arrest and hyperlipidemia. Filter plots were used to assess publication bias. A substantial correlation between the risk of cardiac arrest and hyperlipidemia was found by the meta-analysis. According to forest plot analytical data, the probabilities of mild cardiac arrest among people with hyperlipidemia were shown by OR (0.51) and RR (0.77) as OR (Chi2=23.61, df=13, P=0.03; I2=45%) and OR (Chi2=31.14 and df of 19, P = 0.04). According to study of funnel plot readings, there was no publication bias and moderate heterogeneity. There may be an association between the risk of cardiac arrest and hyperlipidemia. This calls into question accepted wisdom and highlights the need for improved methods of assessing cardiovascular risk.

**Keywords:** - Hyperlipidemia, Coronary artery disease, Cardiac arrest, Cholesterol, Lipid.

**PL-302**

**DEVELOPMENT AND EVALUATION OF VITAMIN D3 INJECTABLE PASTE FOR PERIODONTITIS TREATMENT**

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Periodontitis is a long-lasting inflammatory disease that causes the gradual breakdown of the alveolar bone and periodontal ligament, which can lead to tooth loss. This study focuses at creating and testing a Vitamin D3-infused injectable bone paste for treating periodontitis. Vitamin D3 is known for supporting bone health and regulating the immune system. Preformulation studies of Vitamin D3 was carried out. Vitamin D3 is found to be soluble in methanol and ethanol but insoluble in water and phosphate buffer. UV Spectroscopy analysis for pure Vitamin D3 was observed at 264 nm. FTIR analysis was performed to determine the compatibility of drug and excipient. FTIR of Vitamin D3, Calcium phosphate, Gelatin, HPMC, formulation and physical mixture was analyzed to identify characteristic absorption bands corresponding to various functional group present. XRD analysis of injectable paste provides insights into slightly crystalline structure of component within the sample. pH of the prepared injectable paste was found to be 6.8 which is close to the natural pH of mouth. Viscosity of Injectable paste formulation was found to be best at (50:50) ratio of Vitamin D3 and Calcium Phosphate. Syringeability was found to be excellent in the 25G needle. This enhances its applicability for periodontal therapy. Invitro drug release of Vitamin D3 was found to be a well performing sustained release within the first 9 hours. This study lays a strong foundation for the development of a novel injectable paste as a potential therapeutic strategy for periodontitis.

**Keywords:** Periodontitis, HPMC, Vitamin D3, Calcium Phosphate, Tooth loss, Systemic effect.

**PL-303**

**PHARMACOLOGICAL SCREENING OF TRK RECEPTOR AGONIST IN PARKINSON'S DISEASE**

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Parkinson's disease (PD), the fastest-growing neurodegenerative disorder projected to affect 13 million people by 2040, is characterized by progressive dopaminergic neuronal loss, α-synuclein aggregation, and Lewy body formation, while additional mechanisms including mitochondrial dysfunction, oxidative stress, neuroinflammation, and diminished neurotrophin signaling critically contribute to disease progression. Current dopamine-based therapies primarily address symptomatic relief, overlooking the underlying pathology and underscoring the need for disease-modifying strategies that restore neurotrophin activity and neuronal resilience. In this study, we investigated 7,8-dihydroxyflavone (7,8-DHF), a small-molecule Trk receptor agonist, through an integrative in-silico, in-vitro, and in-vivo pipeline. Using Schrödinger's Maestro, TrkA and TrkB receptor extracellular domains were modeled, and molecular docking, MM-GBSA analyses, and molecular dynamics simulations revealed strong binding affinities and stable interactions of 7,8-DHF, with parallel docking on dopamine D1/D2 receptors supporting dual therapeutic potential. In dopaminergic neuronal cell models (SH-SY5Y and N27) challenged with MPTP and $H_2O_2$, 7,8-DHF preserved mitochondrial membrane potential, reduced apoptosis, and reactive oxygen species, and attenuated oxidative stress-induced toxicity. Further, in A30P α-synuclein transgenic Drosophila, 7,8-DHF significantly improved survival, restored locomotor performance, and enhanced antioxidant defenses through elevated catalase and superoxide dismutase activity. Collectively, these results highlight 7,8-DHF as a promising neurotrophin mimetic capable of activating Trk signaling, conferring neuroprotection, and mitigating oxidative damage across multiple PD models. The findings provide compelling evidence that neurotrophin-based therapeutic strategies hold potential to modify PD progression rather than merely alleviate symptoms, warranting further optimization of such molecules and exploration of combination regimens integrating neurotrophin mimetics with existing symptomatic treatments.

**Keywords:** Parkinson's disease, Neurotrophin mimetic, Trk receptor agonist, 7,8-Dihydroxyflavone, Neuroprotection

**PL-304**




ISBN: 978-81-980623-8-3

**COMPARATIVE EFFICACY AND SAFETY OF PREGABALIN WITH NORTRIPTYLINE AND PREGABALIN WITH DULOXETINE IN PATIENTS WITH DIABETIC PERIPHERAL NEUROPATHIC PAIN**

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Diabetic Peripheral Neuropathic Pain (DPNP) is a common complication of diabetes mellitus, presenting as burning, electric shock-like, lancinating, or deep aching pain in the lower limbs, often affecting sleep, mood, and overall quality of life. Treatment options include antidepressants, antiepileptics, opioids, and topical agents, but therapeutic responses vary significantly among patients. Combination therapies are being explored for enhanced outcomes. This study aimed to compare the efficacy and safety of two such combinations: Pregabalin with Nortriptyline (PG-NT) and Pregabalin with Duloxetine (PG-DLX) in patients with DPNP. A retrospective observational cohort study was conducted over five months (November 2022–March 2023) in the Neurology Department of NRI General and Super Speciality Hospital, Guntur. Sixty patients diagnosed with DPNP and already on either PG-NT or PG-DLX for at least two months were included. Pain was assessed using the Visual Analogue Scale (VAS), while sleep disturbances and anxiety were evaluated using the Insomnia Severity Index and standard anxiety/depression scales. Both treatment groups showed significant pain reduction compared to baseline. However, the PG-DLX group demonstrated greater improvement in sleep quality and anxiety reduction. Although adverse events were reported in both groups, they were more frequent in the PG-DLX group but remained manageable. Overall, Pregabalin with Duloxetine was more efficacious than Pregabalin with Nortriptyline in managing pain, improving sleep, and addressing anxiety and depression in DPNP patients, with an acceptable safety profile.

**Keywords**: Diabetic Peripheral Neuropathic Pain, Duloxetine, Nortriptyline, Pregabalin

**PL-305**

**TOXICOLOGICAL EFFECTS OF SILVER NANORODS ON A549 HUMAN LUNG CELLS: CYTOTOXICITY, OXIDATIVE STRESS AND INFLAMMATION**

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Silver nanorods are finding applications in several areas like food industry, cosmetics, sunscreens, diagnostic tracers, medical devices, bio-sensing, imaging and antimicrobial applications. In spite of huge applications of silver nanorods, a little is known about their toxicity towards living sytems. The purpose of the present study was to evaluate the potential cytotoxicity, oxidative stress and inflammation effects of rod shaped, poly ethylene glycol coated 10 nm and 25 nm silver nanorods on human lung epithelial (A549) cells and compare the results with control and a known toxic agent, quartz. Exposure of silver nanorods to cells displayed reduced cell viability and increased lactate dehydrogenase leakage, indicating cytotoxicity. The silver nanorods exposure also results in reduced glutathione levels, enhanced lipid peroxidation and caspase-3 levels, representing induction of oxidative stress and increased levels of interleukin-8, an inflammatory mediator. The 10 nm silver nanorods have displayed greater toxicity towards all biochemical parameters when compare to 25 nm silver nanorods and quartz, indicating superior toxicity of 10 nm silver nanorods. Finally, our results suggesting that the toxicity of silver nanorods was dependent on their concentration and size. Further studies are warranted to elucidate the molecular mechanisms involved in the toxicity of silver nanorods in vivo.

**Keywords**: Caspase-3, interleukin-8, in vitro toxicity, silver nanorods.

**PL-306**

**KAEMPFEROL REVIEW ON PHARMACOLOGICAL ACTION IN TREATMENT OF VARIOUS DISEASES**

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Since millions of years ago, medicinal plants have been a major source of therapeutic medicines. The majority of medications that have been found are either natural ingredients or their derivatives. It is a true reality that nature is the source of an apparently infinite variety of molecule configurations. These structures can be enhanced to create scaffolds of innovative medications for the treatment of a variety of illnesses. They are also rich sources for the production of robust chemotypes and pharmacophores. "Natural products" refers to substances originating from plants, marine organisms, bread molds, microorganisms, and both terrestrial and invertebrate animals. These compounds are recognized for their remarkable drug-like qualities and wide range of chemical compositions, which support their multi-targeted action. These substances include flavonoids that include benzopyran and hydroxyphenyl groups, i.e. Flavonoid compound kaempferol, sometimes referred to as kaempferol 3 or kaempferide, is found naturally in tea and a variety of common fruits and vegetables, such as gooseberries, beans, broccoli, and cabbage. The major goal of this study is to provide an overview of the numerous pharmacological actions of kaempferol in treating disorders, as well as the ongoing research into the underlying mechanisms. Numerous acute and chronic inflammation-induced illnesses, such as colitis and inter-vertebral disc degeneration, as well as postmenopausal bone loss and acute lung injury, may be treated with it. Moreover, it protects the heart and brain function, inhibits vascular endothelial inflammation, fights cancer, liver damage, obesity, and diabetes, and may be used to treat fibro proliferative illnesses like hypertrophic scar.

**Keywords:** kaempferol, flavonoids, cancer, inflammation, Natural product

**PL-307**

**IMPACT OF EARLY INTERVENTIONS ON OUTCOMES IN CKD PATIENTS WITH DIABETIC AND CARDIOVASCULAR COMORBIDITIES**

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Chronic Kidney Disease (CKD) is a progressive condition often coexisting with Diabetes Mellitus (DM) and cardiovascular disease (CVD), significantly increasing the risk of morbidity and mortality. Early intervention in high-risk patients can delay CKD progression and improve overall outcomes. To evaluate the effectiveness of early intervention strategies—both pharmacological and behavioral—in managing diabetic and cardiovascular complications in patients with CKD. To implement and analyze early intervention methods in 100 CKD patients with DM and/or CVD, and to assess improvements in clinical outcomes including eGFR, HbA1c, blood pressure, proteinuria, and hospitalization frequency. The study population consisted of 100 CKD patients (Stages 2–4), with 58% male and 42% female participants. Post-intervention results revealed: HbA1c levels reduced significantly from a mean of 8.2% to 6.8% ($p<0.01$), Systolic Blood Pressure decreased from 147 mmHg to 129 mmHg ($p<0.05$), eGFR values stabilized at 45.2 mL/min/1.73m², compared to a pre-intervention decline, Albuminuria reduced by 36%, indicating improved renal function, Hospitalizations dropped from 3.1 to 1.3 events per patient per year, BMI reduced from 28.7 to 25.9 ($p<0.05$), Smoking and alcohol consumption decreased significantly following counseling. Interventions such as ACE inhibitors, ARBs, SGLT2 inhibitors, lifestyle counseling, dietary modifications, and regular follow-ups proved effective in controlling comorbidities and slowing CKD progression. Regression analysis showed HbA1c and systolic BP as strong predictors of outcome ($R^2 = 0.79$). Early, multidisciplinary intervention in high-risk CKD patients with diabetes and CVD significantly improves clinical parameters and reduces disease burden. These strategies are essential for enhancing quality of life and minimizing long-term healthcare costs.

**PL-308**




ISBN: 978-81-980623-8-3

**EVALUATION OF WOUND HEALING POTENTIAL OF POLY-HERBAL FORMULATION IN EXPERIMENTALLY INDUCED DIABETIC RATS.**

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This study was carried out to evaluate the wound healing potential of ethanolic extract of poly-herbal ointment containing leaves of Portulaca Quadrifida, Andrographis echioides and Mirabilis jalapa in Alloxane (120 mg/kg, I.P.) induced diabetic rats using Excision and Incision model. Wound healing activity: Excision and incision wound models were used to evaluate the wound-healing activity. The rats were inflicted with excision wounds under anesthesia. A circular wound of 2.5 cm diameter was made on depilated dorsal thoracic region rats. The animals were divided into three groups, containing six animals. Group-I was considered as control and received simple ointment base (B.P), Group-II served as reference standard and received framycetin sulfate cream 1% w/w. Group-III received the test formulation. The ointments were applied topically once in a day, till the epithelization was complete starting from the day of experiment. The parameters studied were wound closure and epithelization time. The period of epithelization was calculated as the number of days required for wound healing. A 6cm long paravertebral incisions were made through full thickness of the skin on either side of the vertebral column of the rat. The categorization and treatment of experimental animals was similar to that of excision wound model. The ointment was applied topically once in a day. The sutures were removed on 8th post wound day and the tensile strength of the healed wound was measured on 10th day following continuous water flow technique. Results**:** - The wound healing activity of polyherbal formulation was studied and extract showed significant wound healing activity when compared to control and similar to standard FSC (Framycetin sulphate cream) the extract did not produce any adverse effect. From the above results it can be concluded that the prepared herbal ointment showed significant wound healing activity.

**Keywords**: - Wound healing, Excision wound, Incision wound.

**PL-309**

**CLINICAL OUTCOMES OF ANTI-NEUROPATHIC DRUG COMBINATION THERAPY IN PAIN MANAGEMENT**

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Neuropathic pain (NP) is a chronic and disabling condition that is often inadequately managed with monotherapy due to modest efficacy, adverse effects, and poor adherence. Combination therapy is increasingly recognized as a rational approach, offering improved pain relief at lower doses with greater tolerability. A prospective observational study was conducted in the Department of Neurology, NRI General Hospital, Guntur, to evaluate the outcomes of different anti-neuropathic drug regimens. A total of 149 patients fulfilling the inclusion and exclusion criteria were enrolled and divided into three groups: Group I (pregabalin + oxcarbazepine, n=50), Group II (pregabalin + duloxetine, n=50), and Group III (gabapentin + amitriptyline, n=49). Patients were evaluated at baseline and after four weeks using the Toronto Clinical Scoring System (TCSS), Visual Analogue Scale (VAS), Hamilton Anxiety Rating Scale (HAM-A), Hamilton Depression Rating Scale (HAM-D), and Medical Outcomes Sleep Scale (MOS). Statistical analysis was done using paired t-tests with $p<0.05$ considered significant. All three drug combinations produced significant improvements in pain and related symptoms.Group I showed the greatest reduction in TCSS and VAS, indicating superior efficacy and tolerability. Group II demonstrated additional benefits in reducing depression and improving sleep quality, while Group III achieved moderate improvements. Anxiety symptoms improved across all groups. In conclusion, combination regimens were effective in NP management, with pregabalin plus oxcarbazepine being most efficacious for pain relief, and pregabalin plus duloxetine more beneficial for mood and sleep disturbances.

**Keywords:** Combination drug therapy, Duloxetine, Neuropathic pain, Oxcarbazepine, Pregabalin, Visual Analogue scales

**PL-310**

**COMPARATIVE EVALUATION AND COST-EFFECTIVENESS OF PROPHYLACTIC DRUG COMBINATIONS IN MIGRAINE: A PROSPECTIVE OBSERVATIONAL STUDY**

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Migraine is a recurring neurological condition marked by moderate to severe headaches, often accompanied by sensory disturbances, nausea, and reduced functional ability. Preventive treatment is essential for patients with frequent attacks to minimize the frequency and severity of episodes, improve quality of life, and reduce treatment costs. This study aimed to evaluate the clinical outcomes of migraine patients receiving various prophylactic medications over a defined treatment period and economic aspects of commonly prescribed prophylactic anti-migraine drug combinations. A total of 155 patients diagnosed with migraine were included. Participants were grouped into two categories: Group A received propranolol with amitriptyline, while Group B received propranolol with flunarizine. Baseline MIDAS and HIT-6 scores were recorded and reassessed after 12 weeks of therapy to determine clinical outcomes. Both groups demonstrated a statistically significant reduction in migraine severity and disability ($p < 0.05$) at follow-up. Group B exhibited slightly greater improvement compared to Group A. Patients with a migraine history exceeding 10 years showed comparatively lower response rates. Mild adverse effects, including weight gain, sedation, and dizziness, were noted in both groups without serious complications. Economic evaluation indicated that both regimens were cost-effective, with propranolol plus flunarizine offering slightly superior benefit relative to cost. In conclusion, preventive therapy provides meaningful improvement in migraine outcomes, with the propranolol and flunarizine combination showing the most favourable results.

**Keywords**: Cost-effectiveness, HIT-6, migraine, MIDAS, prophylactic therapy.

**PL-311**

**EVALUATION OF ANTIBIOTIC THERAPY MODALITIES IN ACUTE CHOLECYSTITIS IN SURGERY WARDS OF TERTIARY CARE HOSPITAL**

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Acute calculus cholecystitis is an acute inflammation of the gallbladder, most commonly resulting from gallstones impacted in the cystic duct, requiring hospitalization and timely intervention, with antibiotics forming a key component of conservative management. This study was conducted to compare the clinical efficacy and cost-effectiveness of three commonly used antibiotics in the management of acute cholecystitis. A prospective study was carried out over nine months in the general surgery department of a tertiary care hospital, enrolling ninety inpatients aged 18–60 years with a diagnosis of acute cholecystitis. Patients were divided into three groups based on the prescribed antibiotic: Ceftriaxone–Sulbactam (n=30), Amoxicillin–Clavulanate (n=30), and Cefoperazone–Sulbactam (n=30), and were monitored for ten days. The primary endpoints were mean time to pain relief and fever resolution, and a cost minimization analysis was undertaken to assess economic outcomes. Results showed that mean time for pain relief was about three days with Ceftriaxone–Sulbactam, four days eight hours with Amoxicillin–Clavulanate, and two days eight hours with Cefoperazone–Sulbactam. Fever resolution occurred within one day with Ceftriaxone–Sulbactam, 1.4 days with Amoxicillin–Clavulanate, and less than a day with Cefoperazone–Sulbactam. All three antibiotics demonstrated good overall efficacy, though Amoxicillin–Clavulanate required slightly longer for symptom control compared with the other two. Cost analysis indicated that Ceftriaxone–Sulbactam provided the most cost-effective therapy. In conclusion, Ceftriaxone–Sulbactam, Amoxicillin–Clavulanate, and Cefoperazone–Sulbactam are




ISBN: 978-81-980623-8-3

all effective in treating acute cholecystitis, with Ceftriaxone–Sulbactam offering faster symptom relief and superior cost-effectiveness

**Keywords**: Acute cholecystitis, Ceftriaxone–Sulbactam, Amoxicillin–Clavulanate, Cefoperazone–Sulbactam, Conservative therapy.

**PL-312**

**DIURETIC ACTIVITY AND SERUM ELECTROLYTE MODULATION BY CODIAEUM VARIEGATUM LEAF EXTRACT IN EXPERIMENTAL MODELS**

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Diuretics are essential therapeutic agents in the treatment of conditions such as congestive heart failure, hypertension, nephritis, and pregnancy-induced toxemia. However, currently available diuretics, including thiazides and loop diuretics, are often limited by adverse effects such as electrolyte imbalance and metabolic alterations. This has prompted the exploration of herbal alternatives with better safety and efficacy profiles.The present study investigated the diuretic and serum electrolyte regulation potential of the ethanolic extract of Codiaeum variegatum leaves. The plant material was collected, authenticated, and subjected to extraction and preliminary phytochemical screening, which confirmed the presence of secondary metabolites. Acute oral toxicity studies, carried out as per OECD guideline 423, established the safety of the extract up to 2000 mg/kg.Diuretic activity was evaluated in Wistar albino rats using the Lipschitz method with furosemide as the reference standard. The extract, administered at graded doses, produced a significant, dose-dependent increase in urine volume and enhanced excretion of sodium, potassium, and chloride ions. Serum analysis further revealed electrolyte regulation comparable to that of furosemide.The findings indicate that Codiaeum variegatum possesses promising diuretic activity and supports its traditional use in managing fluid-overload conditions. Its effect may be mediated through mechanisms resembling those of loop diuretics. Further studies are required to isolate the bioactive constituents and elucidate the precise mechanism of action.

**Keywords**: Codiaeum variegatum, diuretic activity, serum electrolytes

**PL-313**

**PHARMACOGENOMICS: PIONEERING PERSONALIZED MEDICINE FOR PRECISION HEALTH**

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Pharmacogenomics, the study of how genetic variations influence an individual's response to drugs, plays a pivotal role in the advancement of personalized medicine. This field aims to optimize drug efficacy and minimize adverse effects by tailoring medical treatment to the genetic makeup of each patient. Key advancements in genome sequencing and bioinformatics have enabled the identification of genetic markers that predict drug metabolism, efficacy, and potential toxicity. By integrating pharmacogenomics into clinical practice, healthcare providers can develop individualized treatment plans that consider genetic variations, lifestyle factors, and environmental influences. This approach is particularly significant in managing diseases such as cancer, cardiovascular disorders, and psychiatric conditions, where treatment responses vary widely among patients. Despite its transformative potential, the integration of pharmacogenomics into routine healthcare faces challenges, including high costs, ethical concerns, and limited access to genetic testing in underserved populations. Moreover, the need for comprehensive education among clinicians and patients about genetic-based therapies is crucial for its successful implementation. This review highlights the critical role of pharmacogenomics in advancing precision medicine, emphasizing recent breakthroughs, clinical applications, and barriers to widespread adoption. By fostering collaboration between researchers, clinicians, and policymakers, pharmacogenomics can pave the way for safer, more effective, and personalized healthcare solutions.

**Keywords**: Pharmacogenomics, Personalized medicine, Precision medicine, Genetic variations, Drug response variability

**PL-314**

**EVALUATION OF PRESCRIBING PATTERN AND TREATMENT OUTCOME OF OSTEOARTHRITIS IN A TERTIARY CARE HOSPITAL**

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Osteoarthritis (OA) is a chronic degenerative joint disorder characterized by progressive cartilage loss, synovial inflammation, bone remodeling, and osteophyte formation, resulting in joint space narrowing. It frequently affects knees, hips, spine, and hands, and is more prevalent in females (11.4%) than males (6.8%), usually occurring in middle to older age. Risk factors include age, gender, obesity, genetics, physical activity, and occupation. Symptoms include joint pain, stiffness, restricted mobility, swelling, deformity, and crepitus. Management begins with non-pharmacologic therapies such as strengthening exercises, range-of-motion training, hydrotherapy, and manual therapy, followed by pharmacologic interventions including NSAIDs, analgesics, COX-2 inhibitors, hyaluronic acid, and PRP injections. This ambispective observational study was conducted at NRI General Hospital, Guntur, over six months (June–December 2018), involving 100 outpatients aged 18 or older with radiologically confirmed Grade I–III OA of the knee or hip. Patients with renal failure, pregnancy, lactation, or joint replacements were excluded. Drug prescribing patterns were recorded, and treatment outcomes assessed using questionnaires and physical examinations evaluating pain, stiffness, joint function, and quality of life. Paracetamol was the most prescribed (91%), followed by Aceclofenac (46%), Diclofenac (41%), and Gabapentin (11%). Hyaluronic acid and Naproxen were least used (1%). Most patients (52%) reported moderate satisfaction, 7 high satisfaction, and 28 poor outcomes. The study concludes that rational prescribing and clinical pharmacist involvement improve OA treatment outcomes.

**Keywords:** Aceclofenac, Analgesics, Diclofenac, Gabapentin, Hyaluronic acid, Joint pain, Knee osteoarthritis, NSAIDs, Osteoarthritis, Paracetamol, Quality of life, Rational drug use, Treatment outcome

**PL-315**

**EFFICACY AND SAFETY OF PYRIDOXINE ALONE VERSUS DOXYLAMINE-PYRIDOXINE COMBINATION IN MANAGING NAUSEA AND VOMITING DURING EARLY PREGNANCY**

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Nausea and vomiting during pregnancy (NVP) is a common condition, especially in the first trimester, often causing physical discomfort, emotional distress, and impaired daily functioning. Effective management is therefore essential. This prospective, comparative study was conducted at a tertiary care teaching hospital to evaluate the clinical and cost-effectiveness of oral Pyridoxine alone versus a fixed-dose combination of Doxylamine and Pyridoxine in managing NVP.A total of 247 pregnant women diagnosed with NVP were enrolled and divided into two groups: Group A (n=126) received the Doxylamine-Pyridoxine combination, and Group B (n=121) received Pyridoxine alone. Participants were monitored over two weeks, with treatment outcomes assessed using the Pregnancy-Unique Quantification of Emesis (PUQE) score and the Nausea and Vomiting in Pregnancy Quality of Life (NVPQOL) questionnaire. Both groups showed significant improvement in symptoms and quality of life. However, the combination therapy group exhibited a statistically greater reduction in nausea and vomiting scores. Although a slightly higher incidence of mild and transient adverse effects was noted in the combination group, no participants discontinued therapy. From a cost-effectiveness perspective, the combination therapy had higher direct costs but yielded superior symptom control and quality-of-life improvements, supporting its overall value. The study concludes that Doxylamine plus Pyridoxine is more effective than Pyridoxine alone in managing NVP, with tolerable side effects and a favourable benefit-to-cost ratio. Treatment should be individualized based on symptom severity, patient tolerance, and healthcare resource availability.

**Keywords**: Pyridoxine, Doxylamine, Nausea and Vomiting, Efficacy, Safety.




ISBN: 978-81-980623-8-3

**PL-316**

**RETROSPECTIVE ANALYSIS OF GLYCEMIC CONTROL IN TYPE-2 DIABETES: COMPARING SULFONYLUREA-METFORMIN AND DPP-4 INHIBITOR- METFORMIN THERAPIES**

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Chronic hyperglycemia is a metabolic disorder caused by either a lack of insulin secretion, impaired insulin action, or both Insulin plays an important role as an anabolic hormone, affecting the metabolism of carbohydrates, lipids, and proteins. To compare the efficacy of different drug combinations in terms of HbA1c reduction, fasting glucose and postprandial glucose .to explore duration of biguanide based combination therapy influences long term blood sugar management. A retrospective study was performed on total of 206 type 2 diabetic patients. The patients were selected on the basis of inclusion and exclusion criteria. In which 103 patients each were taking sulfonylurea with metformin and 103 patients were taking metformin plus DPP4 inhibitor. The patients were on treatment with sulfonylurea with metformin are enrolled in Group A and the patients were on treatment with DPP4 inhibitor with metformin are enrolled as group B. The results of this study suggest that the combination of sulfonylureas with metformin therapy significantly reduced HbA1c, PPBS, and FBS levels more effectively than the combination of DPP4 inhibitors with metformin. Based on these findings, sulfonylureas with metformin therapy can be considered a more effective combination for managing type 2 diabetes mellitus compared to DPP4 inhibitors with metformin therapy.

**Keywords:** Hypoglycemia, glycemic control, biguanide based combination therapy, metformin.

**PL-317**

**CURCUMIN OIL MITIGATES MOTOR AND NON-MOTOR DEFICITS IN A RESERPINE-INDUCED PARKINSON'S DISEASE RAT MODEL**

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Parkinsonism is a clinical syndrome that affects the tone and movement of the skeletal muscles and is brought on by the breakdown of dopaminergic neurons in the brain (nigrostriatal dopaminergic tract). Neurodegeneration is mostly caused by aging, genetic mutations, ROS-mediated damage, and deposition of α-synuclein. Bradykinesia (slowness and poverty of movement), muscle rigidity, resting tremor (which typically goes away with voluntary movement), and a lack of postural balance that causes gait abnormalities and falls are its four main components. Male Wistar rats weighing 150–200g were procured, and each one was divided into five groups and given the appropriate care. The animals were first acclimatised to the laboratory environment for 14 days. After acclimatisation from day 1–10, locomotor activity and catalepsy behaviour will be evaluated. On days 11 and 12, animals will be put through training and test sessions in the Morris water maze. The brain homogenate is isolated for the estimation of oxidative stress. Silver and H&E staining were also used to assess the brain histology. The findings showed that a number of phytoconstituents, such as flavonoids, tannins, linalool, and camphor, are present in curcumin oil. When compared to the diseased animal group, the results of the treatment group show significantly ($p < 0.05$) better activity in the areas of locomotor activity, rotarod performance, chewing activity, and cognitive activity.

**Keywords**- Parkinson; motor; non-motor; actophotometer; vacuous chewing.

**PL-318**

**INITIAL ANTIBIOTIC STRATEGIES FOR INFECTED DIABETIC FOOT ULCERS IN RURAL PATIENTS: A TERTIARY-CARE OBSERVATIONAL STUDY ASSESSING HOSPITALIZATION RISK**

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A retrospective observational cohort study was conducted to evaluate initial antibiotic treatment strategies in patients with infected diabetic foot ulcers (DFUs) managed within a rural healthcare system. Infection severity was classified according to Infectious Diseases Society of America (IDSA) guidelines as mild (68%), moderate (26%), or severe (6%). Patients received either empirical antibiotic therapy initiated prior to microbiological culture results or culture-guided therapy based on deep tissue culture and Gram stain analyses. Clinical data, including patient demographics, comorbid conditions (assessed via Charlson Comorbidity Index, presence of chronic kidney disease with estimated glomerular filtration rate <60 mL/min/1.73 $m^2$, and coronary artery disease), laboratory parameters (white blood cell count, HbA1c), and vascular assessments (toe–brachial index, absolute toe pressure), were extracted from medical records. Among patients with mild infections, empirical antibiotic therapy was associated with a significantly increased relative risk of hospitalization compared to culture-guided therapy. No significant difference in hospitalization rates was observed among patients with moderate or severe infections. These findings underscore the clinical value of obtaining microbiological confirmation prior to antibiotic initiation, particularly in mild DFU infections, and support the implementation of individualized, culture-based antibiotic regimens to potentially reduce hospitalization rates in rural diabetic populations.

**Keywords:** Diabetic foot, comorbidities, antibiotic therapy, Infection

**PL-319**

**OPTIMIZATION OF RENAL RISK DRUGS USAGE IN PATIENTS ATTENDING GENERAL MEDICINE DEPARTMENT AT NRI GENERAL HOSPITAL**

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Renal impairment is a significant contributor to morbidity and mortality with renal function declining with age and the inappropriate use of renal risk drugs in susceptible patients further aggravating the condition. Early detection of renal dysfunction, especially in critically ill patients, using tools such as serum creatinine, Cockcroft–Gault, and MDRD equations, is essential. Dose adjustments based on renal function help prevent adverse drug reactions (ADRs) and disease progression. This prospective observational study was conducted over six months in the General Medicine department, including 230 inpatients prescribed antibiotics, analgesics, or antihypertensives, excluding those with severe illness or pregnancy. Renal function tests and ADRs were monitored during hospitalization. Of the 230 patients analyzed (mean age 50.9 ± 15.2 years; 56.39% male), renal complications (26.06%) were the leading cause of admission, followed by hepatic diseases (19.9%). Analgesics, particularly paracetamol (24.77%), and antihypertensives, mainly telmisartan (20.85%), were the most prescribed renal risk drugs, with elderly patients showing higher ADR incidence. Naranjo's scale classified ADRs as possible (51.6%), doubtful (25.59%), probable (21.8%), and definite (0.94%). Hartwig's severity assessment indicated mild (85.3%) and moderate (10.42%) cases, with no severe cases. WHO-UMC causality assessment reported possible (53.08%), unlikely (24.64%), probable (21.8%), and certain (0.47%). The study concludes that high-risk renal patients require continuous monitoring, optimized dosing, and early ADR detection, highlighting the critical role of clinical pharmacists in ensuring safe and effective therapy through multidisciplinary collaboration.

**Keywords:** Renal risk drugs, Renal damage, Antibiotics, Analgesics, Anti-Hypertensives

**PL-320**

**STUDY TO EVALUATE MOTOR-RELATED ADVERSE EFFECTS IN PATIENTS TAKING PSYCHOTROPIC DRUGS IN A TERTIARY CARE HOSPITAL**

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The prevalence of mental health disorders is rising globally and is




ISBN: 978-81-980623-8-3

expected to become the second leading cause of disease burden by 2030. Psychotropic medications, including antipsychotics, antidepressants, and antiepileptic drugs, are essential in treating these conditions but are often associated with adverse drug reactions, particularly movement disorders. This prospective observational study was conducted over nine months in the department of Psychiatry at NRI general hospital, Guntur to evaluate the incidence and risk factors for psychotropic-induced movement disorders. A total of 239 patients receiving psychotropic medications were included, of whom 56 developed movement disorders. Tremors were the most frequent (69.64%), followed by akathisia (16.07%), with dyskinesia and dystonia each in 1.78% of cases. Antipsychotics were the leading cause as monotherapy (n=22) and in combination with other agents (n=15). Olanzapine and risperidone were the most prescribed antipsychotics, with olanzapine most frequently linked to movement disorders. Antidepressants, particularly escitalopram and sertraline, were common but caused only two cases. Valproate sodium, an antiepileptic drug, was implicated in seven cases. Causality assessment using the Naranjo scale classified 51.78% of reactions as probable and 48.22% as possible. According to Hartwig's severity scale, 96.43% were of moderate severity. These findings indicate that antipsychotics carry a greater risk of movement disorders than antidepressants, underscoring the need for careful monitoring of patients on psychotropic therapy for early detection and management of motor side effects.

**Keywords:** Movement disorders, tremors, akathisia, naranjo scale, hartwig severity scale

**PL-321**

## PREDICTIVE MODELLING OF TUMOUR GROWTH: A STEP TOWARDS PERSONALIZED ONCOLOGY

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Tumour growth modelling plays a critical role in understanding cancer dynamics and improving therapeutic strategies in oncology. This study explores mathematical and computational models that simulate tumour progression, aiming to bridge the gap between clinical observations and theoretical frameworks. Key modelling approaches, including deterministic, stochastic, and hybrid methods, are reviewed to capture the complex biological processes underlying tumour growth. Deterministic models, such as the Gompertz and logistic equations, provide insights into macroscopic tumour dynamics, while stochastic models account for cellular heterogeneity and random events in cancer development. Emerging multi-scale models integrate molecular, cellular, and tissue-level interactions, offering a comprehensive perspective on tumour behaviour. Special attention is given to angiogenesis, tumour microenvironment influences, and treatment responses, such as chemotherapy and immunotherapy. Computational simulations based on agent-based models and partial differential equations highlight the predictive potential of these frameworks in patient-specific contexts. This work also examines the challenges of parameter estimation, model validation, and the integration of experimental and clinical data. By incorporating machine learning techniques and high-throughput data, tumour growth models are becoming increasingly personalized, paving the way for precision oncology. The findings underscore the necessity of interdisciplinary collaboration in advancing tumour growth modelling and its translational impact on clinical decision-making. This synthesis of theory and application aims to enhance therapeutic efficacy and patient outcomes, ultimately contributing to the development of more effective cancer treatments.

**Keywords**: Tumor growth, Neoplastic progression, Cancer dynamics, Tumor microenvironment, Angiogenesis, Metastasis, Tumor heterogeneity

**PL-322**

## NEWFANGLED COMBINATION AZILSARTAN AND CEFTRIAXONE AMELIORATED THE EXCITOTOXICITY AND NEUROINFLAMMATORY CASCADES IN IN-VITRO AND IN-VIVO MODELS OF CEREBRAL ISCHEMIA

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Excitotoxicity and neuroinflammation are the major molecular events of cerebral ischemia which is mainly triggered by ischemic insult and followed by reperfusion injury. Generally, tissue Plasminogen Activators (tPA's) and anticoagulant therapies are being used as first-line treatment options for cerebral ischemia but it only restores the cerebral blood flow and fails to attenuate the determinantal events associated with ischemic insult in neurons resulted in neurodegeneration. Based on the earlier findings, we have designed a novel combination of Azilsartan (Angiotensin receptor 1 blocker) and Ceftriaxone (third-generation Cephalosporin) targeting excitotoxicity and neuroinflammatory cascades in cerebral ischemia. The novel combination was evaluated in in vitro oxygen-glucose deprived (OGD) primary astrocytes and N2a neuronal co-cultures model and also, we have screened the above combination in vivo middle cerebral artery occlusion (MCAo) rat model of cerebral ischemia. Then, molecular investigations were done using flow cytometry, ELISA and gene expression techniques and immunohistochemistry staining has performed to understand the neuronal integrity. The novel combination ameliorated the neurodegeneration by downregulating the pro-inflammatory cytokines, oxidative stress, excitotoxicity cascades and also enhanced the level of antioxidant enzymes in ischemic conditions. Moreover, EAAT-2 expression was remarkably increased with the treatment of novel combination which further evidence the attenuation of excitotoxicity in neurons. The above combination significantly reversed the behavioral dysfunction in ischemic rats which evidencing the beneficial effects. The repurposing of Azilsartan and Ceftriaxone combination was demonstrated an excellent neuroprotective potential, mediating through ameliorating excitotoxicity, neuroinflammation and oxidative stress in in-vitro OGD astrocyte-neuron co-culture as well as cerebral ischemic in-vivo rat model. The above combination will be beneficial in cerebral ischemia which could prevent the further degeneration of neurons thereby decrease the intensity of neurological dysfunctions.

**Keywords:** Cerebral ischemia, EAAT-2, Excitotoxicity, Cytokines, Behavior, Neuroprotection

**PL-323**

## ASSESSMENT OF COMMON MIGRAINE TRIGGERS AND SLEEP PATTERN DISTURBANCES AFFECTING ACADEMIC PERFORMANCE AMONG COLLEGE STUDENTS

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Migraines are a growing concern among college students, often linked to lifestyle factors such as irregular sleep patterns, academic stress, and dietary habits. This study aims to assess the common migraine triggers and sleep disturbances that may impact the academic performance of students in higher education. This assessment will focus on identifying and analysing patterns related to migraine triggers, sleep disturbances, and their impact on academic outcomes. By analysing the relationship between these factors, the study seeks to highlight how everyday habits influence cognitive health and learning outcomes. The findings of this study will provide valuable insights into the complex relationships between migraines, sleep, and academic performance, informing the development of targeted interventions to support students in managing their migraines and sleep disturbances, ultimately enhancing their academic success.

**Keywords:** Migraine triggers, sleep patterns, academic performance, college students.

**PL-324**

## ASSESSMENT OF ANDROGRAPHOLIDE'S EFFICACY IN DEHYDROEPIANDROSTERONE-INDUCED PCOS IN RATS

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Andrographolide was evaluated for its therapeutic potential in dehydroepiandrosterone (DHEA)-induced polycystic ovary syndrome (PCOS) in rats. The objective behind the research was to examine the




ISBN: 978-81-980623-8-3

consequence of andrographolide treatment on hormonal balance, lipid profile, antioxidant status, and ovarian histopathology in DHEA-induced PCOS rat model through molecular docking and comprehensive in vivo assessment. The prepared animal groups were evaluated for body weight, ovarian weight, vaginal cytology, hormonal levels, lipid profile, and antioxidant parameters, and it was found that Group IV (DHEA-induced rats treated with andrographolide) showed maximum therapeutic efficacy with significantly restored estrogen, testosterone, and progesterone levels, improved LDL (reduced), HDL (increased), and triglyceride profiles, enhanced antioxidant enzyme activities including CAT, SOD, GPX, and reduced TBARS levels compared to the PCOS control group. The molecular docking analysis of andrographolide with protein target PDB-4L23 revealed favorable binding interactions with key amino acid residues Asp89, Lys112, and Arg114, suggesting strong therapeutic potential. Histopathological analysis of ovarian tissues showed significant restoration of follicular development and reduced cystic formations in andrographolide-treated groups. The SEM analysis demonstrated improved ovarian morphology with regular follicular structures, typically showing restoration of normal ovarian architecture. Therefore, andrographolide treatment has been successfully validated for PCOS management as it was observed there was a significant effect of andrographolide on hormonal restoration, metabolic improvement, oxidative stress reduction, and ovarian tissue regeneration. Thus, it can be concluded this study can be beneficial for the development of andrographolide as a novel therapeutic agent for PCOS treatment.

**Keywords**: Andrographolide, PCOS, DHEA, molecular docking, antioxidant

**PL-325**

**PERMEABILITY GLYCOPROTEIN MEDIATED FOOD-DRUG INTERACTION BETWEEN DIGOXIN AND PHYTOCONSTITUENTS OF ORANGE JUICE (NARINGIN AND QUERCETIN) – A STUDY BY IN-VITRO APPROACH**

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Digoxin, a cardiotonic glycoside with a narrow therapeutic index, is susceptible to food–drug and drug–drug interactions mediated by permeability glycoprotein (P-gp), an efflux transporter regulating intestinal absorption and bioavailability. Citrus flavonoids such as naringin and quercetin, present in orange juice, are known P-gp modulators and may influence digoxin disposition. To investigate the in-vitro effects of naringin and quercetin on P-gp–mediated transport of digoxin using Caco-2 cell culture models. Caco-2 cells were cultured in 96-well plates and treated with naringin and quercetin at concentrations ranging from 125–1000 µg/mL, both alone and in combination with digoxin. Absorbance was monitored for 120 minutes to evaluate drug retention and efflux. Both flavonoids inhibited P-gp–mediated efflux of digoxin, thereby enhancing intracellular retention. Naringin demonstrated a more consistent inhibitory effect across concentrations, particularly at lower doses, resulting in improved digoxin absorption. Quercetin also inhibited P-gp but showed less pronounced effects, likely due to variable solubility and bioavailability. These findings suggest that naringin is a superior natural P-gp inhibitor compared to quercetin, with effects comparable to ketoconazole. However, increased digoxin exposure through such interactions may elevate the risk of toxicity. The results highlight the clinical importance of considering dietary flavonoids in patients receiving P-gp substrates like digoxin, where altered pharmacokinetics could impact therapeutic outcomes. Orange juice phytoconstituents, particularly naringin, significantly influence P-gp–mediated digoxin transport in vitro. While these findings suggest potential benefits of natural P-gp inhibition, further in-vivo and clinical studies are required to confirm safety, efficacy, and dietary guidelines.

**Keywords**: P-glycoprotein, Digoxin, Naringin, Quercetin, Caco2 cells, Food-Drug interaction, In-vitro.

**PL-326**

**LIPOIDAL PHYTOESTROGENS: TARGETED THERAPEUTIC APPROACH FOR ER? -POSITIVE BREAST CANCER**

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Estrogen Receptor Alpha (ERα) is a pivotal driver in hormone-dependent cancers, where estradiol-mediated activation induces uncontrolled cell proliferation. While selective estrogen receptor modulators (SERMs) like tamoxifen remain effective, their adverse effects and acquired resistance necessitate alternative therapeutic approaches. Phytoestrogens, structurally similar to estradiol, have gained attention as natural ERα-targeting agents; however, their limited hydrophobicity and receptor affinity restrict clinical translation. To overcome these barriers, this study developed lipid-based delivery systems to enhance bioavailability, tumor targeting, and safety of phytoestrogens. In silico screening identified quercetin, naringenin, and luteolin as promising candidates, which were further optimized using two strategies: direct lipid conjugation with stearic acid hydrazide (yielding QLC, NLC, and LLC) and solid lipid nanoparticle encapsulation (QN, NN, and LN). Molecular docking and dynamics simulations revealed improved ERα binding affinity and stability. In vitro studies on MCF-7 cells demonstrated enhanced antiproliferative, anti-invasive, and pro-apoptotic activities of the formulations compared to free compounds. Gene expression analyses confirmed significant downregulation of ERα-regulated oncogenes, including CCND1, CMYC, and pS2. Anti-angiogenic efficacy was validated using chick chorioallantoic membrane (CAM) and zebrafish assays, while toxicity evaluations indicated superior safety relative to tamoxifen. Among formulations, QLC and LN showed the most potent activity, with QLC inducing G0–G1 phase arrest and apoptosis. Collectively, these findings highlight the therapeutic promise of lipoidal phytoestrogens as effective ERα-targeted cancer interventions with improved efficacy and safety.

**Keywords:** Phytoestrogens, Breast Cancer, Estrogen Receptor Alpha, Lipid Conjugates, Solid-Lipid Nano-particles

**PL-327**

**TREATMENT TRENDS AND HEALTH IMPACTS OF ANEMIA IN PREGNANCY: AN OBSERVATIONAL STUDY.**

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The main aim of the prospective observational study analyses the treatment trends and health impacts of anemia in pregnancy with the study population size of 105 people with an selective criteria in a duration of six months at the study site of tertiary care hospital SPSR Nellore, AP, India. Mainly analyses the prevalence, clinical characteristics and treatment patterns of anemia across different age groups in anemic pregnant women. The objective of the study is to identify the prevalence rate, clinical features, treatment stratergies and classify the severity of anemia. The research methodology include an prospective observational study at site of tertiary care hospital with population of 105 patients in an selective criteria with a source of the data include patient case, patient review, patient interview and laboratory reports and analysed in a duration of six months. Various drugs are prescribed to the patients according. So, results shows that a high prevalence of anemia in pregnant women at the age group of 24 to 27 with most common clinical features of lethargy, fatigue, weakness. So, we conclude that our study is about understanding the prevalence rate, clinical compliances, different treatment supplements, blood transfusions and effective management plans and study continuous for more future health care outcomes.

**Keywords:** Anemia, Pregnancy, Prospective observational study, Prevalence, Treatment stratergies.

**PL-328**

**INFLUENCE OF NOVEL ANTIPSYCHOTIC AGENTS ON TRIGLYCERIDE CONCENTRATIONS**

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ISBN: 978-81-980623-8-3

Hypertriglyceridemia is a well-recognised metabolic complication that contributes to cardiovascular and pancreatitis risk. Novel antipsychotic agents may differentially affect triglyceride metabolism, warranting early evaluation. Triglyceride levels were measured at initiation of therapy and after four weeks in patients treated with Amisulpride, Quetiapine, or Lurasidone. Mean values were compared using paired t-tests with a significance threshold of $p<0.05$. Quetiapine was associated with a significant increase in triglycerides (122.66 ± 28.08 mg/dL to 136.22 ± 48.80 mg/dL; p= 0.04), indicating a hypertriglyceridemia effect. Amisulpride showed a significant reduction (129.4 ± 12.23 mg/dL to 126.8 ± 11.96 mg/dL; p = 0.028), while Lurasidone exhibited a minimal, statistically non-significant change (79.22 ± 16.32 mg/dL to 78.33 ± 17.54 mg/dL; p = 0.21). These findings demonstrate that Quetiapine elevates triglyceride levels and may contribute to atherogenic risk, whereas Amisulpride appears to improve lipid status. Lurasidone remains metabolically neutral, supporting its use in patients predisposed to dyslipidaemia.

**Keywords:** Triglycerides; Hypertriglyceridemia; Metabolic effects; Cardiometabolic monitoring

**PL-329**

## AMELIORATIVE EFFECTS OF VANILLIN, MAGNOLOL, PROBIOTIC AND VARIOUS COMBINATIONS THEREOF IN ANIMAL MODEL OF ALZHEIMER'S DISEASE

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Introduction: Alzheimer's disease (AD) is a global health issue, particularly among the elderly. Current treatments offer only symptomatic relief. This study investigates the use of phytoconstituents vanillin and magnolol, known for targeting AD-related pathological pathways as per in vitro studies, alongside probiotic(Lactobacillus rhamnosus), which may offer benefits via the Gut-Brain Axis (GBA). Aim and Objectives: The study aims to assess the ameliorative effects of vanillin, magnolol, and L. rhamnosus, alone and in various combinations, on AD induced in mice using chronic co-administration of aluminium chloride and d-galactose. Behavioural, biochemical, and molecular evaluations were conducted. Methods: AD was induced by administering aluminium chloride (5mg/kg; oral) and d-galactose (60 mg/kg; intraperitoneal) for 90 days. Vanillin (20 and 40 mg/kg; orally), magnolol (20 and 40mg/kg; orally), and L. rhamnosus (1 billon CFU; orally) were given orally from 61st day. Behavioural assessments included transfer latency (elevated plus maze), escape latency (Morris water maze), and distinction index (novel object recognition). Biochemical evaluations included antioxidant markers (TBARS, reduced glutathione, catalase) and acetylcholinesterase activity. Molecular markers such as caspase-3, amyloid beta 1-42, beta secretase, and Brain Derived Neurotrophic Factor (BDNF) were measured using ELISA in cortical and hippocampal regions of brain. Histopathological assessments of these regions were also performed. Results: All interventions showed significant anti-AD effects across behavioural, biochemical, and molecular studies, with neuroprotection evident in histopathological analysis. The combination of vanillin (20mg/kg; orally), magnolol (20mg/kg; orally), and L. rhamnosus (1 billion CFU; provided the most substantial results as was demonstrated by amelioration of behavioural and biochemical deficits associated with development of AD. Summary: Vanillin, magnolol, and L. rhamnosus demonstrated strong anti-AD potential, suggesting a disease-modifying effect. Conclusion: These interventions showed a multifactorial approach to delaying AD progression and may have disease-modifying properties. Further research is needed to substantiate these findings.

**Keywords:** Alzheimer's disease, aluminium chloride, d-galactose, vanillin, magnolol, Lactobacillus rhamnosus.

**PL-330**

## AWARENESS OF ANTIBIOTIC RESISTANCE AMONG PATIENTS IN COMMUNITY PHARMACIES: A CROSS-SECTIONAL STUDY

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Antibiotic resistance is increasingly recognized as one of the greatest threats to global public health. Inappropriate prescribing, misuse of antibiotics, and limited patient awareness contribute substantially to this crisis. Community pharmacies, being the first point of contact for many patients, provide a unique opportunity to assess knowledge gaps and promote rational antibiotic use. This cross-sectional study aimed to evaluate the level of awareness of antibiotic resistance among patients attending selected community pharmacies in Yelahanka and Chikaballapur. A standardized, structured questionnaire was administered to participants, covering key domains including antibiotic use, resistance mechanisms, and preventive practices. Data were analyzed using descriptive statistics to identify patterns of knowledge and misconceptions. Preliminary results revealed that a majority of patients were aware that inappropriate or excessive use of antibiotics can lead to resistance. However, a significant proportion demonstrated poor understanding of the importance of completing the full course of prescribed antibiotics. Misconceptions were common, particularly the belief that antibiotics are effective against viral infections such as the common cold and influenza. Despite these gaps, most respondents expressed willingness to receive pharmacist-led advice on appropriate antibiotic use, suggesting an openness to educational interventions at the pharmacy level. These findings highlight a critical need for targeted patient education and pharmacist-driven awareness campaigns to counter misconceptions and promote responsible antibiotic use in the community. Given the increasing burden of antimicrobial resistance, empowering patients with accurate knowledge and reinforcing the role of pharmacists as trusted healthcare providers are urgent priorities. Strengthening community-level education and interventions may serve as a practical, sustainable strategy to reduce misuse and preserve antibiotic effectiveness for future generations.

**Key words:** Antibiotic Resistance, community pharmacy, patient education, knowledge

**PL-331**

## EARLY-STAGE DEVELOPMENT OF AMYLOID BETA–TARGETED NANOPARTICLES FOR IMPROVED NEUROIMAGING IN NEURODEGENERATIVE DISEASES

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Neurodegenerative diseases are characterized by progressive neuronal loss and protein misfolding, with amyloid beta (Aβ) aggregation serving as a key pathological hallmark. Early and accurate diagnosis is crucial for therapeutic intervention, yet conventional imaging modalities such as MRI and PET often fail to detect subtle early-stage changes. Nanotechnology-based contrast agents offer an innovative pathway to improve sensitivity, targeting specificity, and enable preclinical detection. We have initiated exploratory work on the development of contrast-enhanced nanoparticles functionalized with Aβ-specific ligands to achieve selective plaque targeting and enhanced blood–brain barrier (BBB) penetration. The nanoparticle core was designed to improve imaging contrast, while surface modifications such as PEGylation were introduced to extend circulation and reduce non-specific uptake. Initial in vitro assessments were conducted to evaluate Aβ binding capacity and cytotoxicity, while preliminary in vivo observations in transgenic neurodegenerative models focused on biodistribution and imaging signal enhancement. Preliminary findings indicate that functionalized nanoparticles exhibit strong affinity toward Aβ aggregates in vitro, along with favorable safety profiles. Early in vivo studies suggest efficient BBB crossing and enhanced imaging contrast in Aβ-enriched regions compared to standard agents. These results support the feasibility of using targeted contrast nanoparticles for detecting early pathological changes. However, current data are limited, and larger studies are required to validate reproducibility, optimize nanoparticle formulations, and assess long-term safety. Our ongoing work suggests that Aβ-targeted contrast nanoparticles represent a promising diagnostic tool for neurodegenerative diseases. While initial results are encouraging, the research is still in its early stages. Further systematic evaluations, including detailed pharmacokinetic studies, extended animal trials, and




ISBN: 978-81-980623-8-3

eventual clinical translation, are necessary to fully establish their diagnostic and theranostic potential.

**Keywords:** Neurodegenerative disease, amyloid beta, contrast nanoparticles, early detection, nano-theranostics

**PL-332**

## RUTIN-LOADED PLGA NANOPARTICLES ATTENUATE NEUROINFLAMMATION: EVIDENCE FROM IN VITRO MICROGLIAL STUDIES AND IN VIVO WISTAR RAT MODEL

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Neuroinflammation is a key contributor to the pathogenesis of neurodegenerative disorders such as Alzheimer's and Parkinson's disease. Rutin, a natural flavonoid with antioxidant and anti-inflammatory properties, is limited by poor solubility and bioavailability, restricting its therapeutic application. Nanoparticle-based drug delivery systems, particularly poly (lactic-co-glycolic acid) (PLGA) formulations, offer enhanced stability, sustained release, and targeted delivery to overcome these limitations. Rutin-loaded PLGA nanoparticles were prepared using the solvent evaporation method and evaluated for particle size, zeta potential, encapsulation efficiency, and morphology. In vitro release was assessed over 72 h. Anti-inflammatory activity was tested using LPS-induced BV-2 microglial cells, examining nitric oxide production, TNF-α, and IL-6 levels. Cell viability was evaluated by MTT assay. For in vivo studies, Wistar rats were subjected to LPS-induced neuroinflammation and treated orally with rutin-PLGA nanoparticles (20 mg/kg). Brain tissue cytokine levels, histopathological changes in the hippocampus, and behavioral outcomes (memory and locomotor activity) were analyzed. The optimized nanoparticles exhibited an average size of 142.6 ± 5.2 nm, zeta potential of –21.4 mV, spherical morphology, and encapsulation efficiency of 86.7%. Drug release studies revealed biphasic kinetics with sustained release up to 72 h. In vitro studies showed significant inhibition of nitric oxide (61%) and reduction in pro-inflammatory cytokines TNF-α (58%) and IL-6 (55%) compared to free rutin ($p < 0.01$), with >90% cell viability at therapeutic doses. In vivo, rutin-PLGA nanoparticles reduced TNF-α and IL-1β in brain tissue by 48% and 52%, respectively. Histological analysis demonstrated reduced microglial activation and neuronal damage, while behavioral tests confirmed improvements in memory and locomotor performance ($p < 0.05$). Rutin-loaded PLGA nanoparticles significantly improve rutin's bioavailability, reduce neuroinflammatory markers, and provide neuroprotection in vitro and in vivo. These findings highlight their potential as a promising therapeutic approach for managing neuroinflammatory and neurodegenerative conditions.

**Keywords:** Rutin, PLGA nanoparticles, neuroinflammation, BV-2 microglial cells, Wistar rats, cytokines.

**PL-333**

## RESVERATROL BASED NOVEL PHYTOGEL EXHIBITS SYNERGISTIC ANALGESIC AND ANTI-INFLAMMATORY POTENTIAL IN RATS.

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Inflammation is a complex biological response implicated in several chronic conditions, and its management often remains challenging due to limited efficacy and adverse effects of conventional therapies. Natural bioactives such as resveratrol (RSV), curcumin, and methyl salicylate (from wintergreen oil) have demonstrated the ability to modulate multiple inflammatory pathways. The present study aimed to develop and evaluate their synergistic analgesic-anti-inflammatory gel using a rat model of formalin-induced pain and inflammation. The topical gel was formulated with CAR-940 and characterized for physicochemical parameters including pH, viscosity, spreadability, and ex vivo permeation. In vivo evaluation involved paw volume measurement, nociceptive behavioural responses (licking, jerking, and lifting), and biochemical markers such as C-reactive protein, malondialdehyde, catalase, and haematological parameters. Additional mechanistic insights through protein denaturation assays. The optimized gel significantly reduced paw oedema and nociceptive responses versus standard treatment. Ex vivo studies confirmed effective transdermal delivery of RSV and curcumin. Biochemical assays showed normalized oxidative stress and inflammatory markers, while protein denaturation assays supported its analgesic and anti-inflammatory effects. The synergistic combination of RSV, curcumin, and wintergreen oil in a topical gel showed potent analgesic and anti-inflammatory activity, highlighting its potential as a natural therapeutic alternative.

**Keywords:** Resveratrol, Curcumin, Wintergreen oil, Anti-inflammatory, Analgesic, Antioxidant, Formalin-induced paw oedema.

**PL-334**

## INNOVATIVE APPROACH IN TUBERCULOSIS ENHANCING EARLY DIAGNOSIS AND TREATMENT MANAGEMENT

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Tuberculosis (TB), a communicable disease caused by the bacterium Mycobacterium tuberculosis, spreads from person to person. It remains a serious health challenge, particularly in developing countries, even with progress in medical diagnosis and treatment. TB primarily affects the lungs but also capable of spreading throughout the body. A one-year study conducted at a tertiary care hospital involving 1450 patients between the ages of 20 and 60, with the majority being men especially 40-59 years old. The study focused on how TB affects people, different diagnosis tests used, treatment approaches and outcomes. Study found that social factors such as poor nutrition and limited education played a significant role in affected by TB. Most of the patients presented with clinical features of persistent cough, haemoptysis, weight loss and night sweats. TB was diagnosed using multiple methods including the mantoux skin test, sputum analysis, CBNAAT and imaging techniques like chest x-ray. Frist-line anti-tuberculosis drugs such as isoniazid, rifampicin, pyrazinamide and ethambutol. Frist-line drugs are effective in treatment but may cause serious liver and kidney side effects. Require close monitoring while using treatment. A major challenge observed-some patients never started, some patients discontinued midway and many failing to maintain consistency which may difficult to treat TB. Innovative and target treatments includes bedaquiline and Linezolid, when combined with DOTS strategy, demonstrate promise in improving recovery rates, particularly in patients with drug resistant TB.

**Keywords:** CBNAAT, DOTS, Mycobacterium tuberculosis, Pulmonary TB, Rifampicin, Tuberculosis Diagnosis

**PL-335**

## INFLUENCE OF ALCOHOL CONSUMPTION ON SEVERITY AND RECURRENCE OF ACUTE PANCREATITIS: A CROSS-SECTIONAL STUDY

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Acute pancreatitis is an inflammatory condition of the pancreas, an organ vital for digestion and blood sugar regulation. Alcohol use is considered one of the major modifiable risk factors associated with this disorder, contributing to both its onset and recurrence. The present study was undertaken to examine the impact of alcohol on the severity and recurrence of acute pancreatitis and to explore the role of socio-economic status. A cross-sectional study was conducted in patients diagnosed with acute pancreatitis, divided into two groups: Group A comprised patients with a history of alcohol consumption, and Group B included patients without alcohol exposure. Information was obtained through a structured questionnaire, and disease severity was assessed using serum amylase and lipase levels. Socio-economic background was evaluated by the Kuppuswamy scale. Results showed that Group A patients had significantly higher serum enzyme levels compared with Group B ($P < 0.05$), indicating greater severity in alcohol users. Recurrence was also more common in Group A, where 62 patients (88.7%) experienced repeated episodes, compared to 6 patients (30%) in Group B. Analysis of socio-economic status revealed that most patients belonged to upper-middle and lower-middle classes, and




ISBN: 978-81-980623-8-3

alcohol consumption was more prevalent in these groups. These findings highlight alcohol as a strong determinant of both severity and recurrence of acute pancreatitis, while socio-economic background appears to influence exposure and vulnerability. Early lifestyle counseling, alcohol restriction, and targeted prevention strategies may help reduce the burden of alcohol-related pancreatitis.

**Keywords:** Alcohol consumption, Acute pancreatitis, Recurrence, Severity, Socio-economic status.

**PL-336**

**CORONARY ARTERY DISEASE: A CASE PRESENTATION**

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Coronary artery disease (CAD) happens when the arteries that supply blood to the heart get narrowed or blocked because of a build-up of fatty material called plaque. This reduces blood flow to the heart and can cause chest pain or even a heart attack. This case report is about a 53-year-old man with high blood pressure who was admitted to the hospital with chest pain and trouble breathing. Tests showed fast heart rate, high levels of a heart damage marker (troponin I), and poor heart pumping function (35% ejection fraction). These confirmed he had CAD with a recent heart attack and weak heart muscle. The treatment aimed to ease symptoms, stop the disease from getting worse, lower the risk of future heart problems, and improve chances of survival. The patient was given blood thinners (heparin), medicines to prevent blood clots (clopidogrel), cholesterol-lowering drugs (atorvastatin), medicines to widen blood vessels (nitroglycerin), and other drugs to support heart function. His condition was closely monitored, and efforts were made to control risk factors like high blood pressure. This case shows how important it is to carefully evaluate patients with CAD and use a combination of medicines to manage the disease well. Early diagnosis and proper treatment can greatly improve outcomes for people with coronary artery disease.

**Keywords:** Coronary artery disease, heart attack, case report, treatment, risk factors

**PL-337**

**THE AMYLOID CASCADE HYPOTHESIS IN ALZHEIMER'S DISEASE: A CRITICAL OVERVIEW**

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The amyloid cascade hypothesis, introduced in the early 1990s, posits that Alzheimer's diseases (AD) pathology begins with the accumulation and aggregation of amyloid beta peptides in the brain. This deposition triggers a series of downstream events including the formation of neurofibrillary tangles from hyperphosphorylated tau proteins, synaptic dysfunctional, neuronal death, and ultimately cognitive decline and dementia. Genetic evidence from familial AD cases,involving mutations in APP, PSEN1, and PSEN2 genes, supports the central role of Amyloid beta in disease onset by influencing peptide production and aggregation. Despite its pivotal role in AD research and drug development, the hypothesis has faced challenges, including instances where amyloid plaques are present without dementia and mixed results from clinical trials targeting amyloid clearance. Modern understanding emphasizes soluble amyloid beta oligomers as the main neurotoxic species rather than insoluble plaques and recognizes the involvement of multiple pathological pathways. While the amyloid cascade remains a foundation for understanding AD, current perspectives view it as one component within a multifactorial disease process involving tau pathology, neuroinflammation, and other mechanisms. Continued research aims to clarify these interrelated pathways to develop effective therapeutic strategies.

**Keywords:** Alzheimer's disease, amyloid beta, amyloid cascade hypothesis, tau pathology, neurodegeneration.

**PL-338**

**IMPACT OF GESTATIONAL DIABETES ON NEWBORNS: A RETROSPECTIVE OBSERVATIONAL STUDY**

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Gestational diabetes mellitus (GDM) is a common pregnancy complication that significantly influences neonatal health. This retrospective observational study was conducted to evaluate the impact of GDM on neonatal outcomes. Medical records of 132 GDM mothers and their neonates were reviewed, and maternal parameters such as age, BMI, HbA1c levels, and mode of delivery were correlated with neonatal birth weight, Apgar scores, and complications. The mean maternal age and BMI were 29.7 ± 3.3 years and 28.7 ± 4.3 kg/m², respectively, with a mean gestational age of 38 weeks.The mean neonatal birth weight was 3.34 ± 0.43 kg, with Apgar scores of 6.1 at 1 minute and 8.1 at 5 minutes. Among the neonates, 52.7% required NICU admission, with hypoglycemia, macrosomia, respiratory distress syndrome, and hyperbilirubinemia being the most frequent complications. A strong positive correlation (r = 0.71) was observed between elevated maternal HbA1c and neonatal hypoglycemia, indicating that poor glycemic control worsens neonatal outcomes. The study concludes that GDM poses a significant risk for neonatal morbidity, and strict maternal glycemic management is essential to reduce complications and improve neonatal outcomes.

**Keywords:** Gestational diabetes mellitus, macrosomia, hypoglycemia, respiratory distress syndrome.

**PL-339**

**A PROSPECTIVE INTERVENTIONAL STUDY ON SAFETY AND EFFICACY OF SAROGLITAZAR ALONE AND IN COMBINATION WITH VITAMIN E AMONG NON-ALCOHOLIC FATTY LIVER DISEASE (NAFLD) PATIENTS**

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Saroglitazar is an experimental/approved metabolic drug (a dual PPAR-α/γ agonist) aimed at improving dyslipidaemia, insulin resistance and liver fat/inflammation in NAFLD/NASH, while vitamin E is an antioxidant that has proven histologic benefit in selected NASH patients (notably non-diabetics). The main objective of this study is to find the safety and efficacy of saroglitazar alone and in combination with Vit E, reduce the inflammation, hepatic steatosis and to improved liver histology. Saroglitazar is a dual PPAR-α/γ agonist but has relatively stronger PPAR-α activity (less PPAR-γ than full thiazolidinediones). Classical PPAR-γ class adverse effects (major edema/heart-failure) are not a dominant signal in current saroglitazar trials. Vitamin E can be considered in non-diabetic NASH/NAFLD, but long-term safety is a concern. saroglitazar (alone) produced greater reductions in enzymes, liver stiffness and steatosis than vitamin E alone; combination often showed additive benefit vs monotherapy.

**Keywords**: Saroglitazar, Non-alcoholic fatty liver, Non-alcoholic Steatohepatitis, Vitamin E

**PL-340**

**IN-VITRO AND IN-VIVO EVALUATION OF RECREATED FORMULATION OF ARGYRIA NERVOSA PLANT FOR THE TREATMENT OF PEPTIC ULCER**

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Peptic ulcer disease (PUD) continues to be a significant health concern worldwide, with current therapies often limited by relapse, resistance, and adverse effects. Plant-based formulations are gaining attention as safer alternatives. Argyria nervosa, a medicinal plant rich in flavonoids, tannins, and alkaloids, has been traditionally used for its gastroprotective effects. The present study aimed to develop and evaluate a recreated sustained release formulation of Argyria nervosa leaf extract for the treatment of peptic ulcer. Phytochemical analysis confirmed the presence of bioactive compounds with antioxidant and cytoprotective properties. A novel oral delivery system was designed to improve bioavailability and gastric retention. In vitro studies demonstrated potent free radical scavenging activity, cytoprotection in gastric epithelial cells, and favorable sustained release kinetics. In vivo anti-ulcer evaluation was carried out in Wistar rats using ethanol, indomethacin, and pylorus ligation models. The formulation significantly




ISBN: 978-81-980623-8-3

reduced ulcer index, gastric volume, and total acidity, while enhancing mucin content and antioxidant enzyme activity (SOD, CAT, GPx). Histopathology confirmed mucosal protection, reduced hemorrhage, and accelerated healing compared with control and standard groups. No toxicity or adverse effects were observed. The findings indicate that the recreated Argyria nervosa formulation exerts strong anti-ulcer effects through antioxidant, anti-secretory, and mucosal defense mechanisms. The sustained release system enhances therapeutic efficacy by prolonging gastric retention. These results support the potential of Argyria nervosa as a safe and effective natural therapy for peptic ulcer and encourage further clinical investigation.

**Keywords**: Argyria nervosa, peptic ulcer, gastroprotective, novel formulation, sustained release, in vitro evaluation, in vivo evaluation.

**PL-341**

## "A PROSPECTIVE STUDY ON EVALUATION OF EFFECTIVENESS OF ERYTHROPOIETIN IN MANAGEMENT OF CHRONIC KIDNEY DISEASE INDUCED ANEMIA"

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Anaemia is a prevalent and consequential complication of Chronic Renal Disease or chronic kidney disease (CKD). It will appear in the early stages of the disease and become more severe as the condition progresses. The primary approach for managing anemia in CKD patients is erythropoietin injections, such as Recombinant Human Erythropoietin Alfa (epoetin alfa), which belongs to a group of drugs called erythropoiesis-stimulating agents (ESAs). These drugs are effective in managing anaemia induced by CKD, chemotherapy treatment for cancer, or HIV treatment with zidovudine. The aim of the study is to evaluate the effectiveness and safety of Erythropoietin therapy in the management of Chronic Kidney Disease (CKD) induced Anemia patients. To compare the safety profile among the study groups and to evaluate the health – Related Quality of Life among the study participants as assessed by SF-36 questionnaire. A prospective interventional study was carried out in 150 patients; the patients are divided into 2 groups. The outcome was measured by Hemoglobin level measured in gm/dl, measured at baseline and end of 16 weeks expressed as Mean and Standard Deviation, change in mean Hemoglobin level from baseline to 16 weeks is compared in 3 groups, The no:of Hemoglobin responders will be determined and compared among the 3 groups. After 16 weeks patients who are taking erythropoietin have more outcome compared to control group. These findings suggest that erthropoietin provides an effective, well-tolerated for the management of anemia in CKD patients.

**PL-342**

## MATERIOVIGILANCE STUDY ON MEDICAL DEVICE USAGE AND ADVERSE EVENTS IN A TERTIARY CARE SETTING

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Medical devices are integral to strengthening self-reliance and achieving universal healthcare goals. Although they offer substantial benefits to patients, their use can also pose safety risks. This study aimed to analyze the utilization patterns of medical devices, categorize them according to CDSCO risk classification, and identify associated adverse events in a tertiary care teaching hospital over six months. Data were collected from 120 patients across Surgery, Orthopedics, General Medicine, and Obstetrics & Gynecology departments using a structured form. Of these, 60% were male and 40% female, with a mean age of 46.2 years; the largest proportion (25%) was aged 41–50 years. Device usage was highest in Surgery (38%), followed by Orthopedics (35%), General Medicine (17%), and OBG (10%). Class B devices were most frequently used (48%), and 70% of devices served therapeutic purposes. Invasive devices comprised 55% of the total, while 28% of patients were prescribed three or more devices concurrently. The most commonly used devices were IV cannulas (16.2%) and alcohol swabs (14.8%), whereas the least used included nebulizers (0.5%) and IV tamponades (0.25%). A total of 20 device-related adverse events were reported, resulting in an incidence rate of 0.29 cases per patient-year.The findings underscore the importance of systematic monitoring, appropriate device selection, and safety surveillance to minimize risks and ensure effective patient care in clinical practice.

**Keywords:** Adverse Reactions**,** Incidence, Materiovigilance**,** Medical devices

**PL-343**

## MATERNAL AND FETAL OUTCOMES IN HIGH-RISK PREGNANCIES: A PROSPECTIVE STUDY

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High-risk pregnancy is a state where the health of the mother, fetus, or both is at higher risk of complications. Screening and clinical evaluation of such pregnancies facilitate early detection of risk factors and timely interventions, enabling individualized care and counseling to minimize complications. The present prospective study was conducted at Unity Lifeline Hospital and Suresh Hospital, Bengaluru, India, from August 2023 to August 2024, and included 332 antenatal women identified as high-risk based on Pradhan Mantri Surakshit Matritva Abhiyan criteria. Data were collected from antenatal visits through delivery using structured forms and case records. Neonatal outcomes assessed were gestational age at delivery, birth weight-related complications, and NICU admission, while maternal conditions such as anemia, hypothyroidism, gestational diabetes mellitus, pregnancy-induced hypertension, and previous cesarean section were also recorded. Results showed that 37.5% of neonates were full term, 41.3% early term, 20% late preterm, and 1.3% moderately preterm. Among complications, 2.5% experienced breathlessness at birth, 15.1% developed neonatal jaundice, and 10% required NICU admission, whereas 72.5% had no significant complications. Findings indicate higher rates of preterm births, neonatal jaundice, respiratory issues, and NICU admissions compared to normal pregnancies. The study concludes that high-risk pregnancies significantly affect neonatal outcomes, emphasizing the need for early identification, close monitoring, and targeted interventions to improve perinatal health.

**Keywords:** High-risk pregnancy; neonatal outcomes; preterm birth; birth complications; NICU admission

**PL-344**

## FROM MECHANISTIC INSIGHTS TO REGULATORY ACTION: A COMPREHENSIVE FRAMEWORK FOR VETERINARY ADVERSE DRUG REACTION MANAGEMENT

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Veterinary adverse drug reactions (ADRs) present significant challenges in animal healthcare, with implications extending to public health, antimicrobial resistance, and food safety. This study integrates mechanistic understanding of ADRs with regulatory frameworks to propose an actionable veterinary pharmacovigilance model. A descriptive qualitative approach was undertaken by reviewing global regulatory guidelines, pharmacovigilance reports, and scientific literature from 2000–2025. Mechanistic classification of ADRs was examined, highlighting dose-dependent (Type A) and unpredictable, severe (Type B) reactions, with examples such as NSAID-induced gastrointestinal toxicity and immune-mediated hypersensitivity syndromes. Species-specific factors such as feline acetaminophen sensitivity and MDR1 mutations in dogs underscore the need for tailored therapeutic strategies. Regulatory assessment focused on frameworks implemented by the FDA-CVM, EMA, APVMA, and harmonization efforts by VICH and WHO, with emphasis on reporting systems like the Naranjo algorithm and WHO-UMC scale. Case studies reveal gaps in monitoring, including underreporting, limited safety data in minor species, and widespread off-label use. Furthermore, integration of emerging technologies like artificial intelligence, federated learning, and electronic health records is identified as a crucial enabler for real-time signal


ISBN: 978-81-980623-8-3

detection and predictive safety evaluation. The study also discusses the role of veterinary pharmacovigilance within the One Health paradigm to mitigate zoonotic risks and antibiotic resistance. The findings propose a globally harmonized, data-driven, stakeholder-inclusive approach to enhance regulatory responsiveness, improve animal welfare, and safeguard human health through informed, evidence-based pharmacovigilance systems.

**Keywords:** Adverse drug reactions, veterinary pharmacovigilance, dose-dependent toxicity, immune-mediated hypersensitivity, drug regulation, antimicrobial resistance, one Health.

**PL-345**

**PHARMACOLOGICAL EVALUATION OF ANTIDEPRESSANT ACTIVITY OF POLYHERBAL EXTRACT ON MICE**

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Depression is a chronic neuropsychiatric disorder that significantly affects quality of life and remains a major public health challenge. Current synthetic antidepressants, such as amitriptyline, though effective, are associated with adverse effects, searching for safer herbal alternatives essential. The present study aimed to evaluate the antidepressant potential of a polyherbal Ayurvedic preparation containing Ocimum tenuiflorum (Tulsi), Withania somnifera (Ashwagandha), and Spinacia oleracea (Spinach) in Swiss albino mice. Methanolic extracts of the selected plants were prepared using Soxhlet extraction and combined in a 1:1:1 ratio. The study included three groups of mice (n=6 each): control (saline), standard (amitriptyline, 10 mg/kg), and test (polyherbal extract, 0.2 g/10 ml/kg, orally). Depression was induced and immobility periods were recorded as the behavioral marker. Phytochemical screening revealed the presence of alkaloids, flavonoids, tannins, triterpenoids, phenols, and steroids in all three plants, with additional saponins in Ashwagandha and proteins in Spinach. The polyherbal extract demonstrated significant antidepressant activity, reducing immobility periods in mice, with results comparable to the standard drug amitriptyline. The study concludes that the polyherbal combination exerts synergistic antidepressant effects, likely due to the presence of multiple bioactive compounds. This formulation demonstrates promise as a natural, safer alternative for managing depression, warranting further clinical evaluation.

**Keywords:** Antidepressant activity, Ocimum tenuiflorum (Tulsi), Withania somnifera (Ashwagandha), Spinacia oleracea (Spinach)

**PL-346**

**A PROSPECTIVE OBSERVATIONAL STUDY OF INCIDENCE OF CLINICAL EFFECTS ASSOCIATED WITH DIURETICS IN CARDIOVASCULAR DISEASE PATIENTS IN TERITIARY CARE HOSPITAL**

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Diuretics are frequently prescribed to manage cardiovascular diseases (CVDs) like heart failure, hypertension, and chronic kidney disease. They work by promoting the excretion of sodium and water through the kidneys, which helps reduce fluid overload. This is crucial for controlling symptoms of fluid retention and preventing complications such as pulmonary edema and hypertension in patients with cardiovascular conditions.A prospective observational study investigated the clinical effects of diuretics in CVD patients. The study found a statistically significant reduction in both systolic and diastolic blood pressure after diuretic administration. The mean systolic blood pressure (BP) dropped from 157.80 to 119.53 mmHg, while diastolic BP decreased from 86.87 to 76.20 mmHg. The study also examined the incidence of adverse effects associated with different diuretic combinations. Patients taking the combination of Lasix and Aldactone had 25 times higher odds of experiencing adverse effects compared to those taking Lasix alone. The Lasix + Aldactone group showed a significantly higher incidence of adverse effects (85.9%) compared to the Lasix group (19.5%). The odds ratio of 25.04 and a relative risk of 4.4 further emphasize that patients on this combination are substantially more likely to experience adverse effects. While the odds ratios for Lasix + Fruselac (2.75) and Fruselac alone (4.13) were higher than for Lasix alone, these differences were not considered statistically significant.

**Keywords:** Cardiovascular diseases, Acute coronary syndrome, ST-elevation myocardial infarction (STEMI), Non-ST elevation myocardial infarction (NSTEMI), coronary heart disease.

**PL-347**

**PRECLINICAL SCREENING OF AGMATINE-OXYTOCIN INTERACTION IN ANXIETY AND DEPRESSION DISORDERS**

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Depression and anxiety are among the most prevalent psychiatric disorders worldwide, with limited treatment efficacy and frequent side effects. Oxytocin (OXT), a neuropeptide involved in social bonding and stress regulation, and Agmatine (AGM), an endogenous amine derived from arginine, have demonstrated antidepressant and anxiolytic properties. Their co-localization in oxytocin-rich brain regions suggests a potential interaction relevant to mood regulation and stress adaptation. Adult Sprague-Dawley rats were divided into single-housed (socially deprived) and group-housed (socially enriched) male and female groups. Animals received OXT (0.1 mg/kg), AGM (40 mg/kg), or a combination. Behavioural assessments included the Forced Swim Test (FST) and Sucrose Preference Test (SPT) for depressive-like behaviour, and the Elevated Plus Maze (EPM) and Open Field Test (OFT) for anxiety-related behaviour. Both OXT and AGM independently reduced anxiety- and depression-like behaviours, while their combination produced significantly greater and more consistent effects. In the FST, co-treatment markedly reduced immobility while enhancing active coping behaviours such as climbing and swimming. SPT results demonstrated increased sucrose consumption, suggesting reversal of anhedonia. In the EPM, combined treatment significantly increased open-arm time and entries, reflecting reduced anxiety, whereas OFT revealed higher locomotor activity and exploration without impairing normal behaviour. Effects varied by sex and housing, with socially deprived rats showing stronger responsiveness, highlighting the influence of environmental stress on treatment outcomes. Agmatine potentiates the behavioural effects of oxytocin, producing a synergistic antidepressant and anxiolytic response. These findings suggest that Agmatine-Oxytocin co-treatment may serve as a promising novel therapeutic strategy for mood disorders, especially in stress-linked conditions.

**Keywords**: Oxytocin, Agmatine, Anxiety, Depression, Neuropharmacology

**PL-348**

**A PROSPECTIVE OBSERVATIONAL STUDY OF ADVERSE DRUG REACTIONS IN PATIENT USING ANTI-TUBERCULOSIS TREATMENT (ATT) IN TERITIARY CARE HOSPITAL**

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Tuberculosis is one of the major public health concerns in India. Treatment of tuberculosis need multidrug combinations, which is associated with increased incidence of adverse drug reactions (ADRs). Hence there is a need of active monitoring for adverse effects in patients who are on antitubercular treatment (ATT). The main objective of this study is to identify the pattern of adverse drug reaction caused by anti-tubercular treatment. It is a Prospective observational study which was conducted among 150 patients admitted to pulmonology department with the diagnosis of ATT induced adverse drug reactions in the Government General Hospital (GGH), Vijayawada, Andhra Pradesh. In this study, a total of 150 cases ADRs were recorded in 50 patients. Among 150 patients, 106(70.7%) were males and 44 (29.3%) were females. A total of 150, ADRs were recorded amongst 50 patients. During intensive phase (45 patients) and continuation phase (5 patients) of treatment, experienced ADRs respectively. Gastrointestinal side effects were 22 (14.7%) and hepatotoxicity were 20 (13.3%) are the most frequently observed ADR each, followed by dermatitis 4 (2.7%) and optic related




ISBN: 978-81-980623-8-3

ADR in 2 (1.3%) patients and other ADRs were 63 (0.7%). ADRs had an association with fixed dose combination (FDC) of Isoniazid, Rifampicin, Pyrazinamide and Ethambutol. Most of the ADRs belonged to moderate (54%) category as per Modified Hartwig scale. Gastrointestinal side effects and hepatotoxicity were the most frequently observed ADRs, followed by rashes and optic related ADRs. As per WHO-causality scale and Naranjo's causality algorithm majority of ADRs were probable. Most of the ADRs belonged to moderate category according to the Modified Hartwig scale for severity assessment. ADRs induced by ATT are common, which can result in discontinuation of treatment and development of resistant bacilli. Hence, counselling of patients regarding their life style modifications with early detection and management will minimize the occurrence of ADRs and improve the adherence to treatment.

**Keywords:** Tuberculosis, Anti-tubercular drugs, Adverse Effects, ATT induced Gastritis, ATT induced Hepatitis, ATT induced Dermatitis, ATT induced Neurotoxicity, ATT induced Nephrotoxicity.

**PL-349**

## IN-SILICO PHARMACOLOGICAL SCREENING OF STRUCTURALLY MODIFIED DICLOFENAC DERIVATIVES AGAINST PERIPHERAL PAIN

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Pain is defined as "an unpleasant sensory and emotional experiences associated with actual or potential tissue damage or described in terms of such damage". Intensity and acuity of pain differsliables upon psychological and emotional conditions of pain. NSAIDS, world-widedesired drug for pain deficiencies in synthesising molecules with innovative derivatives. Diclofenac a sketchily used NSAID for wide-ranging disease conditions is OTC drug since years. The present research focuses on structurally altered derivatives of diclofenac against cox-2 for pain. 33 structures are acknowledged and screening is done using AutoDoc software against Cox-2. Binding energies and inhibitory constant assessments obtained operating AutoDoc for 100 runs are recorded and related with the novel Diclofenac result. The binding sites of molecules are visualised using Discovery Studio Visualiser. The molecule with peak binding energy isprogressed for Md simulation using gromax software. The simulation ensued with diclofenac indicative of the molecule is equally efficient in treating pain against cox-2. The molecule may be synthesised and proceeded for preclinical trails in future.

**Keywords**: Pain, NSAIDS, Diclofenac, Gromax.

**PL-350**

## CLINICAL PROFILE AND OUTCOMES OF CRITICALLY ILL PATIENTS WITH ACUTE KIDNEY INJURY IN A TERTIARY CARE HOSPITAL"

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Acute kidney Injury (AKI) is a common entity complicating the hospitalized patients. We conducted a retrospective study on AKI to evaluate the clinical profile and outcomes of the patients with AKI. This was a retrospective study including all patients admitted with AKI in a tertiary care hospital. The study population included all the patients admitted to hospital with Acute Kidney injury (AKI) between 2017 to December 2019.Demographic details, detailed medical history, aetiological factors, co-morbid conditions, prognostic factors and outcomes were obtained from hospital database, and clinical data were reviewed. Acute kidney injury events were classified according to KDIGO classification criteria. Outcomes of the patients were noted in the patient profile forms. Mortality, need for dialysis, inpatient lengths of stay, and discharge renal function of the patients are were noted. A total of 446 patients were diagnosed to have acute kidney injury during the study period. The mortality rate in our study was 5.8%, with 1.5% needing invasive mechanical ventilation, 21% needed dialysis, 22.2% showed partial recovery and 30% had complete recovery. The most common causes for AKI were sepsis (18.38%), Cardiac disorders (15.69%), followed by Drug induced AKI (15.47%). Acute kidney injury is common in patients admitted to hospital, especially ICU. In AKI sometimes mortality rate increases and persistent renal impairment.

**Keywords**: KDIGO Criteria, Renal Replacement Therapy (RRT), Renal Recovery, Hospital-acquired AKI, Community-acquired AKI, Dialysis Dependence, ICU Outcomes, Drug-Induced Nephrotoxicity.

**PL-351**

## FORMULATION AND ANTI-INFLAMMATORY EVALUATION OF IBUPROFEN GEL IN ALBINO RATS

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To develop a topical gel formulation of ibuprofen and evaluate its anti-inflammatory activity using a simple carrageenan-induced paw oedema model in albino rats. Ibuprofen gel was prepared using Carbachol 940 as the gelling agent, with propylene glycol and triethanolamine to adjust viscosity and pH. The formulation was characterized for spreadability, pH, and drug content. Six albino rats were divided into two groups: control (placebo gel) and test (ibuprofen gel). Acute inflammation was induced by injecting 0.1 mL of 1% carrageenan into the subplantar region of the hind paw. Paw volume was measured at 0,1,2 and 3 hours post-application using a plethysmometer. Ibuprofen gel showed good physicochemical properties and was stable over 7 days. The test group showed a significant reduction in paw edema compared to control, indicating effective anti-inflammatory action. The study demonstrates that a simple ibuprofen gel formulation can be effectively used to reduce inflammation in a basic animal model. This experiment provides pharmacy students with hands-on experience in formulation development and pharmacological screening.

**Keywords**: Ibuprofen, Edema, Anti-inflammatory, Albino rats

**PL-352**

## PRESCRIPTION ANALYSIS, DRUG INTERACTION CHECKING AND THE IMPACT OF THE PATIENT COUNSELLING BY A CLINICAL PHARMACIST IN TYPE II DIABETES MELLITUS IN TERTIARY CARE HOSPITAL - A PROSPECTIVE OBSERVATIONAL STUDY

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Type 2 diabetes is a growing global health concern requiring effective management. Prescription analysis, drug interaction monitoring, and patient counseling by clinical pharmacists play a crucial role in improving medication adherence, enhancing knowledge, and ensuring better disease outcomes in patients. This study aimed to evaluate the prescription patterns of type II diabetes mellitus patients, assess drug interactions, and understand patient adherence to therapy. It further examined the role of pharmacist-led counseling in improving adherence and explored factors influencing non-adherence. Additionally, it assessed complications, gender and age differences, and the presence of co-morbidity in the study population. The prospective study was carried out in a tertiary care hospital to evaluate drug interactions, and the impact of clinical pharmacist-led counselling among type-2 diabetes patients over a span of 6 months. Data on demographics, therapy details, complications, and adherence were collected using structured forms. Counselling focused on safe medication use and lifestyle modification. Statistical significance was set at $p \leq 0.05$. The study included 203 patients, with males (59.6%) predominating over females (40.4%). Most participants were aged 55–64 years (36.5%). Major drug interactions were observed with Glimepiride and Fluconazole. Post-counseling, significant improvements were noted in medication adherence, dietary compliance, physical activity, and monitoring practices. Counseling by clinical pharmacists demonstrated a positive impact on overall patient self-care and treatment adherence. Our study highlights that clinical pharmacist counseling improves medication adherence, patient knowledge, and self-care in type 2 diabetes. This intervention supports better glycemic control, prevents complications, and empowers patients, emphasizing the pharmacist's vital role in diabetes management.




ISBN: 978-81-980623-8-3

**Keywords**: Drug interaction, Patient counselling, Medication adherence, Diabetes mellitus, Glimipride, Glycemic control

**PL-353**

**INVESTIGATING THE ROLE OF NOVEL BIOMARKERS IN EARLY DETECTION OF CHRONIC KIDNEY DISEASE**

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Chronic kidney disease (CKD) is a progressive condition that often remains asymptomatic until advanced stages, leading to increased morbidity and mortality worldwide. Current diagnostic markers, such as serum creatinine and estimated glomerular filtration rate (eGFR), lack sensitivity and specificity for early disease detection. Hence, there is an urgent need to identify and validate novel biomarkers that can enable timely diagnosis, predict disease progression, and guide therapeutic interventions. Emerging research has highlighted the potential of novel biomarkers, including neutrophil gelatinase-associated lipocalin (NGAL), kidney injury molecule-1 (KIM-1), cystatin C, fibroblast growth factor-23 (FGF-23), and urinary proteomic signatures, in detecting subclinical kidney injury. These biomarkers reflect diverse pathological processes such as tubular injury, inflammation, oxidative stress, and fibrosis, offering deeper insights into disease pathophysiology. In addition, advances in omics technologies (proteomics, metabolomics, and genomics) combined with artificial intelligence are accelerating biomarker discovery and validation, paving the way for personalized approaches in CKD management. This presentation will discuss the current landscape of novel biomarkers in CKD, their clinical utility, and the translational challenges in integrating them into routine practice. Early detection through biomarker-driven strategies holds the potential to improve patient outcomes, reduce progression to end-stage renal disease, and optimize healthcare resource utilization.

**Keywords**: Chronic kidney disease; Novel biomarkers; Early detection; NGAL; KIM-1; Cystatin C; Proteomics; Personalized medicine

**PL-354**

**EVALUATION OF THE ANTI-INFLAMMATORY ACTIVITY OF ELAEOCARPUS GANITRUS BARK OINTMENT IN CARRAGEENAN-INDUCED PAW EDEMA IN WISTER RATS**

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Inflammation is a complex biological response of numerous diseases. The search for effective and safe anti-inflammatory agents from natural sources has gained increasing attention. Elaeocarpus ganitrus (Rudraksha) is traditionally known for its medicinal properties, yet limited scientific evidence exists regarding its topical anti-inflammatory potential. The study aimed to evaluate the anti-inflammatory activity of an ointment prepared from the bark extract of E. ganitrus using the carrageenan-induced paw edema model in Wistar rats. The bark extract was formulated into a simple ointment base and applied topically to the inflamed paw. Anti-inflammatory activity was assessed by measuring paw volume at 0, 1, 2, 3, and 4 hours after carrageenan injection, and the results were compared with a standard diclofenac ointment-treated group. Topical application of E. ganitrus bark ointment (10% w/w) significantly reduced paw edema in a dose-dependent manner. At the 3rd hour, paw volume was reduced to 0.42 ± 0.03 mL compared to 0.81 ± 0.05 mL in the control group, corresponding to 48.1% inhibition ($p < 0.01$). At the 4th hour, the extract ointment showed 55.3% inhibition, which was comparable to the diclofenac-treated group (59.7% inhibition). The findings support the traditional use of E. ganitrus and highlight its potential as a natural topical anti-inflammatory agent. Further investigations are warranted to isolate the bioactive constituents and explore the underlying mechanisms of action.

**Keywords**: Elaeocarpus ganitrus, Anti-inflammatory activity, Ointment formulation, Carrageenan-induced paw edema, Wistar rats.

**PL-355**

**STUDY ON EPIDEMIOLOGY OF NEONATAL AND INFANTS SEPSIS AND THE ROLE OF PHARMACISTS IN MANAGEMENT AND PREVENTION OF SEPSIS**

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Neonatal and infant sepsis remains a significant cause of morbidity and mortality worldwide, accounting for approximately 15% of neonatal deaths globally. Effective management strategies are crucial to improve outcomes and reduce antibiotic resistance. Pharmacist-led interventions have shown promise in optimizing antimicrobial therapy and enhancing patient care. To investigate the impact of pharmacist-led interventions on neonatal and infant sepsis management, focusing on incidence density, pathogen identification, antibiotic misuse, hospital stay, and mortality rates. Prospective observational study conducted in a tertiary care hospital's neonatal and pediatric intensive care units over 9 months. Patients (0-12 months) diagnosed with sepsis were enrolled. Pharmacist-led interventions included: Antimicrobial stewardship programs, Education on sepsis management and antibiotic use, Medication therapy optimization, Collaborative rounds with healthcare teams-Incidence density of neonatal sepsis: 12.6 per 1000 live births. Pharmacist-led interventions significantly improve antimicrobial therapy, sepsis management, and resistance prevention in neonatal and infant populations. Collaborative efforts between pharmacists, physicians, and healthcare professionals are essential to enhance patient outcomes and reduce the burden of sepsis.

**Keywords:** Neonatal sepsis, infant sepsis, Epidemiology

**PL-356**

**AMBISPECTIVE CROSS SECTIONAL STUDY IN THE SEVERITY OF COGNITIVE FUNCTION AND ASSOCIATED NEUROLOGICAL DISORDER WITH ITS COMORBIDITIES USING CNS DEPRESSANT MEDICATIONS**

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This Ambispective cross-sectional study investigates the severity of cognitive function and its association with neurological disorders and comorbidities in patients prescribed central nervous system (CNS) depressant medications. Given the increasing population of cognitive impairment in aging populations and the widespread use of CNS depressants, understanding their impact on cognitive health is critical. We analysed data from a cohort of patients receiving CNS depressants for various neurological conditions, including epilepsy, stroke and Parkinson disease. The cognitive function was assessed using standardized assessment scale, while the severity of neurological disorders and associated comorbidities were documented through clinical evaluations and patient case history. Our first findings or else to reveal a significance between (drug vs severity) use of CNS depressants and increased severity of cognitive impairment, and second finding to reveal a not significant between (condition with and without comorbid vs severity). Particularly in patients with pre-existing neurological disorders stroke, Parkinson's and seizure were found to exacerbate cognitive decline, suggesting a multifaceted interplay between these factors. The results indicate that while CNS depressants may provide symptomatic relief, they also carry risks of further cognitive deterioration, particularly in vulnerable populations. This study highlights the need for comprehensive assessments of cognitive function in patients using CNS depressants and calls for careful consideration of their prescribing practices. Especially in individuals with existing neurological disorders and comorbid conditions. Further longitudinal studies are warranted to establish causal relationships and inform clinical guidelines.

**Keywords**: CNS Depressant medications, Cognitive functions and Associated neurological disorder

**PL-357**

**PHARMACEUTICAL CARE ON CLINICAL OUTCOMES AND QUALITY OF LIFE FOR ISCHEMIC HEART DISEASE PATIENTS BY MEDICATION ADHERENCE IN A TERTIARY CARE HOSPITAL**

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Ischemic heart disease (IHD) is a major global health issue, causing 8.6 million deaths annually. It's influenced by factors like aging, urbanization,




ISBN: 978-81-980623-8-3

and lifestyle changes. Effective management involves lifestyle modifications, medication adherence, and regular monitoring. However, suboptimal adherence, affecting up to 50% of patients, can lead to reduced effectiveness, increased risk, higher healthcare costs, and decreased quality of life. To evaluate the impact of pharmaceutical care on medication adherence. clinical outcomes, and quality of life in patients with ischemic heart disease. Study design: Prospective, randomized controlled trial. Study location: Tertiary care hospital. Sample size: 100 patients. Inclusion criteria: Patients diagnosed with IHD. Exclusion criteria: Patients with severe comorbidities, cognitive impairment. or inability to provide informed consent. Intervention: Pharmaceutical care (patient education, medication counselling. and follow-up) provided by a clinical pharmacist. Duration: 9 months. Medication adherence: Significant improvement in the intervention group ($p < 0.01$). Clinical outcomes: Blood pressure reduction ($p < 0.05$), Lipid profile improvement ($p < 0.05$), Decrease in cardiovascular events ($p < 0.05$), Quality of life: Significant improvement in the intervention group ($p < 0.01$). Pharmaceutical care significantly enhances medication adherence, clinical outcomes, and quality of life in patients with ischemic heart disease.

**Keywords:** Ischemic heart diseases, medication adherence, quality of life.

**PL-358**

## ASSESSMENT OF EFFICACY, SAFETY AND APPROPRIATE USE OF FLIGRASTIM AND PEGFILGRASTIM AS PRIMARY PROPHYLAXIS FOR NEUTROPENIA / FEBRILE NEUTROPENIA IN CHEMOTHERAPY /PY PATIENTS A PROSPECTIVE OBSERVATIONAL STUDY

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BACKGROUND: In patients undergoing cytotoxic chemotherapy, febrile neutropenia (FN), which is caused by immunosuppression and bone marrow suppression, is a serious and potentially fatal undesirable side effect. Prophylactic use of granulocyte colony-stimulating factors (G-CSFs), such filgrastim and pegfilgrastim, has been demonstrated to improve patient outcomes, increase chemotherapy tolerance, and lower the risk of FN. OBJECTIVE: To evaluate the efficacy, safety, and appropriate utilization of filgrastim and pegfilgrastim as primary prophylaxis for neutropenia/febrile neutropenia in cancer patients undergoing chemotherapy. METHODS: Among chemotherapy patients receiving filgrastim or pegfilgrastim for primary prophylaxis, prospective observational research was conducted out. Risk variables, adverse events, hospitalization rates, FN incidence, patient demographics, and chemotherapy dose intensity were all collected. The cost-effectiveness and safety of both agents were also compared. RESULTS: Prophylactic G-CSF injection decreased hospitalization rates, supported chemotherapy at planned dose intensity, and dramatically decreased the frequency and severity of FN. Pegfilgrastim demonstrated higher convenience and increased compliance because it was administered in a single dosage, but filgrastim was more economical in some regimens. Both medications showed respectable safety profiles with few side effects. Nonetheless, there were instances of underutilization and noncompliance with the requirements. CONCLUSION: In oncology care, the study shows that prophylactic administration of filgrastim and pegfilgrastim according to guidelines efficiently prevents FN, improves treatment continuity, and lowers the socioeconomic load. Improving patient safety and treatment outcomes for chemotherapy practice requires optimizing the appropriate use of G-CSFs.

**Keywords:** Febrile neutropenia (FN), Chemotherapy -induced neutropenia, granulocyte colony stimulating factor (G- CSF), Filgrastim, Pegfilgrastim, G-CSF, Primary prophylaxis

**PL-359**

## CLINICALLY RELEVANT POTENTIAL DRUG–DRUG INTERACTIONS IN INTENSIVE CARE PATIENTS: A PROSPECTIVE OBSERVATIONAL STUDY IN A TERTIARY CARE HOSPITAL

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Drug–drug interactions (DDIs) are a critical concern in intensive care units (ICUs) due to polypharmacy and complex treatment regimens. This prospective observational study was conducted in the medical ICUs of Government General and Teaching Hospital, Rajahmundry, to evaluate the prevalence, severity, and clinical impact of potential DDIs. Data from 101 patients were collected after obtaining Institutional Ethics Committee approval and informed consent. Demographic details, comorbidities, laboratory findings, and prescribed medications were documented. Potential DDIs were identified using Lexi-Drugs and Micromedex interaction checkers, and clinically significant findings were communicated to treating physicians for necessary interventions. Among the study population, males (67%) exhibited higher rates of interactions compared to females (32%). Patients aged 60–80 years experienced the most interactions (50%). Hypertension (56%) and diabetes mellitus (50%) were the most common comorbidities associated with increased risk. Moderate interactions were predominant (65%), while major interactions accounted for 20% of cases, with a total of 74 major interactions identified. Abnormal laboratory values were noted in 33% of patients, and ICU stay was extended in 6% due to DDIs. The study concludes that DDIs are frequent among ICU patients, particularly in elderly males with comorbidities such as hypertension and diabetes. Most interactions were of moderate severity, but major interactions significantly contributed to clinical complications, prolonged ICU stays, and altered laboratory parameters. Early detection and timely intervention can optimize therapy, minimize risks, and improve patient outcomes in critical care settings.

**Keywords:** Drug–drug interactions, intensive care unit, comorbidities, polypharmacy, Lexi-Drugs, Micromedex.

**PL-360**

## STUDIES ON IMMUNOLOGICAL ACTIVITY OF IGG TOWARDS PEANUT ALLERGENS

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Chicken immunoglobulin Y (IgY), a functional analog of human IgG, is an important source of therapeutic antibodies in a scalable, non-invasive, and ethical manner. IgYs were extracted from eggs laid by white hens and tested to see their ability to recognize and neutralize major allergens of peanuts (Arachis hypogaea). IgY purity was further confirmed by SDS-PAGE analysis that showed bands at approximately 75 and 18 kDa corresponding to the heavy and light chains, respectively, with some 90% purity levels obtained by densitometry. Peanut allergens Ara h1 (~63 kDa), Ara h3 (~45–35 kDa), and Ara h6 (~14 kDa) were detected also. IgY was bound with the max sensitivity in ELISA plates at a concentration of 500 µg/mL (OD= 1.98 ± 0.12), especially from white eggs, showing specific interaction with peanut proteins. The interaction was further confirmed by Western blot analysis, which showed stronger binding of IgY to Ara h1, h3, and h6. IgY would neutralize peanut allergens by directly binding to allergenic epitopes and thus preventing their binding to allergen-specific IgE on mast cells and basophils. Such blocking will prevent cross-linking of IgE with histamine and other inflammatory mediators released, thus inducing allergic reactions. The FTIR analysis would support the structure of peanut proteins after purification, demonstrating that they can be used as antigens. These findings underline the specificity of IgYs and its promise in therapy and diagnosis of peanut allergy. Further studies are warranted in vivo for seeking a clinical application in modulating allergy.

**Keywords**: Arachis hypogaea, ELISA, FTIR, IgY, SDS PAGE, Western blotting

**PL-361**

## THYROID PATIENTS SUFFERING WITH ANXIETY AND DEPRESSION: A PROSPECTIVE INTERVENTIONAL STUDY

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ISBN: 978-81-980623-8-3

Thyroid disorders are among the most common endocrine conditions and are frequently associated with psychiatric manifestations such as anxiety and depression. This prospective interventional study assessed 150 thyroid patients using HAM-D and GAD-7 scales to evaluate anxiety and depression before and after treatment. The majority of participants were female (79%) and within the 20–40 age group, with hypothyroidism (67%) being the most prevalent condition. Findings revealed that anxiety (70.7%) and depression (72.7%) were highly prevalent, with mild to moderate severity dominating. Sleep disturbances were also commonly reported. Statistical analysis showed a positive correlation between elevated TSH levels and increased anxiety and depression scores. The results emphasize the importance of early psychiatric screening in thyroid patients and integrating mental health support with endocrine care. Routine assessments and timely interventions can significantly improve quality of life and treatment outcomes.

**Keywords:** Thyroid disorders, Hypothyroidism, Anxiety, Depression, Mental health screening.

**PL-362**

## A RETROSPECTIVE OBSERVATIONAL STUDY ON ASSESSMENT OF RISK FACTORS AND WARNING SIGNS OF STROKE AND TRANSIENT ISCHEMIC ATTACK, THE IMPACT OF THEIR PROPER RECOGNITION AND RATIONAL MEDICAL MANAGEMENT ON POST STROKE DISABILITY OF THE PATIENTS

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Stroke is a leading cause of death and disability in India. Proper recognition of risk factors and warning signs, coupled with rational medical management, is crucial for reducing the incidence of stroke and minimizing post-stroke disability.This retrospective observational study in Erode, Tamil Nadu, assessed risk factors and warning signs of Stroke and Transient Ischemic Attack (TIA) in 132 patients over six months, using standardized tools like the Rosier Scale, ABCD2 Score, and Modified Rankin Scale. Key risk factors identified were hypertension (62.12%), diabetes (52.03%), physical inactivity (42.43%), and heart disease (41.66%). Dominant warning signs included asymmetric facial weakness (98.48%), speech disturbance (94.69%), and visual field disturbances (86.37%). Ischemic stroke was more common (83.33%) than hemorrhagic stroke (16.67%), with higher incidence in females and the 41-60 age group. Effective risk factor management post-TIA was linked to delayed stroke occurrence (>7 days), and emergency treatment (62.12%) correlated with favorable outcomes, with 60.62% showing minimal disability at 28 days. The study emphasizes the importance of identifying risk factors, recognizing warning signs, and enhancing patient awareness for TIA secondary prevention to delay stroke and reduce disability.

**PL-363**

## A STUDY ON A PROSPECTIVE OBSERVATIONAL STUDY ON EVALUATING PRESCRIPTION PATTERNS OF ANTI-HYPERTENSIVE MEDICATIONS IN A TERTIARY CARE HOSPITAL

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Hypertension is a significant global public health concern that requires effective medication to prevent complications. A prospective observational study was conducted at a tertiary care hospital to analyze the prescription patterns of antihypertensive medications. The study aimed to assess adherence to clinical guidelines and identify trends in drug use. The study included 200 hypertensive patients. Of these, 80 had coronary artery disease (CAD), 55 had Cerebrovascular Accidents (CVA), 57 had chronic kidney disease (CKD), and 98 had diabetes. The patient population consisted of 101 males and 98 females. The average age for developing hypertension was found to be 53.4 years. The study also found a correlation between age and blood pressure stability, with an r-value of 0.7153. The study's findings show that Angiotensin Receptor Blockers (ARBs) were the most frequently prescribed medications, accounting for 43% of prescriptions. Beta-Blockers were next at 23%, followed by Calcium Channel Blockers (CCBs) at 22%, Diuretics at 11%, and ACE Inhibitors (ACEIs) at 1%. Monotherapy was effective in 44.5% of patients, while 55.5% required combination therapy. The study concluded that most prescriptions align with standard treatment guidelines. The prescribing trends were influenced by factors such as patient demographics, comorbidities, and physician preferences. The authors noted that regular assessment of prescription patterns, along with patient counseling and adherence to guidelines, can lead to better blood pressure management.

**Keywords:** Hypertension, Coronary Artery Disease, Calcium Channel Blockers, Angiotensin Receptor Blockers, Angiotensin Converting Enzyme, Loop Diuretics.

**PL-364**

## CLINICAL PRESENTATION AND MANAGEMENT OF CHOLELITHIASIS: A CASE-BASED APPROACH

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Cholelithiasis, characterized by the formation of gallstones within the gallbladder, is a common gastrointestinal condition with significant global prevalence. It presents with varied clinical features ranging from asymptomatic cases to severe complications such as acute cholecystitis, choledocholithiasis, and gallstone pancreatitis. Early diagnosis and appropriate intervention are essential to prevent morbidity. A 50 year-old male presented with recurrent right upper quadrant abdominal pain radiating to the scapular region, accompanied by nausea and postprandial discomfort. Physical examination revealed localized tenderness in the right hypochondrium. Laboratory evaluation showed mild leucocytosis with normal liver function tests. Abdominal ultrasonography confirmed the presence of multiple gallstones with features suggestive of chronic cholecystitis. The patient underwent elective laparoscopic cholecystectomy, which was performed successfully without complications. Histopathological findings supported chronic inflammatory changes in the gallbladder wall. The postoperative recovery was uneventful, and the patient reported complete resolution of symptoms on follow-up. This case emphasizes the importance of ultrasonography as the first-line diagnostic tool and highlights laparoscopic cholecystectomy as the gold standard treatment for symptomatic cholelithiasis. Case-based learning offers valuable insights into the clinical spectrum, diagnostic approach, and therapeutic strategies in gallstone disease, which remains a major healthcare concern.

**Keywords**: Cholelithiasis, Gallstones, chronic inflammatory changes, Laparoscopic cholecystectomy

**PL-365**

## EXPLORING POTENTIAL OF NICOTINAMIDE AS SIRT-1, CLASS III HDAC INHIBITOR IN MOUSE MODEL OF STREPTOZOTOCIN INDUCED DEMENTIA

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The present study was designed to investigate the potential of SirT1 class III HDAC inhibitor Nicotinamide in a mouse model of intracerebroventricular streptozotocin (i.c.v., STZ) induced dementia. STZ (3mg/kg; i.c.v.) was injected to induce dementia in Swiss albino mice. The Morris water maze (MWM) was employed to evaluate the effect on cognitive functions. A series of biochemical estimations such as brain total protein, brain acetylcholionesterase (AChEase) activity, brain thiobarbituric acid-reactive species (TBARS), reduced glutathione (GSH), brain myeloperoxidase (MPO) activity and brain nitrate/nitrite were performed. Histopathological studies involving H & E staining and Congo red staining of coronal brain sections were also performed to assess the beneficial effects of Nicotinamide. STZ produced significant changes in MWM performance including both escape latency time (ELT) and time spent in target quadrant (TSTQ) of the animals; indicating impairment of learning & memory. STZ treated mice exhibited a noticeable rise in brain AChEase activity, brain oxidative stress (increased TBARS and decreased GSH), brain nitrite/nitrate and a significant increase in brain MPO activity. Furthermore, the stained micrographs of STZ treated mice




ISBN: 978-81-980623-8-3

indicated pathological changes such as neutrophilic infiltration and amyloid beta (Aβ) deposition. Treatment with Nicotinamide showed substantial attenuation of STZ induced memory deficits, biochemical alterations and histopathological changes. Hence, the findings demonstrated the potential of Nicotinamide SirT 1 class III HDAC inhibitor in memory dysfunctions which may probably be attributed to its anti-cholinesterase, anti-amyloid, and anti-oxidative effects. The study concluded that SirT 1 (HDAC class III) can be explored as an important pharmacological target for dementia.

**Keywords:** Nicotinamide, STZ, HDAC, Dementia, Morris water maze.

**PL-366**

## INVIVO PHARMACOLOGICAL SCREENING OF HERBAL EXTRACTS AGAINST NEUROPATHIC PAIN

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Neuropathic Pain (NP) is defined as "Pain that is brought on by a primary nervous system lesion or dysfunction." It is majorly observed as co-morbidity with diabetes, rheumatoid arthritis and others. A few drugs are used in treatment with side effects. Recent investigations are focusing light on NP. Solanum melongena and Solanum lycopersicum are popular medicinal herbs employed for treating various diseases. The present research focuses on screening of leaves of Solanum melongena and Solanum lycopersicum for neuropathic pain. The extraction is performed using continuous hot percolation with ethanol as menstruum. The extracts are subjected for phytochemical screening in order to evaluate the type of phytoconstituent present in it. Screening for neuropathic pain property is performed using Formalin induced paw flinching behaviour and AITC induced paw oedema models. Formalin and AITC acts as inducers for neuropathic pain by stimulating TRP channels in nerves. The inflammatory volume observed in group of animals treated with Solanum melongena leaf extract at dose of 400mg/kg showed maximum activity in both the models indicating a decline in oedema and flinching behaviour compared with other extracts. A mild increase in response is observed when compared with standard values. The Solanum melongena leaf extract at dose of 400mg/kg showed good Neuropathic Pain property.

**Keywords:** Neuropathic pain, Solanum species, Formalin, AITC., paw flinching.

**PL-367**

## A STUDY ON PREVALENCE OF DRUG SENSITIVITY & RESISTANCE PROFILE IN MICROBIOLOGICALLY CONFIRMED PULMONARY TUBERCULOSIS PATIENTS IN TERTIARY CARE HOSPITAL

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In the Asian subcontinent, pulmonary tuberculosis is the most common form of the disease. While most cases can be treated with primary anti-Koch's medications, some have shown resistance, and the number of these cases is increasing. The multidrug-resistant form of pulmonary tuberculosis is not well documented in existing literature, making diagnosis and management a significant challenge for healthcare providers. A study conducted at a tertiary care hospital aimed to assess the critical issues of drug resistance in these patients. The findings highlight the ongoing challenge of drug-resistant tuberculosis (DR-TB), with notable cases of both multidrug-resistant tuberculosis (MDR-TB) and mono/poly-DR-TB. Although the majority of cases were sensitive to first-line drugs, the presence of drug resistance shows the need for continuous monitoring and surveillance to prevent the spread of resistant strains. The study found a statistically significant difference in drug resistance and sensitivity to Isoniazid (INH) based on whether the patient had comorbidities like diabetes (DM) or hypertension (HTN). A p-value of 0.003, which is less than 0.05, indicates that the observed difference between these groups is statistically significant. This research emphasizes the importance of early detection, appropriate drug susceptibility testing, and tailored treatment plans for effective management and control of tuberculosis.

**Keywords:** Tuberculosis (TB), Mycobacterium Tuberculosis, Pulmonary Tuberculosis, Diagnostic methods, Sensitivity & Resistance.

**PL-368**

## A COMPARATIVE INTERVENTIONAL STUDY ON DRUG-RELATED PROBLEMS IN GERIATRIC PATIENTS USING START/STOPP CRITERIA: ROLE OF CLINICAL PHARMACIST COUNSELING IN ENHANCING MEDICATION APPROPRIATENESS, ADHERENCE, AND QUALITY OF LIFE

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Geriatric patients are highly susceptible to drug-related problems (DRPs) due to polypharmacy, comorbidities, and age-related pharmacokinetic changes. The application of START/STOPP criteria helps identify potentially inappropriate medications (PIMs) and optimize therapy. A hospital-based pre–post comparative interventional study was conducted among geriatric outpatients (>65 years). A total of 304 patients (sample may vary) were enrolled and allocated into interventional (n=106) and non-interventional (n=72) groups. Data included demographics, medication history, pill count adherence, and WHOQOL-BREF scores. START/STOPP criteria were applied to detect PIMs, and clinical pharmacists provided individualized counseling on medications, adherence, and lifestyle modifications to the intervention group. Statistical analysis was performed using the t-test and one-way ANOVA. Overall, 183 DRPs were identified, with 133 STOPP-related and 50 START-related. DRPs were most frequent in the cardiac department and least in the urogenital/endocrine. START-related DRPs were highest in cardiac cases, while STOPP-related DRPs were most common in CNS disorders. Pharmacist intervention significantly improved adherence (pill count), reduced DRPs, and enhanced quality of life scores, particularly in physical and psychological domains. Educational status was positively associated with better knowledge and adherence ($p<0.05$). Pharmacist-led interventions using START/STOPP criteria effectively improve medication appropriateness, adherence, and quality of life in geriatrics. Integration of pharmacists into routine geriatric care can minimize DRPs and strengthen long-term clinical outcomes.

**Keywords:** START/STOPP Criteria, Medication Adherence, Quality of Life (WHOQOL-BREF), Polypharmacy

**PL-369**

## PHARMACOGENOMIC INFLUENCE OF CYP2C19 POLYMORPHISM ON CLOPIDOGREL RESPONSE IN CARDIOVASCULAR PATIENTS

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Clopidogrel requires activation by CYP2C19. Genetic polymorphisms in this enzyme influence therapeutic response, predisposing patients to thrombotic or bleeding risks. To assess the impact of CYP2C19 polymorphisms on clopidogrel response in cardiovascular patients undergoing PCI.A prospective observational study was conducted in 120 patients on clopidogrel 75 mg daily. CYP2C19 genotyping (PCR-RFLP) categorized patients as extensive metabolizers (EM), intermediate metabolizers (IM), or poor metabolizers (PM). Platelet aggregation was measured at baseline and day 7, with outcomes monitored over 3 months. Among 120 patients, 56.7% were EM, 28.3% IM, and 15% PM. Platelet inhibition was significantly lower in PM (24.6% ± 8.2) compared to EM (56.2% ± 10.1, $p<0.001$), with IM showing intermediate response (39.4% ± 9.7). Recurrent ischemic events occurred in 21% of PM, 11.7% of IM, and 4.4% of EM. Bleeding events were infrequent and not statistically significant. CYP2C19 polymorphisms significantly alter clopidogrel response, with poor metabolizers at greater thrombotic risk. Genotype-guided antiplatelet therapy may improve outcomes, highlighting the role of pharmacogenomic testing in personalized care.

**Keywords**: Pharmacogenomics, CYP2C19, Clopidogrel, Personalized Medicine.




ISBN: 978-81-980623-8-3

**PL-370**

## EVALUATION OF MUCOLYTIC ACTIVITY AND HISTAMINE-INDUCED BRONCHOCONSTRICTION INHIBITION BY A MULTI-COMPONENT HERBO-MINERAL PREPARATION

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Effective mucolytic and bronchodilatory agents are needed in respiratory care, especially for conditions marked by excessive mucus and airway constriction. This study evaluates the mucolytic efficacy of a prepared novel herbo-mineral formulation (Formulation No. 8) against acetylcysteine and assesses the bronchodilatory activity of curcumin, piperine, and suvarnasindoor combinations in isolated goat tracheal tissue. Mucolytic activity was determined by monitoring viscosity changes in a 20% egg white solution over seven days, comparing phosphate buffer control, acetylcysteine, Formulation No. 8, and an Eppendorf formulation at 12, 30, and 60 rpm. Bronchodilatory effects were evaluated by recording cumulative histamine-induced contraction responses in goat tracheal segments treated with single, dual, and triple combinations of curcumin, piperine, and suvarnasindoor. The control remained highly viscous across all measurements. Acetylcysteine progressively lowered viscosity, reaching 800 cP at 60 rpm by Day 7. Formulation No. 8 achieved greater reduction, with final values of 700 cP, demonstrating superior mucolytic action. The Eppendorf preparation showed moderate effect. In tracheal assays, the combination of curcumin, piperine, and suvarnasindoor produced the most substantial inhibition of histamine-induced contractions; other combinations exhibited partial or moderate efficacy. Formulation No. 8 displays enhanced mucolytic activity relative to acetylcysteine, and the triple formulation of curcumin, piperine, and suvarnasindoor significantly diminishes airway constriction. Multi-component herbo-mineral formulations may offer therapeutic advantages for managing mucus hypersecretion and bronchoconstrictive disorders.

**Keywords:** Mucolytic activity, Bronchodilation, Herbo-mineral formulation, Curcumin and Piperine, Goat tracheal chain assay.

**PL-371**

## ANALGESIC ACTIVITY OF PAVONIA ZEYLANICA: EVALUATED BY ACETIC ACID-INDUCED WRITHING AND EDDY'S HOT PLATE METHODS IN MICE

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Pain, an unpleasant sensory and emotional experience from tissue damage, remains challenging to manage. Traditional plants like Pavonia zeylanica, with anti-inflammatory and analgesic properties, are explored as safer alternatives. Aim is to evaluate the analgesic activity of Pavonia zeylanica using acetic acid-induced writhing and Eddy's hot plate methods and compare it with standard analgesics. Swiss albino mice (20–30 g) were divided into four groups (n=6): control, standard (Ibuprofen/Tramadol), and two test groups receiving Pavonia zeylanica extract (150 & 300 mg/kg, orally). Analgesic activity was assessed using acetic acid-induced writhing and Eddy's hot plate tests. The methods allowed evaluation of anti-nociceptive responses. Results were expressed as mean ± SEM, with statistical significance considered at $p<0.05$. The extract and standard drugs significantly ($p<0.05$) reduced acetic acid-induced writhing and hind limb stretching in a dose-dependent manner. In the hot plate test, reaction time increased dose-dependently, indicating central analgesic activity. The extract showed 33–60% inhibition of writhing, approaching the standard drug (71%), and significantly reduced pain compared to control. The ethyl acetate extract of Pavonia zeylanica showed significant dose-dependent analgesic activity through central and peripheral mechanisms, suggesting its potential as a natural pain reliever.

**Keywords**: Pavonia zeylanica, acetic acid, Eddy's hot plate, nociception, standard drug.

**PL-372**

## REDUCING DRUG-RELATED PROBLEMS AND SLOWING RENAL PROGRESSION: THE ROLE OF PHARMACIST INTERVENTIONS AND STRICT VOLUME CONTROL IN DIALYSIS PATIENTS

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Dialysis patients are highly vulnerable to drug-related problems (DRPs) due to polypharmacy, renal impairment, and multiple comorbidities. Previous studies report DRPs in 72% of dialysis patients, with inappropriate renal dosing accounting for 27% and drug–drug interactions for 23% of all cases. These problems increase hospitalization risk and accelerate renal decline. Clinical pharmacists can optimize pharmacotherapy by reducing DRPs, while strict volume control supports hemodynamic stability and preserves residual renal function. This prospective interventional study was conducted among maintenance dialysis patients. Clinical pharmacists performed medication reviews, dose adjustments, DDI screening, and individualized counseling. Strict volume control included sodium/fluid restriction education, daily weight monitoring, and tailored ultrafiltration. Outcomes measured were DRPs, adherence, dialysis adequacy, hospitalization rates, and renal progression markers. Pharmacist interventions reduced overall DRPs by 37%, particularly inappropriate dosing, and DDIs. Patient adherence improved by 23% following targeted counseling. Strict volume control achieved better blood pressure regulation, with 15% fewer intradialytic hypotension episodes and slower decline in residual renal function (mean preservation 6–9 months longer than controls). Patients receiving integrated pharmacist-led care with strict volume management had 27% fewer hospitalizations and greater clinical stability compared with standard care. Clinical pharmacist interventions effectively reduce DRPs and improve adherence in dialysis patients. When combined with strict volume control, they enhance hemodynamic stability, reduce hospitalizations, and improve renal outcomes. These findings reinforce the value of incorporating pharmacists into multidisciplinary renal care for long-term treatment success.

**Keywords:** Clinical pharmacist, drug-related problems, dialysis, strict volume control, renal progression

**PL-373**

## THE ROLE OF PHARMACIST COUNSELING IN OPTIMIZING MEDICATION ADHERENCE, LIFESTYLE MODIFICATIONS, AND DAILY LIFE OUTCOMES AMONG GERIATRIC STROKE PATIENTS: A PROSPECTIVE OBSERVATIONAL ANALYSIS

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Stroke is a leading cause of disability and mortality among the geriatric population, with recurrence rates reaching 15–30% within five years if secondary prevention is inadequate. Long-term management depends on adherence to preventive medications and lifestyle modifications, yet studies report 40–50% of patients show poor adherence. Pharmacist counseling may significantly improve therapeutic outcomes. A prospective observational study was conducted in geriatric stroke patients. Pharmacist counseling at discharge focused on medication adherence, dietary modifications, physical activity, and risk factor management. Adherence was measured by pill count at discharge and at three-month follow-up. Patient-reported daily functioning was also assessed. At discharge, 55% of patients demonstrated low adherence (<60%), 30% moderate adherence (60–80%), and only 15% high adherence (>80%). After pharmacist counseling, knowledge scores improved by 35–40%, and awareness of lifestyle modifications increased by 45%. At three months, pill count analysis showed mean adherence rising from 62% at discharge to 82%. Medication errors declined by 30%, and the proportion of high adherence patients increased to 48%. Patient-reported outcomes indicated improvements in daily mobility (+20%), dietary compliance (+25%), and routine management (+22%) compared with baseline. Pharmacist-led counseling in geriatric stroke patients significantly improves adherence, reduces errors, and enhances functional outcomes. Routine follow-up with objective adherence monitoring highlights the pharmacist's essential role in stroke care teams.




ISBN: 978-81-980623-8-3

**Keywords:** Stroke, Geriatric Patients, Pharmacist Counseling, Medication Adherence, Pill Count, Follow-up

**PL-374**

**EVALUATION OF ANALGESIC ACTIVITY OF ETHANOLIC EXTRACT OF Crossandra infundibuliformis LEAVES ON EXPERIMENTAL ANIMALS**

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This study aimed to evaluate the analgesic activity of the ethanolic extract of leaves of Crossandra infundibuliformis in experimental animals. The analgesic activity of ethanolic extract of Crossandra infundibuliformis in mice was investigated by using Eddy's hot plate and Acetic acid induced writhing method. The ethanolic extract of Crossandra infundibuliformis (200mg/kg and 400 mg/kg, p.o) was selected for boththe models. For eddy's hot plate the parameters like licking their fore or hind paws and jumping response, while in acetic acid induced model number of writhing responses were measured. The administration of the dose (200mg/kg and 400mg/kg) of ethanolic extract of Crossandra infundibuliformis produces significant reduction in the writhing response and increases basal hot plate latency period. Significant reduction in the writhing response and increase in the basal hot plate latency period of extract compared with control shows the significant analgesic activity of extract of Crossandra infundibuliformis. The extract (400mg/kg) significantly increased hot plate latency (up to 69.38% inhibition) and reduced writhings (up to 53.96% inhibition) compared to control ($P<0.001$). This dose-dependent pattern, almost equivalent to standard drugs, indicates both central and peripheral analgesic properties, likely due to detected alkaloids, flavonoids, and tannins.The outcome of the present study provides the evidence that the ethanolic extract of Crossandra infundibuliformis leaves reported to have dose dependent beneficial effect against pain.

**Keywords:** Acetic acid, Analgesic, Crossandra infundibuliformis, Eddy's hot plate

**PL-375**

**PREVENTING ACUTE MIGRAINE ATTACKS AND OPTIMIZING OUTCOMES THROUGH CLINICAL PHARMACIST INTERVENTIONS**

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Migraine is a chronic neurological disorder that significantly impairs daily functioning and quality of life, affecting nearly 15% of the global population. Poor adherence, inappropriate drug use, and lack of preventive strategies contribute to frequent acute attacks and medication overuse, which occurs in up to 30–40% of migraine patients. Clinical pharmacists, through structured interventions, have been shown to improve adherence by 20–25% and reduce drug-related problems in chronic neurological disorders. A prospective interventional study was conducted in migraine outpatients. Clinical pharmacists provided individualized care, including medication reviews, counseling on lifestyle modifications, education on avoiding medication overuse, and guidance on adherence to preventive therapy. Patients were reassessed at three months to evaluate adherence, frequency of acute attacks, use of rescue medications, and satisfaction with therapy. Pharmacist-led interventions improved adherence rates by nearly 25%, reduced medication overuse, and promoted rational drug use. Patients reported enhanced knowledge of migraine triggers and the importance of prophylaxis, leading to a 28% reduction in acute migraine episodes and fewer emergency visits. Quality of life assessments showed measurable improvement, particularly in psychological and social domains. Clinical pharmacist involvement in migraine management prevents medication overuse, reduces acute attack frequency, and improves quality of life. These findings emphasize the importance of pharmacist-led care as an integral component of comprehensive migraine management.

**Keywords:** Migraine, Clinical Pharmacist, Patient Counseling, Medication Adherence, Preventive Therapy

**PL-376**

**OPTIMIZING COPD, ASTHMA, AND COMORBIDITY CARE THROUGH PHARMACIST-LED INTERVENTIONS: IMPROVING SAFETY, REDUCING CARDIOVASCULAR RISKS, AND STRENGTHENING ADHERENCE**

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Chronic respiratory diseases such as COPD and asthma remain major contributors to global morbidity and mortality. Patients frequently present with cardiovascular disease, frailty, or cancer, complicating management. Inhaled bronchodilators are essential but have been linked to a 1.5–2-fold increased risk of cardiovascular events in heart failure patients. Polypharmacy further elevates the likelihood of clinically significant drug–drug interactions (DDIs), reported in up to 30–40% of COPD cases. COPD also worsens lung cancer outcomes, with studies showing a 20–25% higher rate of treatment interruptions and reduced survival compared with patients without COPD. Frailty prevalence in COPD is estimated at 25–32%, correlating with frequent exacerbations. Asthma has shown an association with migraine, with a 1.3–1.5 times increased risk, while smokers demonstrate 15–20% lower adherence rates and more DDIs compared to non-smokers. To address these challenges, a mixed-methods study was conducted, including a randomized controlled trial in COPD and asthma outpatients. Patients receiving pharmacist-led care—comprising medication reconciliation, DDI screening, inhaler technique training, and adherence support—achieved25% improvement in adherence and 40% fewer DDIs compared with usual care. Among those with heart failure, pharmacist monitoring during bronchodilator therapy reduced cardiovascular complications by 35%. Pharmacist integration in pulmonology care significantly enhances safety, improves adherence, reduces cardiovascular risks, and offers critical insights into the management of complex comorbidities, ultimately optimizing respiratory patient outcomes.

**Keywords:** Pharmacist intervention, COPD, Asthma, Medication safety, medication reconciliation

**PL-377**

**COMORBIDITIES IN GERIATRIC PATIENTS WITH LONG-TERM RHEUMATOID ARTHRITIS: A PROSPECTIVE CROSS-SECTIONAL STUDY**

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Rheumatoid arthritis (RA) is a chronic autoimmune disorder requiring lifelong therapy, commonly with disease-modifying antirheumatic drugs (DMARDs) and corticosteroids. With improved survival and treatment advancements, a growing population of geriatric patients now lived with RA for over three decades. In this population, prolonged disease activity and treatment exposure predispose patients to multiple comorbidities, significantly affecting quality of life and treatment outcomes. A prospective cross-sectional study was conducted among patients aged 60 years and above, who had a history of rheumatoid arthritis treatment for at least 30 years. Demographic data, clinical history, medication regimens, and comorbidities were collected through structured interviews and medical record review. The prevalence of comorbidities and their association with long-term therapy were analyzed. Comorbid conditions were observed in nearly 50% of participants. The most frequent were cardiovascular diseases (hypertension, ischemic heart disease, heart failure), metabolic disorders (type 2 diabetes, dyslipidemia), osteoporosis with fracture risk, renal impairment, and pulmonary complications such as interstitial lung disease and chronic obstructive pulmonary disease. Long-term corticosteroid use contributed to osteoporosis and diabetes, while methotrexate and other DMARDs were linked with hepatic and Hematological abnormalities. Psychological comorbidities such as depression and cognitive decline were also notable in this age group. Geriatric patients aged 60 years and above, with over 30 years of rheumatoid arthritis treatment, are highly susceptible to multiple comorbidities. Early screening, individualized therapy adjustments, and multidisciplinary care are essential to optimize outcomes in this vulnerable population.

**Keywords:** Rheumatoid Arthritis, Geriatrics, Long-Term Therapy, Comorbidities, Prospective Cross-Sectional Study




ISBN: 978-81-980623-8-3

**PL-378**

## REDUCING CARDIOVASCULAR RISK THROUGH PHARMACIST-LED CARE: EVIDENCE ON LDL-C REDUCTION, DRUG–DRUG INTERACTION MANAGEMENT, AND IMPROVED ADHERENCE

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Heart disease remains a leading cause of morbidity and mortality worldwide. Although lipid-lowering therapies are effective, many patients do not achieve target LDL-cholesterol levels due to harmful drug–drug interactions (DDIs) and poor adherence. Prior studies have shown pharmacist interventions can reduce LDL-C by 10–20%, lower DDI risk, and improve adherence by 15–25%. Evidence specific to cardiology outpatients, however, is limited. This randomized controlled trial included adults with elevated LDL-cholesterol (≥130 mg/dL) and at least one cardiovascular prescription. Participants were randomized into two groups: (1) pharmacist-led care, which involved medication review, systematic DDI screening with cardiologist feedback, personalized lifestyle and therapy counseling, and adherence tools such as pill organizers and reminder calls; and (2) routine physician care. Baseline demographics and comorbidities were comparable between groups. The primary outcome was the change in LDL-cholesterol at six months. Secondary outcomes included significant DDIs, adherence (refill records and validated self-report), LDL-C target achievement, and physician acceptance of pharmacist recommendations. Pharmacist-led care achieved an LDL-C reduction of 18–22% versus 8–12% in controls. Significant DDIs were nearly 40% lower, adherence improved by 20–25% compared with 10–12% in usual care, and two-thirds of intervention patients reached LDL-C targets versus fewer than half in controls. Physician acceptance was high (75–90%). Pharmacist-led care significantly improves cholesterol control, reduces DDIs, and enhances adherence, supporting its integration into cardiology teams.

**Keywords**: Pharmacist intervention, Cardiology, Cholesterol management, Drug–drug interactions

**PL-379**

## AN OBSERVATIONAL STUDY ON THE INCIDENCE, RISK FACTORS, AND CLINICAL CONSEQUENCES OF DRUG-RELATED PROBLEMS IN HOSPITALIZED PATIENTS RECEIVING CARDIOVASCULAR THERAPY

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Cardiovascular diseases (CVDs) often require complex therapeutic regimens, making patients highly vulnerable to drug-related problems (DRPs). The reported prevalence of DRPs in CVD patients ranges between 45–60%, largely due to polypharmacy, advanced age, and multiple comorbidities. Understanding these risk factors in real-world clinical settings is critical for improving safety and outcomes. A prospective observational study was conducted in a tertiary care hospital among patients admitted with cardiovascular conditions. Data on demographics, comorbidities, prescribed medications, and clinical outcomes were collected. DRPs were identified and categorized, and their associated risk factors were analysed. Nearly 50% of the study population experienced at least one DRP. The most common problems were drug–drug interactions (28%), inappropriate dosing in renal/hepatic impairment (21%), and non-adherence (15%). Polypharmacy (>5 drugs) and advanced age (>65 years) significantly increased risk, with odds ratios of 2.1 and 1.8, respectively. Comorbidities such as diabetes, chronic kidney disease, and hypertension further raised the likelihood of DRPs by 32%. Frequently implicated drug classes included antihypertensives, anticoagulants, antiplatelets, and statins. Unrecognized DRPs were associated with longer hospital stays and delayed recovery. The high incidence of DRPs in cardiovascular patients highlights the need for targeted interventions. Incorporating regular clinical pharmacist reviews, dose optimization, and patient education can reduce preventable DRPs and improve therapeutic outcomes in this high-risk population.

**Keywords:** Cardiovascular Disease, Drug-Related Problems, Risk Factors, Polypharmacy.

**PL-380**

## ENHANCING ADHERENCE, LIFESTYLE MODIFICATIONS, AND QUALITY OF LIFE IN ALCOHOLIC LIVER DISEASE: THE ROLE OF CLINICAL PHARMACIST INTERVENTIONS

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Alcoholic liver disease (ALD) is a leading cause of morbidity and mortality worldwide, contributing to 30–50% of chronic liver disease hospitalisations. Patients frequently face polypharmacy, poor adherence (reported as low as 40–50%), and multiple drug-related problems (DRPs). Clinical pharmacist interventions, including hepatic dose adjustments, drug–drug interaction checks, and lifestyle counselling, have been shown to reduce DRPs by 25–35% and improve adherence by 20–30% in chronic liver disease populations. A prospective interventional study was conducted among ALD inpatients. Clinical pharmacists performed individualized medication reviews, hepatic dose calculations, and provided patient-centered counselling on adherence, alcohol cessation, diet, exercise, and sleep hygiene. Outcomes included changes in DRPs, adherence, and the WHO Quality of Life (QOL-BREF) domains at admission and discharge/follow-up.Pharmacist interventions reduced inappropriate dosing and prevented potential hepatotoxic drug use. Medication adherence improved by nearly 25% post-counselling, with patients demonstrating a stronger understanding of therapy and abstinence importance. Lifestyle modifications led to higher rates of dietary compliance and alcohol avoidance. WHO QOL scores improved across all four domains, with the greatest gains observed in psychological (+20%) and social well-being (+18%). Post-hospitalisation, patients showed fewer complications and better clinical stability. Clinical pharmacist interventions significantly optimise therapy, adherence, and lifestyle modifications in ALD. Integration of pharmacists into multidisciplinary liver care enhances safety, improves quality of life, and supports long-term recovery.

**Keywords:** Alcoholic liver disease, pharmacist intervention, medication adherence, lifestyle modification, hepatic dose calculation

**PL-381**

## CHARACTERIZATION OF THE CYTOTOXIC AND ANTIOXIDANT ACTIVITIES OF WRIGHTIA TICTORIA EXTRACTS: AN IN VITRO STUDY USING NORMAL HUMAN CELL CULTURE

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This study investigates the cytotoxic and antioxidant activities of Wrightia tinctoria extracts, focusing on their potential as natural therapeutic agents against cancer. Wrightia tinctoria, traditionally used in South East Asia and Africa was subjected to sequential extraction using hexane, ethyl acetate and methanol. Phytochemical analysis revealed the methanol extract to be particularly rich in flavonoids, alkaloids and phenolic compounds which including quercetin, gallic acid and rutin. In vitro cytotoxicity assays on normal human cell lines demonstrated that the methanol extract exhibited significant dose dependent antiproliferative effects with $IC_{50}$ values decreasing from 150 µg/mL at 24 hours to 75 µg/mL at 72 hours. Complementary assays such as Trypan Blue exclusion and Propidium Iodide staining, confirmed a substantial increase in non-viable and apoptotic/necrotic cells. Furthermore, the methanol extract displayed potent antioxidant activity, inhibiting 85% of DPPH radicals and 87% of ABTS radicals. Mechanistic investigations indicated that the cytotoxic effects were mediated through the induction of apoptosis, characterized by mitochondrial membrane depolarization, activation of caspase 3 and caspase-9 and DNA fragmentation. These findings suggest a multifaceted mechanism involving reactive oxygen species generation, mitochondrial dysfunction and caspase activation. While highlighting the promising therapeutic potential of Wrightia tinctoria as a source of novel anticancer agents, the study underscores the necessity for further in vivo studies and comprehensive toxicity assessments to validate its clinical applicability.




ISBN: 978-81-980623-8-3

**Keywords:** Wrightia tinctoria, cytotoxicity, antioxidant activity, apoptosis, natural anticancer agents

**PL-382**

**CASE PRESENTATION OF DILATED CARDIOMYOPATHY: CLINICAL AND STRUCTURAL INSIGHTS.**

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Dilated cardiomyopathy (DCM) is characterized by dilation and impaired contraction of one or both ventricles, leading to systolic dysfunction and progressive heart failure. It may be idiopathic, familial, or secondary to ischemic, infectious, metabolic, or toxic causes. Clinical manifestations are often nonspecific and diagnosis requires echocardiographic and structural assessment. A 51 year old male presented with progressive exertional dyspnea, orthopnea, and episodes of palpitations for 3 months. General symptoms observed are shortness of breath for 4 months, ggeneralized weakness since 2 months and swelling of feet for 15 days. Past history revealed with no family history of cardiac disease. On examination, the patient had elevated jugular venous pressure, bilateral basal crepitations, and pedal edema. Electrocardiogram showed sinus tachycardia. Chest X-ray revealed cardiomegaly. Coronary angiography excluded ischemic heart disease. Laboratory parameters ruled out thyroid dysfunction and infectious causes. The patient was initiated on guideline-directed medical therapy including ACE inhibitors, beta-blockers, diuretics, and aldosterone antagonists. Lifestyle modification, alcohol cessation, and fluid restriction were advised. Symptomatic improvement was observed over 3 months with reduced hospital admissions. Regular follow-up was planned with repeat echocardiography. Dilated cardiomyopathy should be suspected in patients with progressive heart failure symptoms and cardiomegaly. Structural assessment via echocardiography is essential for diagnosis and management planning. Early detection, optimized medical therapy, and lifestyle modification play a crucial role in improving prognosis.

**Keywords:** Dilated cardiomyopathy, echocardiography, Coronary angiography, Lifestyle modification

**PL-383**

**CLINICAL PROFILE AND A COMPARATIVE STUDY ON THE EFFECTIVENESS OF NINTEDANIB AND CORTICOSTEROIDS IN INTERSTITIAL LUNG DISEASE AT A TERTIARY CARE TEACHING CENTRE.**

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Objectives: To study the clinical profile and effectiveness of Nintedanib and corticosteroids in Interstitial Lung Disease (ILD). Methods: A prospective cross-sectional observational study was conducted on 58 patients who met the inclusion criteria, from December 2022 to June 2023. Results: Among the 58 patients, 52% were women, with a mean age of 59 years. Common symptoms included breathlessness and dry cough. Key risk factors were occupational exposure (12%), prior tuberculosis (12%), and COVID-19 infection (10.3%). Comorbidities included rheumatoid arthritis (14%) and diabetes mellitus (17%). High-resolution computed tomography (HRCT) findings commonly revealed honeycombing with traction bronchiectasis (9%) and ground-glass opacities with honeycombing (9%). The most frequent ILD diagnoses were idiopathic pulmonary fibrosis (IPF, 29.3%) and nonspecific interstitial pneumonia (NSIP, 25.8%). IPF was the most prevalent ILD and had a worse prognosis and higher mortality rate compared to NSIP. Patients on corticosteroid therapy demonstrated a better trend in forced vital capacity (FVC) and forced expiratory volume in one second ($FEV_1$) on spirometry than those on Nintedanib. The six-minute walk test (6MWT) indicated greater improvement in the Nintedanib group (11.6 meters). Therapy response varied with ILD subtype. Conclusions: This study shows that Nintedanib is effective in fibrotic ILDs, while corticosteroids benefit inflammatory types. The findings highlight the complexity of ILD management and the need for further research to optimize treatment strategies. This work lays a foundation for evidence-based, personalized ILD care.

**PL-384**

**ROLE OF VITAMIN B12 SUPPLEMENTS IN MITIGATING PACLITAXEL – BASED CHEMOTHERAPY – INDUCED PERIPHERAL NEUROPATHY**

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Background: Chemotherapy-induced peripheral neuropathy (CIPN) is a frequent and debilitating side effect of paclitaxel. Vitamin B12 deficiency has been linked to worsened neuropathic symptoms, suggesting a potential therapeutic role for supplementation. This study evaluated the efficacy of Vitamin B12 in reducing CIPN severity in cancer patients undergoing paclitaxel-based chemotherapy. In this prospective, randomized, placebo-controlled study, 132 cancer patients receiving paclitaxel were assigned to receive either oral Vitamin B12 (1000 mcg daily) or placebo for six weeks. CIPN severity was assessed using the National Cancer Institute-Common Terminology Criteria for Adverse Events (NCI-CTCAE) and the Total Neuropathy Score (TNS). Vitamin B12 status was evaluated via methylmalonic acid (MMA) and homocysteine levels. Quality of life was measured using the EORTC QLQ-CIPN20 questionnaire. At 12 weeks, the Vitamin B12 group showed a significant reduction in CIPN severity compared to placebo ($p < 0.05$), with improvements in both TNS and NCI-CTCAE scores. Patients also exhibited significant decreases in MMA and homocysteine, indicating correction of subclinical B12 deficiency. Additionally, quality of life scores were significantly better in the treatment group based on EORTC QLQ-CIPN20 outcomes. Vitamin B12 supplementation significantly reduced the severity of paclitaxel-induced peripheral neuropathy and improved quality of life. These findings support its potential as an adjunctive therapy in managing CIPN.

**Keywords**: Paclitaxel, Vitamin B12, efficacy, neuropathy severity, quality of life.

**PL-385**

**THE EFFECT OF SILDENAFIL/ GLYCINE/COMBINATION OF SILDENAFIL AND GLYCINE AGAINST CISPLATIN AND GENTAMICIN INDUCED NEPHROTOXICITY IN RATS**

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The study was designed to investigate the effect of sildenafil/ glycine and the combination of sildenafil and glycine against cisplatin and gentamicin induced nephrotoxicity in rats. Albino Wistar rats were used in this study; cisplatin was given for 7 days i.p (7.5mg/kg) to induced kidney damage. Sildenafil, glycine and combination of sildenafil and glycine were administered continues 7th days on the 8th day animal were sacrificed; serum was separated and used for the estimation of kidney damage markers. The study was carried out the similar way were gentamicin (60mg/kg) instead of cisplatin. The study revealed the elevation in serum creatinine, serum urea and MDA. And the decrease in the level of CAT, GSH, SOD, total protein in the animal treated with cisplatin and gentamicin when compare to the normal control group. Increased in the kidney weight and decrease in the body weight was also observed in the disease control model. In tissue parameter Elevation of LPO level and decrease in the level of CAT, GSH, SOD and total protein also observed in disease control group. The histopathological findings also indicated the protection offered by sildenafil/glycine/sildenafil and glycine against cisplatin/gentamicin nephrotoxicity. In the treatment group sildenafil offered good protection. Serum urea and serum creatnine are concerned, whereas the protein content was decreased when compare to the normal control group. Glycine also offered good protection against cisplatin and gentamicin induced damage as for as serum creatnine, serum urea and total protein parameters are concerned. The combination of sildenafil and glycine also offered good protection against cisplatin induced nephrotoxicity. In the gentamicin induced nephrotoxicity also moderate protection was offered by sildenafil and glycine combination. Overall the sildenafil and glycine showed moderate protection against cisplatin and gentamicin induced nephrotoxicity. However it was interestingly to note treat the combination of sildenafil and glycine did not offer better protection when compare to them individuals effect.

**Keywords:** nephrotoxicity, cisplatin, gentamicin, sildenafil and glycine.




ISBN: 978-81-980623-8-3

**PL-386**

## INCIDENCE AND RISK FACTORS OF SURGICAL SITE INFECTIONS IN ONCOLOGIC PATIENTS: THE ROLE OF ANTIBIOTICS AND EVALUATION OF RESISTANCE

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Surgical site infections (SSIs) remain a significant complication in oncologic surgeries, contributing to increased patient morbidity and mortality. This prospective study aimed to investigate the incidence of SSIs among cancer patients, identify associated risk factors, and evaluate the impact of antibiotic usage and resistance patterns on clinical outcomes. The analysis included cancer patients who underwent surgery between January and June 2024, utilizing electronic health records for data on SSI incidence, comorbidities, antibiotic prophylaxis, and microbial resistance. Statistical tools such as chi-square tests and logistic regression were employed to identify significant associations. The overall incidence of SSIs was 16%, with the highest rates observed in patients with head and neck cancers, particularly carcinoma of the tongue. Common comorbidities among patients who developed SSIs included hypertension and diabetes. Key risk factors identified were advanced T-stage of tumors, substantial intraoperative blood loss, and prolonged surgery duration. Antibiotic usage analysis revealed that patients receiving Cefoperazone/Sulbactam had higher SSI rates compared to those administered Cefixime. Notably, 16% of the patients treated with Cefoperazone/Sulbactam exhibited antibiotic resistance.Microbiological evaluation of wound cultures demonstrated a range of resistant pathogens, including MRSA, Klebsiella pneumoniae, and Pseudomonas aeruginosa, highlighting the complex bacterial etiology of SSIs in oncology settings. The findings emphasize the need for improved antibiotic stewardship and selection protocols to counter rising antimicrobial resistance. The observed resistance to commonly used antibiotics such as Cefoperazone/Sulbactam further underscores the necessity of exploring alternative agents. Further large-scale studies are recommended to validate and expand upon these findings.

**Keywords:** SSI, antibiotic, Cefoperazone, Sulbactam, MRSA, oncologic surgeries

**PL-387**

## PHARMACOLOGICAL EVALUATION OF CHRYSIN LOADED PHYTOSOMES IN THE TREATMENT OF COLORECTAL CANCER IN WISTAR RATS

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Chrysin is a phytoconstituent which has shown potential in anticancer activity. The study aims to formulate, characterize and evaluate the cytotoxic effect of chrysin loaded phytosomes using Dimethyl hydrazine induced colorectal cancer model. Chrysin loaded phytosome was prepared by Antisolvent precipitation method. Particle size, polydispersity index, zeta potential, entrapment efficiency, melting point analysis, crystallography, scanning electron microscope and Fourier transform infrared spectroscopic analysis were carried out for the characterization to confirm the production of chrysin loaded phytosomes. Invivo parameters such as polyps count, colon weight by length ratio, haematological, biochemical estimation and histopathological examination was carried out. Chrysin loaded phytosomes displayed particle size of 93.91nm with polydispersity index of 0.29 and zeta potential -1.33 mV. The entrapment efficiency was 65.35 %. Melting point and amorphous state was revealed using Differential scanning calorimeter and X ray diffraction. Scanning electron microscopy revealed the surface morphology of chrysin loaded phytosomes and fourier transform infrared spectroscopy showed that there was no change in the molecular state in chrysin loaded phytosomes. Significant changes in polyps count, colon weight by length ratio, haematological, biochemical and histological findings was observed. This research provided indicative evidence for the therapeutic application of Chrysin loaded phytosomes in the treatment of colorectal cancer in experimental animals. Hence further investigation is required focusing on the clinical aspects of the prepared nanoformulation in the treatment of colorectal cancer.

**Keywords:** Colorectal cancer, phytosomes, nanoformulation, chrysin.

**PL-388**

## TO ASSESS THE EFFECT OF SODIUM BICARBONATE TREATMENT IN NON-DIALYSED CHRONIC KIDNEY DISEASE PATIENTS

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Metabolic acidosis is a frequent complication of chronic kidney disease (CKD) and is associated with faster progression of renal dysfunction, muscle wasting, bone disease, and poor clinical outcomes. Sodium bicarbonate supplementation is commonly used to correct metabolic acidosis, but its effect on kidney function and related outcomes in non-dialyzed CKD patients remains an area of ongoing research. Objective: To assess the effect of sodium bicarbonate treatment on kidney function, metabolic parameters, and clinical outcomes in non-dialyzed CKD patients. This study evaluates non-dialyzed adult patients with CKD who received oral sodium bicarbonate therapy. Key outcomes assessed include changes in estimated glomerular filtration rate (eGFR), serum bicarbonate levels, progression to end-stage kidney disease (ESKD), and metabolic markers. Safety outcomes such as blood pressure, edema, and electrolyte imbalance were also considered. Results: Sodium bicarbonate therapy was associated with significant improvement in serum bicarbonate levels, reduced progression of metabolic acidosis, and slower decline in eGFR compared with controls. Patients receiving therapy showed a lower risk of progression to dialysis and improved nutritional markers. Adverse effects such as hypertension and volume overload were minimal and manageable with standard care. Conclusion: Sodium bicarbonate treatment in non-dialyzed CKD patients effectively corrects metabolic acidosis and may slow the progression of kidney disease while improving metabolic outcomes. Routine use, with careful monitoring, could be considered as a safe and cost-effective adjunct in CKD management.

**Keywords**: Chronic kidney disease, Sodium bicarbonate, Metabolic acidosis, Non-dialyzed patients, eGFR, Kidney function.

**PL-389**

## ASSESSMENT AND EVALUATION OF LUTEOLIN FOR ANTIOXIDANT AND ANTICANCER ACTIVITIES: IN VITRO AND IN VIVO STUDIES IN HUMAN CERVIX ADENOCARCINOMA (HELA) MODEL

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Cancer is the second leading cause of death worldwide; this occurs when normal cells grow uncontrollably and spread to other parts of the body. Cervical cancer, which affects the cervix in women, remains a major health concern, especially in developing countries. There is a continuous need for new, effective, and safer treatments. Luteolin, a flavonoid compound found in many plants have gained attention for their potential therapeutic applications due to their antioxidant and anticancer properties. This study aimed to investigate the antioxidant potential, in vitro anticancer effects, and in vivo acute oral toxicity of luteolin using human cervix adenocarcinoma (HeLa) cell lines and animal models. Antioxidant activity was assessed using the DPPH free radical scavenging assay. In vitro anticancer activity was evaluated by treating HeLa cells with graded concentrations of luteolin, followed by MTT assay to measure cell viability, cell cycle analysis, and apoptosis induction. For in vivo safety evaluation, acute oral toxicity testing of luteolin was carried out in rodents according to OECD guidelines. Animals were monitored for mortality, behavioural changes, body weight, and organ histopathology. The results showed that luteolin exhibited strong antioxidant activity and a significant, dose-dependent reduction in HeLa cell viability in vitro. It induced cell cycle arrest and apoptosis confirmed by gene expression modulation. The acute oral toxicity study revealed no mortality or major toxicological signs at tested doses, indicating a favourable safety profile. This research demonstrates that luteolin shows potent antioxidant and anticancer activity in vitro, along with good safety margins in acute oral toxicity studies. These findings suggest that




ISBN: 978-81-980623-8-3

luteolin could serve as a promising natural therapeutic candidate against cervical cancer, warranting further preclinical and clinical investigations.
**Keywords**: Luteolin, Cervical cancer, HeLa cells, Antioxidant, Apoptosis, Acute oral toxicity.

**PL-390**

## HEPATOPROTECTIVE ACTION OF SELENICEREUS UNDATUS METHANOLIC EXTRACT IN PARACETAMOL INDUCED MALE ALBINO WISTAR RATS

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Background: Paracetamol overdose is a well-recognized cause of drug-induced hepatotoxicity, often leading to severe hepatic injury. Exploration of natural plant sources offers promising alternatives for hepatoprotection. Objective: This study investigated the hepatoprotective potential of methanolic extracts of Selenicereus undatus in paracetamol-induced hepatotoxicity using male albino Wistar rats. Methods: Hepatic injury was induced by oral administration of paracetamol (2 g/kg). Treatment groups received S. undatus extract at low (150 mg/kg) and high (300 mg/kg) doses for seven consecutive days. Biochemical assays (SGOT, SGPT, ALP, bilirubin, glucose), hematological indices, and histopathological examinations were performed. Results: Paracetamol administration produced marked elevation of SGOT, SGPT, ALP, bilirubin, and glucose, confirming liver damage. Post-treatment, both doses of S. undatus significantly reduced these parameters in a dose-dependent manner. The high-dose group showed near-normalization of liver enzymes, bilirubin reduction to 0.1–0.9 mg/dL, and glucose decrease from ~190 mg/dL (disease control) to ~120 mg/dL. Histopathological analysis further supported biochemical results, revealing severe necrosis and vacuolization in the disease control group, while treated groups demonstrated improved hepatocyte integrity and reduced cellular degeneration. Conclusion: Methanolic extract of Selenicereus undatus exhibits potent hepatoprotective activity against paracetamol-induced toxicity, likely mediated by phenolic and flavonoid constituents. The findings establish its therapeutic promise as a natural hepatoprotective agent and provide a basis for further research on bioactive compound isolation and mechanism elucidation.
**Keywords:** Selenicereus undatus, hepatoprotection, paracetamol, Wistar rats, liver injury

**PL-391**

## EPIDEMIOLOGICAL PROFILE, RISK FACTORS, AND OUTCOMES OF STROKE PATIENTS: EVIDENCE FROM A HOSPITAL-BASED OBSERVATIONAL STUDY

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Stroke remains a leading cause of mortality and long-term disability worldwide, accounting for nearly 12% of all deaths and affecting 15–20 million people annually. The burden is particularly high in low- and middle-income countries, where delayed diagnosis, limited awareness, and inadequate access to preventive care contribute to poor outcomes. Understanding the epidemiological profile of stroke patients is essential for planning effective preventive and therapeutic strategies. A prospective observational epidemiological study was conducted in a tertiary care hospital. Data were collected on demographics, stroke subtypes, risk factors, comorbidities, and outcomes in patients diagnosed with ischemic or haemorrhagic stroke. Clinical outcomes such as hospital stay, recurrence, and mortality were analysed. Among 250 stroke patients enrolled, ischemic stroke was most common (72%), followed by haemorrhagic stroke (28%). The majority were aged >60 years (65%), with a male predominance (58%). Hypertension (70%), diabetes (45%), and dyslipidaemia (40%) were the leading risk factors. Tobacco use (30%) and alcohol consumption (25%) were also significant contributors. The mean hospital stay was 8 days, with an in-hospital mortality rate of 12%. Recurrent strokes were documented in 15% of cases, predominantly among those with poor medication adherence. The study highlights hypertension, diabetes, and dyslipidaemia as major modifiable risk factors for stroke. Epidemiological insights underscore the need for early risk factor control, patient education, and continuous follow-up. Incorporating clinical pharmacists into stroke care may further reduce recurrence and improve long-term outcomes.
**Keywords:** Stroke, Epidemiology, Risk Factors, Clinical Outcomes

**PL-392**

## THE ROLE OF CLINICAL PHARMACIST COUNSELING IN ENHANCING MEDICATION ADHERENCE AMONG PAEDIATRIC EPILEPSY PATIENTS: A COMPARATIVE STUDY OF VALPROATE AND LEVETIRACETAM

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Epilepsy in children requires long-term antiseizure medications (ASMs), where adherence is crucial for therapeutic success. Valproate and levetiracetam are among the most commonly prescribed ASMs, but adherence may be affected by adverse effects, regimen complexity, and caregiver understanding. Studies indicate that non-adherence in paediatric epilepsy ranges from 30–50%, often leading to breakthrough seizures and hospitalizations. Clinical pharmacists can play a key role by counseling parents, monitoring adherence, and addressing drug-related problems. A prospective observational study was conducted in the neurology department among paediatric epilepsy patients prescribed valproate or levetiracetam. Parents received individualized pharmacist counseling on administration techniques, the importance of adherence, seizure first aid, and adverse effect recognition. Adherence was assessed at discharge and at follow-up using validated adherence scales and pill counts. Pharmacist intervention significantly improved adherence scores in both groups. Mean adherence increased from 68% at baseline to 85% at follow-up overall. Levetiracetam patients showed higher adherence (from 70% to 88%) compared with valproate (from 66% to 82%), likely due to favourable tolerability and simpler dosing. Parents reported improved understanding, reduced missed doses, and greater confidence in home seizure management. Valproate patients required closer monitoring for dose-related adverse effects, yet counseling still yielded substantial improvement. Clinical pharmacist-led parental counseling enhances adherence in paediatric epilepsy. Both valproate and levetiracetam benefit from pharmacist involvement, though levetiracetam demonstrates relatively higher adherence post-counseling. Incorporating pharmacists into paediatric neurology teams optimizes long-term epilepsy management and improves quality of life.
**Keywords:** Paediatric epilepsy, Clinical pharmacist, Valproate, Levetiracetam, Adherence, Parental counseling

**PL-393**

## EPIDEMIOLOGICAL STUDIES AND EVALUATION OF ADVERSE DRUG REACTIONS CAUSED BY INJECTION PEGFILGRASTIM

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Pegfilgrastim, a long-acting granulocyte colony-stimulating factor (G-CSF), is commonly prescribed to cancer patients receiving chemotherapy to lower the risk of febrile neutropenia. However, real-world evidence regarding its safety and adverse drug reactions (ADRs) remains limited. The present study aimed to assess the epidemiological profile, safety, efficacy, and ADRs of pegfilgrastim in cancer patients. A prospective observational study was conducted at Omega Super Specialty Hospital, Banjara Hills, for six months (August 2019 – January 2020). A total of 150 cancer patients were enrolled: 50 with breast cancer, 50 with colon cancer, and 50 with rectal cancer. Patients were followed from the first to the eighth chemotherapy cycle. Data on demographics, laboratory findings, treatment history, and ADRs were recorded using structured case report forms. Among breast cancer patients, the most frequent ADRs were leukocytosis (37%), weakness (22%), and body pains (8%). Colon cancer patients experienced leukocytosis (38%), weakness (20%), and body pains (16%), while rectal cancer patients presented leukocytosis (47%), weakness (12%), and loss of appetite (8%). ADRs typically appeared within a few days of administration and resolved within 3–4 days. No life-threatening complications were identified. Pegfilgrastim showed a favourable safety profile and effectively prevented neutropenia across cancer types. Mild to moderate ADRs




ISBN: 978-81-980623-8-3

were common but manageable and transient. Nutritional support and vigilant monitoring are recommended to optimize therapeutic outcomes.

**Keywords:** Pegfilgrastim, Adverse Drug Reactions (ADRs), Safety and Efficacy, Cancer Chemotherapy, Breast Cancer

**PL-394**

## IMPACT OF CLINICAL PHARMACIST COUNSELING ON LIPID CONTROL, MEDICATION ADHERENCE, AND QUALITY OF LIFE IN CARDIAC PATIENTS WITH HYPERLIPIDEMIA

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Hyperlipidemia is a key modifiable risk factor for cardiovascular disease, yet many patients struggle with sustaining lifestyle modifications and adhering to lipid-lowering therapies after discharge. Studies show that 30–40% of cardiac patients demonstrate poor adherence within three months, and only 50–60% achieve LDL targets with routine care. Clinical pharmacist counseling may bridge these gaps through structured education and monitoring. A prospective interventional study was conducted in cardiac patients with hyperlipidemia. At discharge, patients and caregivers received structured pharmacist counseling on diet, exercise, medication adherence, and adverse drug effect awareness, supported by diet charts and lifestyle reminder tools. Adherence was monitored using validated scales, while quality of life (WHO-QOL) was assessed at discharge and three-month follow-up. Pharmacist interventions significantly improved adherence, with mean scores rising from 65% at baseline to 85% at follow-up. Missed doses decreased by 30%, and active engagement in diet and exercise increased by 25–30%. WHO-QOL scores improved across domains, with the largest gains in psychological (+18%) and physical (+20%) well-being, reflecting reduced anxiety about cardiac risk and stronger self-care confidence. Lipid profiles showed favourable trends, with LDL-C reductions of 19% in actively counselled patients compared with minimal change in routine care. Clinical pharmacist counseling at discharge and reinforcement during follow-up enhances adherence, lifestyle compliance, lipid control, and quality of life. Integration of pharmacists into cardiac care teams supports improved outcomes and patient empowerment in hyperlipidemia management.

**Keywords:** Hyperlipidemia, Lipid control, WHO-QOL, Cardiac patients, Clinical Pharmacist.

**PL-395**

## GASTROPROTECTIVE ACTIVITY OF COUROUPITA GUIANENSIS FLOWER PETAL AQUEOUS EXTRACT AGAINST ETHANOL-INDUCED GASTRIC LESIONS IN RATS.

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Gastric ulcers are a prevalent gastrointestinal disorder linked to alcohol intake, stress, and oxidative injury. Even though conventional medications for ulcers work, they have side effects, so safer plant-based alternatives are needed. The traditional treatment for inflammatory and gastrointestinal conditions with Couroupita guianensis (Cannonball tree) has not been extensively examined for its gastroprotective potential. An aqueous extract of C. guianensis flower petals was tested in Wistar rats using the ethanol-induced gastric ulcer model. Animals were divided into four groups: normal control, ethanol-induced ulcer control, standard (omeprazole 20 mg/kg), and treatment groups receiving C. guianensis extract at graded doses (100, 200, and 400 mg/kg, p.o.). Measurements included the ulcer index, gastric volume, pH, and total acidity. Additionally, the gastric mucosa was histopathologically examined. Ethanol administration produced severe gastric lesions with a high ulcer index (7.8 ± 0.5). Treatment with C. guianensis extract significantly ($p < 0.01$) reduced the ulcer index in a dose-dependent manner (100 mg/kg: 4.2 ± 0.3; 200 mg/kg: 2.8 ± 0.4; 400 mg/kg: 1.9 ± 0.2), comparable to omeprazole (1.6 ± 0.3). In addition, the extract raised pH while decreasing gastric volume and total acidity. A histological examination showed that the gastric mucosa was protected well, with less edema, bleeding, and necrosis. Probably through antioxidant and cytoprotective mechanisms, the aqueous extract of Couroupita guianensis flower petals protects rats' stomachs from ethanol-induced gastric lesions. These results lend credence to its potential as a natural remedy for treating gastric ulcers.

**Keywords**: Couroupita guianensis, Gastroprotective activity, Aqueous extract, Ethanol-induced gastric lesions, Ulcer index, Wistar rats.

**PL-396**

## ENDOMETRIOSIS BEYOND THE PELVIS: VICARIOUS MENSTRUATION AS EXTRAPELVIC PRESENTATION

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Vicarious menstruation refers to cyclical bleeding outside the uterine cavity during the menstrual cycle. Extrapelvic endometriosis is a rare form of endometriosis, characterized by the presence of endometrial tissues in sites outsides the uterus, most commonly the pelvic cavity. When this tissue occurs in more distant parts of the body such as lungs, diaphragm, abdominal wall or even the brain and peripheral nerves it is referred to as extrapelvic endometriosis. Haemolacria or blood in tears, is a rare medical phenomenon that can occur with menstruation or in association with endometriosis defined by the presence of endometrial-like tissue in extra-uterine sites, affects around 10% of fertile women; the ocular system is one of the rarest sites it can be present in. Endometriosis usually requires a biopsy for diagnosis, and the anatomic difficulty of obtaining a biopsy of the ocular system makes ocular endometriosis diagnosis more obscure. However, few cases have been described in the literature and due to the psychological, physical, and social implications of haemolacria on the patient, treatment is of utmost importance. We reviewed the literature on ocular endometriosis and ocular vicarious menstruation with the aim to discuss the clinical presentation, necessary workup and various treatment modalities, while also shedding light on the connection between the eyes and endometriosis in general. It is hypothesised that uterine endometrial cells can travel lymphatically or haematogenously and deposit extra-uterine endometriotic lesions that bleed in response to hormonal changes in the menstrual cycle. Additionally, the conjunctival vasculature has been found to be responsive to hormonal changes due to the presence of oestrogen and progesterone receptors, causing bleeding at the corresponding sites, even without endometriotic lesions. Clinical correlation of the haemolacria with the menstrual cycle can suffice for a diagnosis of vicarious menstruation, and thus opens the possibility of treatment to provide symptomatic treatment for the patient. Evidence-based approaches to diagnosis and treatment of extra-pelvic endometriosis remain immature given the low prevalence and limited quality of research available in the literature. To gain a better understanding of extra pelvic endometriosis we reviewed the literature on ocular endometriosis and ocular vicarious menstruation with the aim to discuss the clinical presentation, necessary workup and various treatment modalities, while also shedding light on the connection between the eyes and endometriosis in general.

**Keywords:** Vicarious menstruation, endometriosis, extrapelvic, haemolacria, conjunctival vasculature, haematogenously, modalities

**PL-397**

## COST-EFFECTIVENESS ANALYSIS OF PHARMACEUTICAL CARE IN GERIATRIC PATIENTS WITH TYPE 2 DIABETES MELLITUS-A RANDOMIZED CONTROLLED TRIAL

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Pharmaceutical care is the responsible provision of drug therapy to achieve definite outcomes. From the literature review, it is found that the prevalence of diabetes and the number of older people with diabetes are high. The high prevalence of uncontrolled diabetes increases negative outcomes, such as complications, comorbidities, hospital stay, and early death; the negative outcome increases both direct and indirect costs15. Quality of life is also affected, so it is helpful to society to have any intervention that can provide a positive outcome. So, it is decided to explore the outcome of pharmaceutical care, in terms of cost of therapy, effectiveness, and quality of life in the management of type 2 DM in older people. The aim was to evaluate the effectiveness




ISBN: 978-81-980623-8-3

and cost-effectiveness of pharmaceutical care in older persons with Type 2 DM relative to usual care who are living at home and receiving repeat prescriptions, in a tertiary care Govt hospital. The objectives were to evaluate the health care expenditure by evaluating the direct costs and indirect costs in T2DM geriatric patients in a tertiary care hospital, and to evaluate the effectiveness of pharmaceutical care in terms of HbA1C, Glucose level (FBG, PPBG). The study was a randomized controlled trial registered in CTRI, with a calculated sample size of 38 in the intervention group and control group. The intervention was structured pharmaceutical care for nine months. Statistical Analysis of the results of the study revealed that structured pharmaceutical care can reduce the cost of therapy, impart a reduction in HbA1C, FBG, and PPBG. At the same time, the quality of life is also improved. At the beginning of the study, the expected outcome was a reduction in HbA1C by 0.5 to 1% in the intervention group, and we were able to obtain a reduction of 1.2%. The cost of therapy was also reduced, and a cost saving of 49 rupees per patient and a statistically significant improvement in quality of life were also obtained. By using this per-patient cost reduction of 49 Rs, we can calculate the total cost reduction of the entire state. In this study, it is proven that, in addition to a clinically effective strategy, pharmaceutical care is an economically viable strategy in the public health system. That is, pharmaceutical care is cost-effective.

**Keywords**: Pharmaceutical care, Cost-effectiveness Analysis, Geriatric Patients, Type 2 Diabetes mellitus.

**PL-398**

## REPURPOSING MICONAZOLE FOR ANTI-DEPRESSANT TREATMENT: A PRECLINICAL INVESTIGATION

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Depression is one of the most common neuropsychiatric diseases believed to cause imbalances in neurotransmitters like serotonin, norepinephrine & dopamine, which regulates mood, emotions & motivation. The present study aims to repurpose the antifungal drug Miconazole for its observed neuroprotective and anti-inflammatory properties, in the olfactory bulbectomy (OBX) induced depression in experimental animals, observing histopathological changes and biochemical parameters. OBX causes depression by inducing oxidative stress and disruption of HPA axis which leads to neuroinflammation and neurodegeneration resulting in decrease in the level of serotonin, norepinephrine, dopamine. The OBX rats showed the behavioral symptoms for depression like hyperlocomotion, anxiety, behavioral despair and anhedonia using actophotometer, open field test and sucrose preference test respectively. Miconazole was given orally at a dosage 5mg/kg and 10mg/kg, among which the 10mg/kg dosage was observed to be significantly effective and reduced the depression like symptoms in the OBX rats; the results were compared to the standard Fluoxetine. In the biochemical estimation, the dopamine and catalase levels were increased and lipid peroxidase levels decreased in the treatment group when compared with the induction and standard group. The histopathological examination showed improvement in the pyramidal cell necrosis in the treatment group when compared with the induction and standard group. In-silico study of Miconazole was performed to assess the binding affinity on 5HT and BDNF with receptors MAO-A and TrkB respectively. Miconazole showed good binding affinity towards both the receptors when compared with Fluoxetine. Thus, Miconazole can be reprofiled as a beneficial treatment for depression like condition.

**Keywords:** Depression, repurposing, olfactory bulbectomy, miconazole.

**PL-399**

## IN-VITRO AND IN-VIVO HEPATOPROTECTIVE ACTIVITY OF BIOACTIVE FRACTION OF LUDWEGIA HYSSOPIFOLIA AGAINST ETHANOL INDUCED HEPATOTOXICITY

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Among the several degenerative diseases, liver disorders have become one of the serious health troubles worldwide. In the absence of reliable hepatoprotective drug in this current modern system of medicine, traditional herbal medicine has begun to gain its popularity worldwide. The objective of the study is to evaluate the in-vitro and in-vivo hepatoprotective activity of fractions of methanolic extract of Ludwigia hyssopifolia (LHME) against ethanol induced oxidative damage in HepG2 cell lines and Wistar rats respectively. Results: The in-vitro hepatoprotective activity of different fractions of the extract, LHME, was assessed by estimating the cell supernatant for hepato specific parameters viz., Alanine aminotransferase (ALT), Lactate dehydrogenase (LDH) and Aspartate aminotransferase (AST) while the in-vivo hepatoprotective activity of the fractions of methanolic extract, LHME, was estimated on the basis of enhancement in the varied level of various serum biochemical parameters and in the alterations occurred in the histology of liver of the rats. The most effective fraction was evaluated for its in-vivo anti-inflammatory activity against Carrageenan induced inflammation in rats. Among all the fractions of LHME, butanol fraction of LHME (BF-LHME) at 50 µg/kg and 100 mg/kg were found to be the effective doses in in-vitro and in-vivo hepatoprotective methods respectively.

**Keywords:** Ludwigia hyssopifolia, HepG2 cell lines, Wistar rats, Ethanol-induced hepatotoxicity, Anti-inflammatory activity.

**PL-400**

## TECHNOLOGY-BASED APPROACHES TO TAILORED CANCER TREATMENT

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Cancer remains a leading cause of mortality worldwide, demanding innovative strategies that extend beyond conventional one-size-fits-all therapies. Recent advances in medical technology have transformed cancer management by enabling personalized and patient-cantered treatment approaches. Precision oncology, driven by genomic profiling, biomarker identification, and pharmacogenomics, facilitates the selection of therapies tailored to an individual's molecular and clinical characteristics. Artificial intelligence (AI) and machine learning algorithms are increasingly applied to analyse complex datasets, predict drug responses, and optimize chemotherapy regimens while minimizing toxicity. Additionally, companion diagnostics and next-generation sequencing (NGS) technologies support the identification of actionable mutations and resistance mechanisms, allowing oncologists to choose the most effective targeted therapies. Digital health tools, including clinical decision support systems, electronic health records, and predictive analytics, further enhance treatment planning and monitoring. These technology-based approaches not only improve therapeutic outcomes but also reduce adverse effects, improve quality of life, and promote cost-effective cancer care. Despite these advancements, challenges remain in terms of accessibility, cost, data integration, and ethical considerations. Continued research, global collaborations, and investment in digital oncology platforms are essential for the widespread implementation of technology-driven personalized cancer therapy. Overall, integrating technological innovations into oncology represents a promising paradigm shift toward more precise, effective, and patient-specific cancer treatment.

**Keywords:** Cancer treatment, precision oncology, genomic profiling, artificial intelligence, pharmacogenomics, biomarkers, targeted therapy, clinical decision support, personalized medicine.

**PL-401**

## EVALUATING MEDICAL DEVICE SAFETY AND BENEFITS IN POST-OPERATIVE GERIATRIC AND AMBULATORY PATIENTS

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Medical devices are very important in post-operative patient care because they improve clinical outcomes. However, they can also lead to negative effects, especially in vulnerable groups like older patients and those who are ambulatory. This study aimed to assess the risk-benefit ratio of medical devices by looking at adverse effects in post-operative patients, focusing on older patients (aged 65 and over) and ambulatory subgroups. We conducted a retrospective analysis of 75 patients who




ISBN: 978-81-980623-8-3

received interventions involving medical devices. We collected information on demographics, existing health conditions, types of surgeries, device usage, adverse events, recovery time, readmission, and mortality. Adverse events were reported in 16.0% of the patients. The rate was 16.67% among older patients and 14.81% among those who were younger. Ambulatory patients had fewer adverse events at 9.38%, while inpatients faced a rate of 20.93%. The average recovery time was 7.41 days, and the mean clinical score improved by 25.22 points, rising from 47.08 to 72.30. The readmission rate was 14.67%, with no recorded deaths. In general, the benefits of quicker recovery and better clinical outcomes outweighed the risks, particularly for ambulatory patients. However, older patients showed a slightly higher risk of negative events. These results support the use of medical devices in post-operative care, with careful attention to patient selection and ongoing monitoring, especially for older patients, to improve the balance of risks and benefits and increase patient safety and outcomes.

**Keywords:** Medical Devices, Adverse effects, Risk-Benefit ratio, Geriatrics

**PL-402**

## DUAL THERAPEUTIC STRATEGY FOR ALBINISM: REPIGMENTATION EFFICACY OF BANANA PEEL EXTRACT ENRICHED WITH THYROSINASE AND IMATINIB

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Albinism is a genetic disorder caused by reduced melanin production, resulting in hypopigmentation of the skin, hair, and eyes. Current treatments are limited, expensive, or carry side effects. This study explored the repigmentation effects of banana peel extract enriched with tyrosinase and the drug Imatinib using Drosophila melanogaster as a model. The banana peel–tyrosinase extract produced strong and sustained repigmentation, likely due to its natural phytochemicals, while Imatinib also showed pigmentation recovery by stimulating melanocyte activity. The banana peel–tyrosinase formulation was more effective overall, making it a safer and more affordable option. Together, natural bioactives and repurposed drugs may provide a new dual therapeutic approach for treating albinism and similar pigmentation disorders.

**Keywords**: Albinism, Banana peel extract, tyrosinase, Imatinib, Repigmentation, Drosophila melanogaster, Hypopigmentation, Dual therapy

**PL-403**

## ANTIBIOTIC PRESCRIBING PATTERNS IN A TERTIARY CARE HOSPITAL: A PROSPECTIVE STUDY

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Antibiotics are drugs used for treating infections caused by bacteria. Antibiotics are currently the most commonly prescribed drugs in hospitals worldwide. The aim of the study was to analyze the prescribing patterns of antibiotics and to observe the rational use of antibiotics. A prospective study was conducted for a period of 10 months in tertiary care hospital in Hyderabad. Prescriptions containing antibiotics were taken into consideration from patient case sheets who fitted the inclusion criteria. A total of 729 prescriptions with antibiotics were included, majority of the antibiotics prescribed to male patients with 69.5% and females patients with 30.5%. Most of the antibiotics were prescribed between the age group of 19-59. Culture test was done in only 97 prescriptions in that only 61% were positive whereas 39% negative, the most common cultures observed were urine, blood, et secretion, BAL fluid, stool with 51%, 22%, 11%, 8%, and 4%. Most common indications in this study include therapeutic (40.3%), and followed by empirical (36.4%), prophylactic (15.8%) and Unknown (7.5%). Infections that are included are UTI, RTI, and systemic infections. In monotherapy intravenous was the most common prescribed antibiotic was Ceftriaxone (50%), followed by Magnex Forte, Piptaz. In monotherapy oral route, the most common prescribed antibiotic was Augmentin (12%) at a frequency of BID. Present study concludes that the commonly prescribed antibiotics are Cephalosporins 60%, Penicillin 33%, Metronidazole 4%, Fluoroquinolones 2% and Tetracycline 1%. Irrationality of 44.03% was present in prescribing of antibiotics which was found using guidelines as comparison.

**Keywords;** Antibiotic, prescribing patterns, prescriptions, Monotherapy

**PL-404**

## A PROSPECTIVE OBSERVATIONAL STUDY ON PRESCRIPTION PATTERN OF DRUGS USED IN POLYCYSTIC OVARIAN SYNDROME AND ITS MULTIDIMENSIONAL IMPACTS ON WOMENS HEALTH

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Polycystic Ovary Syndrome (PCOS) is one of the most common endocrine disorders in women of reproductive age, often presenting with irregular menstruation, infertility, obesity, hirsutism, and emotional distress. Understanding drug prescription patterns and their multidimensional impact is crucial for improving treatment outcomes. To investigate the prescription pattern of drugs used in PCOS, evaluate multidimensional impact on women's health, and analyse the cost of therapy. A prospective observational study was conducted over six months among 86 female outpatients aged 12–53 years diagnosed with PCOS at the Gynaecology Department of Indiana Hospital and Heart Institute, Mangalore. Data were collected using a structured data collection form covering patient demographics, medical history, investigations, and details of prescribed drugs including name, class, dose, frequency, route of administration, and cost and PCOSQ 24 questionnaires was used. PCOS was most prevalent among women aged 26–32 and 40–46 years, with all patients presenting with ovarian cysts and/or fibroids. Hormonal medications were the primary choice of therapy, with DUPHASTONE prescribed in 64.28% of cases, followed by CRINA NCR 15 (68.18%) and LETROZOLE, TRAPIC MF, and PAUSE MF were also prescribed. Cost analysis revealed that most prescriptions (39.53%) fell within the ₹500–₹1500 range, while only a minority exceeded ₹3500. 29.06% of patients were emotional weak, 53.48% of patients had hirsutism, 24.41% were obese, 23.25% of patients had infertility problems 44.18% of patients had irregular menstrual cycle. Our study shows that PCOS affects women across ages, especially in their late 20s–30s and early 40s, often lasting for much of life. Many women were overweight and faced additional health issues, with a surprising number reporting urinary tract infection. Beyond medical concerns, participants shared struggles with emotional stress, unwanted hair, irregular cycles, and fertility worries, showing how PCOS impacts daily life, relationships, and self-esteem. Cultural patterns, like high marriage rates, and findings such as increased fibroids, also stood out. Overall, PCOS is a complex condition that requires holistic care addressing physical, emotional, and cultural needs.

**Keywords**: Duphastone, PCOS (polycystic ovarian syndrome), Letrozole.

**PL-405**

## PHARMACOTHERAPEUTICS STRATEGIES IN LONG COVID MANAGEMENT

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Long COVID, also known as post-acute sequelae of SARS-CoV-2 infection (PASC), has emerged as a global health challenge characterized by persistent symptoms such as fatigue, dyspnoea, neurocognitive dysfunction, myalgia, and cardiovascular complications. The complex and multisystemic nature of long COVID necessitates tailored pharmacotherapeutic strategies to improve patient outcomes. Current evidence suggests that management is primarily symptomatic, focusing on individualized treatment plans. Pharmacological interventions include the use of anti-inflammatory agents, anticoagulants, antihistamines, corticosteroids, and selective antivirals to mitigate ongoing viral activity and immune dysregulation. Additionally, neuromodulators and antidepressants have shown promise in addressing neuropsychiatric manifestations such as brain fog, anxiety, and depression. Emerging strategies target mitochondrial dysfunction and autonomic imbalance through agents like beta-blockers, ivabradine, and nutritional supplements. Immunomodulators and monoclonal




ISBN: 978-81-980623-8-3

antibodies are also being investigated for their role in reducing persistent immune activation. Despite these therapeutic approaches, evidence-based guidelines remain limited, underscoring the need for large-scale randomized controlled trials. Multimodal management, combining pharmacotherapy with lifestyle modifications, physiotherapy, and psychosocial support, is essential to address the heterogeneity of symptoms. A precision medicine approach, guided by biomarkers and patient-specific risk factors, holds the potential to optimize therapy and minimize adverse outcomes. In conclusion, pharmacotherapeutic strategies for long COVID management are evolving, with emphasis on symptom control, immune regulation, and functional recovery. Further research is vital to establish safe, effective, and standardized treatment protocols.

**Keywords:** Long COVID, pharmacotherapy, anti-inflammatory agents, antivirals.

**PL-406**

## CHRONOPHARMACOTHERAPEUTICS: ALIGNING DRUG THERAPY WITH BIOLOGICAL RHYTHMS (APPLICATIONS IN HYPERTENSION, ASTHMA, CANCER THERAPY, AND DIABETES MANAGEMENT)

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Chronopharmacotherapeutics, an emerging discipline in pharmaceutical sciences, emphasizes the alignment of drug administration with the body's intrinsic biological rhythms to maximize therapeutic outcomes and minimize adverse effects. The circadiac rhythm, governed by the suprachiasmatic nucleus, influences physiological processes such as hormone secretion, blood pressure, lung function, glucose metabolism, and cell proliferation. In hypertension management, evening or bedtime dosing of certain antihypertensives has shown improved blood pressure control and reduced cardiovascular risk compared to morning dosing. Similarly, asthma symptoms typically worsen during the night or early morning, and chronotherapy with inhaled corticosteroids or bronchodilators enhances symptom relief and lung function during these critical periods. In cancer therapy, chronomodulated chemotherapy leverages circadian-dependent variations in tumor cell proliferation and host tolerance, improving therapeutic index while reducing toxicity. Diabetes management also benefits from chronotherapeutic strategies, as insulin sensitivity and glucose tolerance vary across the day; tailored dosing schedules of antidiabetic agents enhance glycemic control and lower complications. Despite its clinical promise, challenges such as interindividual variability in circadiac rhythms, limited clinical trials, to widespread application. Future research integrating chronobiology, personalized medicine, and digital health tools holds potential to revolutionize treatment paradigms. Chronopharmacotherapeutics thus represents a pivotal step toward precision therapy, offering safer, and more effective and time-optimized management of chronic diseases.

**Keywords**: Chronopharmacotherapeutics, Circadian rhythm, Hypertension, Asthma, Cancer therapy, Diabetes management, Chronotherapy.

**PL-407**

## CENTRAL HISTAMINE COUNTERACT ANTI-COMPULSIVE ACTIVITY OF VERAPAMIL AND AMLODIPINE IN MARBLE-BURYING BEHAVIOUR MICE

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Obsessive–compulsive disorder (OCD) is a disabling neuropsychiatric condition with limited pharmacological treatments. While serotonergic modulation remains central to therapy, the role of calcium signaling and histaminergic neurotransmission in compulsive behavior requires further exploration. The present study investigated the effects of the calcium channel blockers verapamil and amlodipine, as well as histaminergic agents, in the marble-burying test (MBT) in mice. Intracerebroventricular administration of verapamil (5 or 60 µg/mouse) and amlodipine (10 or 60 µg/mouse) significantly reduced marble burying, suggesting anti-compulsive-like activity. Independent administration of histamine (0.1–10 µg/mouse), its precursor L-histidine (1 or 2.5 µg/mouse), the H3 receptor antagonist/inverse agonist thioperamide (0.5–2 µg/mouse), the H1 agonist FMPH (2 µg/mouse), and the H2 agonist amthamine (0.1–0.5 µg/mouse) also attenuated marble-burying behavior. However, combination studies revealed complex interactions: histamine and thioperamide reversed the anti-compulsive effects of both verapamil and amlodipine, while L-histidine potentiated the effect of verapamil but not amlodipine. Neither FMPH nor amthamine significantly altered CCB-induced responses. These findings indicate that although CCBs and histaminergic agents each independently reduce compulsive-like behavior, their combined actions do not yield synergistic benefits, and in some cases diminish efficacy. The contradictory result suggests that CCBs may attenuate the compulsive-like behavior by decreasing central histamine release, and that enhanced histaminergic tone can counteract their effects. The lack of involvement of H1 and H2 receptors points to a more intricate mechanism, potentially mediated by presynaptic H3 receptors. Overall, this study highlights calcium channel blockade as a potential therapeutic strategy for compulsive behavior and underscores histamine's critical modulatory role.

**Keywords:** Obsessive compulsive disorder; Compulsive-like behavior; Marble-burying test (MBT)

**PL-408**

## EVALUATION OF ANTIHYPERLIPIDEMIC ACTIVITY OF ETHANOLIC EXTRACT OF JUSTICIA TRANQUEBARIENSIS LEAVES IN HIGH FAT DIET INDUCED IN WISTAR RATS

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The aim of the current study was to evaluate the antihyperlipidemic activity of ethanolic leaves extract of Justicia tranquebariensis using high fat diet induced in albino Wistar rats. The leaves of the plant Justicia tranquebariensis are one of the richest sources of phytosterols flavonoids that have been shown to possess a variety of biological activities like antioxidant, hepatoprotective, anthelmintic, cardioprotective, antiulcerogenic, bronchial asthma, anti-arthritic and antimicrobial activities. The phytochemical analysis revealed the presence of phytosterols flavonoids compounds. Hence the present research was aimed to study the antihyperlipidemic activity of the ethanolic extract of leaves of Justicia tranquebariensis using high fat diet induced in albino Wistar rat. In the assessment of hyperlipidaemia induced by feeding high fat diet in rats, 30 rats were divided into 5 groups. Group I served as normal control group and Group II disease control group which received only high fat diet (ghee) on 28 days respectively while Group III was the treated group with standard drug (Atorvastatin 10mg/kg, p.o). Group IV and V served as the test groups, which was treated with 200 and 400mg/kg body weight per day of Justicia tranquebariensis, and treatment was given for 28 consecutive days. On the 29th day, blood samples were taken for biochemical estimation. The rats treated with ethanolic extract of leaves of Justicia tranquebariensis showed significant antihyperlipidemic activity induced by high fat diet in rats and rat models as evident by a decrease in elevated levels of serum TG, TC, LDL, VLDL and HDL and calculated statistically to evaluate the antihyperlipidemic effect in high fat diet of Justicia tranquebariensis linn and the high dose 400mg/kg body weight of Justicia tranquebariensis linn was found to be more effective than the low dose 200mg/kg body weight of Justicia tranquebariensis linn. High dose of ethanolic extract of rhizomes of Justicia tranquebariensis linn possess significant antihyperlipidemic activity against high fat diet. Thus, Justicia tranquebariensis linn possess antihyperlipidemic activity induced by high fat diet in rats.

**Keywords:** Justicia tranquebariensis linn, Total Cholesterol, Triglycerides, High Density Lipoproteins, Low density lipoprotein, Very low density lipoprotein.

**PL-409**

## A COMPARATIVE STUDY TO ASSESS THE EFFICACY AND SAFETY OF BILASTINE VERSUS FEXOFENADINE FOR TREATMENT OF CHRONIC URTICARIA

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ISBN: 978-81-980623-8-3

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Chronic urticaria is a long-standing skin disorder that is widely treated with second-generation antihistamines, necessitating a comparative analysis of two majorly prescribed antihistamines, bilastine and fexofenadine. The objective of this study was to compare and evaluate the efficacy and safety profile of both the drugs using validated tools such as the Urticaria Activity Score (UAS) and Dermatology Life Quality Index (DLQI), along with the occurrence of established adverse events associated with both the drugs. A prospective observational study was conducted, involving 73 patients diagnosed with chronic urticaria. Each patient was observed for periodic reduction in symptoms over the duration of 4 weeks along with overall quality of life assessment before and after treatment. The primary effectiveness evaluation using UAS revealed a significant reduction in scores over baseline to week 4 in both the treatment groups; however, bilastine consistently produced a greater reduction in UAS at all follow-up intervals, with a statistically significant difference of $p<0.001$. The secondary effectiveness evaluation using DLQI showed notable improvement in quality of life in both categories; however, bilastine showed numerically greater benefit, but the in-between group difference did not reach statistical significance ($p<0.05$). The safety analysis indicated infrequent, mild and even distribution of adverse events in both categories with no statistically significant difference in safety outcomes, suggesting favourable tolerability profiles in both. These results convey preferential use of bilastine for rapid symptom control; however, both drugs improved disease severity and quality of life.

**Keywords**: Chronic Urticaria, Bilastine, Fexofenadine, Urticaria Activity Score, Dermatology Life Quality Index.

**PL-410**

## ASSESSMENT REGARDING SLEEPING DISORDERS AND THEIR EFFECTS IN YOUNG ADULTS OF THIS GENERATION

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In the present generation, sleeping disorders are becoming increasingly common due to lifestyle and environmental changes can be occur. Excessive use of smartphones and digital device at night disrupts the circadian rhythm by delaying the melatonin release. Irregular sleep, psychological stress, irregular work schedules it can further disturb the natural sleep cycles. some environmental factors also influence it. Unhealthy lifestyle habits such as intake of excessive caffeine and alcohol use worsen the problem. They cause not only tiredness but also cause serious long term health issues. These factors make the adults leading to fatigue, poor concentration in daily activities, mood disorders may occur, long term risk of cardiovascular and other metabolic disorders. These sleeping disorders can managed by avoid screen time at least 1 hour before bed, maintain a fixed sleep. Stress management therapies like yoga practice, meditation deep breathing or relaxation techniques etc. Insomnia, Apnea , Circadian rhythm disorder, parasomnias these are common sleeping disorders are mainly seen in young adults. The survey highlight that majority of adults suffer from sleeping disorders due to digital life style, stress, irregular habits.

**Keywords:** Sleeping disorders, Stress, Circadian rhythm, Fatigue, Insomnia

**PL-411**

## ORGANOIDS IN BIOMEDICAL RESEARCH: EMERGING PLATFORMS FOR DEVELOPMENT, DISEASE MODELING, AND THERAPY

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Organoids have emerged as transformative three-dimensional (3D) culture systems that closely recapitulate the architecture and function of human tissues. Derived from pluripotent or adult stem cells, organoids offer unprecedented opportunities to model developmental biology, unravel disease mechanisms, and accelerate translational research. Unlike conventional two-dimensional cell cultures, organoids mimic in vivo microenvironments, allowing researchers to study cellular heterogeneity, stem cell niche dynamics, and organ-level physiology with remarkable fidelity. In disease modeling, organoids have provided insights into cancer progression, infectious diseases, and genetic disorders by enabling patient-specific and genotype-phenotype investigations. Their applications in regenerative medicine are equally promising, where organoid-derived tissues hold potential for transplantation and functional recovery. In drug discovery and personalized medicine, organoids enable high-throughput screening, prediction of patient-specific drug responses, and reduction of animal testing. Furthermore, integration of organoid technology with CRISPR-Cas genome editing, single-cell sequencing, and microfluidics ("organ-on-a-chip") enhances their utility for precision therapeutics. Despite these advances, challenges remain in terms of standardization, scalability, vascularization, and regulatory pathways for clinical translation. Addressing these limitations will be critical to harnessing organoids as reliable platforms for next-generation biomedical research and therapeutic interventions.

**Keywords**: Organoids; Stem cells; Disease modeling; Precision medicine; Drug discovery; Regenerative medicine; 3D culture; Therapeutics

**PL-412**

## A PROSPECTIVE OBSERVATIONAL STUDY ON PRESCRIPTION PATTERN OF VARIOUS SKIN DISEASES IN DERMATOLOGY OUTPATIENT DEPARTMENT

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Healthy and attractive skin plays an important role in most people's self-esteem. Skin diseases, however more common worldwide, research on skin diseases is more crucial than ever. Skin conditions have an impact on people of all ages and their quality of life. The prevalence of skin disorders has made it necessary to conduct prescription evaluations of medications in order to maximize therapeutic efficacy and minimize side effects. Evaluating the drug prescription trend was the study& goal. Evaluation of prescribing patterns is one of the key tools for encouraging the responsible use of medications. A prospective and observational study was conducted over a period of 6 months in a tertiary care hospital in Dermatology Department at Prathima Institute of Medical Science. Data was collected through data collection form which includes demographic details of patient, symptoms, diagnosis and prescription pattern in this study, we studied about prescribing pattern analysis of Various drugs given to Various Skin Diseases. A total number of 150 patients out of which were 67 males and 83 were females. The most common disease pattern seen in patients was primarily Tinea 28% followed by Scabies 13.33%, Dermatitis 9.33%, psoriasis 9.33%, Urticaria 6%. Female patients are mostly affected with Tinea infections, Urticaria, Xerosis, Acne comparing to Male patients. Male patients are mostly affected with Psoriasis and Scabies compared to female patients. The most common Prescription pattern seen in patients was primarily Antihistamines 31.08% followed by Antifungal 20.46%, Corticosteroids 12.40%, antibiotics 5.44%, Antiscabicides 5.18%. Female patients are mostly prescribed comparing to male patients. In the end, a drug utilization study can be a useful tool in promoting rational and economical drug prescription practices. From our study we found out that tinea (28%) and Scabies (13.33%) were more common in this region and Antihistamines were most commonly prescribed group of drugs (31.08%).

**Keywords:** Drug utilization, Dermatology, OPD, Prescribing pattern, Skin diseases, Tinea

**PL-413**

## EVALUATION OF ANTIFUNGAL EFFECT BY SYNERGISTIC ACTIVITY OF ITRACONAZOLE AND TITHONIA DIVERSIFOLIA PLANT EXTRACT IN DIABETIC MICE MODEL.

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The present study was carried out to evaluate the efficacy on Evaluation of antifungal effect by synergistic activity of Itraconazole and Tithonia diversifolia plant extract in diabetic mice model. A preliminary




ISBN: 978-81-980623-8-3

phytochemical test of leaf extract was performed. Swiss Albino mice were used, and streptozotocin was given to induce diabetes. Mice were inoculated by placing cotton wool balls saturated with the suspension of Candida albicans sublingually. Leaf extract and Itraconazole were given orally for 14 days at a 3:1 ratio. The synergistic antifungal activities were studied by using a diabetic mice model and histo pathological studies. The zone of inhibition and MIC level of the fungus were assessed. The ethanolic leaf extract of Tithonia diversifolia and Itraconazole with a dose of 3:1 ratio demonstrated a substantial dose-dependent recoverywith a decrease in transfer latency and an increase in percentage changes compared to the illness and control groups. The antifungal activities in terms of MICs of Itraconazole, extract, Itraconazole in combination, and extract in combination were (1.442, 8.336, 0.690, and 2.344) mg/ml respectively. The combination showed synergetic activity as illustrated by the FIC index of 0.759. Based on the present study results it may be concluded that the ethanolic leaf extract of Tithonia diversifolia and Itraconazole has significant antifungal activity.

**Keywords**: Antifungal, Microbial Inhibitory concentration, Itraconazole Inhibition concentration

**PL-414**

## EVALUATION OF SYNERGISTIC ANTIFUNGAL ACTIVITY OF FLUCONAZOLE AND CASSIA TORA LEAF EXTRACT IN DIABETIC MOUSE MODEL INDUCED WITH CANDIDA ALBICANS

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Oral candidiasis is a prevalent and manageable oral mucosal infection that is commonly observed in individuals with diabetes and HIV infection or acquired immune deficiency syndrome (AIDS). The current study was conducted to evaluate the synergistic antifungal activity of fluconazole and cassia tora leaf extract in diabetic mouse model induced with candida albicans. Swiss Albino mice were used, where streptozotocin was given to induce diabetes. Mice were inoculated by placing cotton wool balls saturated with suspension of Candida albicans sublingually. Leaf extract and fluconazole were given orally for 14 days at a 3:1 ratio. The synergistic antifungal activities were studied by using diabetic mice model and Cell viability %. A minimum inhibitory concentration (MIC) and FICI of leaf extract and the medication fluconazole was determined by In- vitro tests. The ethanolic leaf extract (ELE) of Cassia tora (CT) and fluconazole with a dose of 500 mg/kg + 3.3mg/kg, and 1000 mg/kg + 9.9 mg/kg in 3:1 ratio demonstrated a substantial dose dependent recovery with a decrease in transfer latency and an increase in percentage changes compared to the illness and control groups. Therefore, the study concludes that the ELE of CS and FZ has significant synergistic antifungal activity.

**Keywords**: Oral candidiasis, Cassia tora leaf extract, fluconazole, streptozotocin, candida albicans

**PL-415**

## ASSESSMENT OF DRUG USE EVALUATION IN MYOCARDIAL INFARCTION IN A TERTIARY CARE HOSPITAL

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Myocardial infarction (MI) is a major cause of death and disability worldwide. The risk of acute MI increases progressively throughout life. The study aimed to assess the current practice patterns in pharmacotherapy for myocardial infarction in adult patients and the effect of patient related variables on the treatment and patient outcome. The present study of 105 patients during the period of December 2024 to May 2025 indicates that a majority of the patients who were admitted with MI were males (70.48%). The mean age of the study population was 54.34±12.4 years. The major risk factor was hyperlipidaemia with an occurrence of 33.33%. The majority of patients suffered with inferior wall MI. Left ventricular dysfunction (44.76%) was the major co-morbidity in this study. The drug usage pattern was antiplatelets 98.10%, statins 98.10%, aspirin 97.14%, thrombolytics 53.33%, anticoagulants 95.24%, beta blockers85.71%, ACE inhibitors 68.57%, calcium channel blockers 14.29% and nitrates were 38.10% of patients. Men are highly affected than the women. Hyperlipidemia and smoking was the major risk factors of MI. Most of the patients were affected by infarction of inferior wall of coronary artery. In this study the mortality rate is found to be 1.90% so patient care is an important factor in reducing mortality and also in improving the outcome of MI patients.

**Keywords:** Myocardial infraction, Hypertension, Antiplatelets, Statins

**PL-416**

## MOLECULAR MARKERS BASED IDENTIFICATION AND DIVERSITY ASSESSMENT OF WITHANIA CULTIVARS WITH COMPARATIVE ASSESSMENT OF PHARMACOLOGICAL ACTIVITY

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The genetic diversity among five commercially released cultivars of Withania somifera (JA-20, JA-134, RVA-100, Poshita and Pushti) was evaluated and correlated with phytochemical and therapeutic potential to identify the elite variety that can be utilized in pharmaceutical and nutraceuticals.The genetic diversity was analyzed in 21 accessions using ten sets of each RAPD **and** ISSR primers. RAPD produced 108 polymorphic bands (90%) with an average of 13.33 bands/primer, while ISSR generated 83 (76.14%) averaging 12.11 bands/primer. The mean PIC values were 0.734 (RAPD) and 0.693 (ISSR), indicated high marker informativeness. UPGMA divided 21 accessions into two major clusters with JA-20 forming a separate cluster, showing significant genetic diversity. Total Withanolide content in hydro alcoholic root extracts quantified using reverse phase HPLC (acetonitrile (40%) and 0.1% acetic acid in water (60%) in isocratic mode as mobile phase at 230 nm), followed order of JA-20>Poshita>Pushti>JA-134>RVA-100. Extracts exhibited notable morphological difference in THP-1 cells, especially JA-20 followed by Poshita and Pushti; and suppressed LPS-induced IL-12, IL-23 and TNF-α expression and significantly reduced serum IL-1β and TNF-α while improved 96-h survival in mice. In silico analysis showed that Withanolides inhibit the TIRAP–BTK–PKCδ interaction, thereby attenuating LPS-induced inflammation. These findings establish that molecular marker techniques are appropriate for studying genetic diversity, with JA-20 as the most elite variety forming a distinct cluster, showing highest Withanolides and anti-inflammatory activity through upstream inhibition of TIRAP–BTK–PKCδ interaction establishing the mechanism of action**.**

**Keywords:** Cultivars, Withanolides, TIRAP, Withania, genetic diversity, RAPD, ISSR.

**PL-417**

## PHARMACOLOGICAL EVALUATION OF CITRUS FRUIT JUICES AGAINST UV-INDUCED PSORIASIS IN RATS: ROLE OF PDE4 AND ANTIOXIDANT ENZYMES

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Psoriasis is a chronic autoimmune inflammatory disorder marked by keratinocyte hyperproliferation, immune dysregulation, and oxidative stress. Excessive reactive oxygen species (ROS) generation disrupts antioxidant defence, leading to lipid peroxidation and cytokine release, while overactivation of phosphodiesterase-4 (PDE4) lowers intracellular cAMP, amplifying inflammation. Targeting oxidative stress enzymes and PDE4 signalling thus represents a promising therapeutic approach to manage psoriasis like condition. This study investigated the anti-psoriatic effects of Citrus sinensis (orange) and Citrus limon (lemon) juices in UV-induced psoriasis rat model. Molecular docking of citrus phytoconstituents like Hesperidin and Naringenin displayed the high and favourable affinity for PDE4 (-12.3 and -9.2 kcal/mol) compared to standard ligands (-9.7 kcal/mol), supporting its role in attenuating PDE4-mediated cAMP degradation and subsequent pro-inflammatory cascades. In vivo, UV exposure significantly elevated PASI scores (3.33 ± 0.52), hydroxyproline (0.90 ± 0.01 µg/50 mg tissue), malondialdehyde (281.0 ± 1.77 nmol/mg protein), WBC count (31,158 ± 675.3 cells/mm$^3$),




ISBN: 978-81-980623-8-3

and CRP (1.32 ± 0.02 µg/ml), while catalase activity declined (0.83 ± 0.01 nmol $H_2O_2$). Citrus juice treatment reversed these changes, with the orange-lemon combination showing the greatest effect: PASI 1.50 ± 0.55, hydroxyproline 0.29 ± 0.02, catalase 2.15 ± 0.03, MDA 119.7 ± 2.21, WBC 16,373 ± 404.1, and CRP 0.42 ± 0.02. Histopathology confirmed normalization of epidermal structure. In conclusion, citrus juices, particularly the orange-lemon combination, exerted strong anti-psoriatic activity by restoring antioxidant enzymes and inhibiting PDE4 signalling. Their dual action on oxidative stress and PDE4-driven inflammation highlights their potential as safe, natural adjuncts in psoriasis management.

**Keywords:** Psoriasis, Hesperidin, Naringenin, UV-induced psoriasis model, PDE4, Oxidative stress

**PL-418**

## ECOPHARMACOVIGILANCE: TOWARD A GLOBAL REGULATORY FRAMEWORK

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Pharmaceuticals, while essential for human and animal health, are increasingly recognized as emerging environmental contaminants. The persistence of active pharmaceutical ingredients (APIs) in soil, surface water, and drinking water has raised concerns regarding ecological toxicity, antimicrobial resistance, and potential long-term risks to human health. Ecopharmacovigilance (EPV), defined as the science and activities relating to the detection, assessment, understanding, and prevention of adverse environmental effects of pharmaceuticals, has emerged as a critical component of sustainable healthcare. Despite growing awareness, global regulatory approaches to EPV remain fragmented, with considerable variation in monitoring, risk assessment, and mitigation strategies. The European Union has integrated environmental risk assessments into the marketing authorization process, while other regions rely on limited or voluntary guidelines. However, the absence of a harmonized global framework hinders effective management of pharmaceutical residues across borders. This study examines the existing regulatory landscape and proposes the development of a unified EPV framework emphasizing three pillars: (1) Risk Assessment and Monitoring – strengthening environmental surveillance systems for APIs; (2) Regulatory Harmonization – aligning international guidelines to ensure consistent risk evaluation and control; and (3) Stakeholder Engagement – fostering collaboration among regulatory agencies, pharmaceutical industries, healthcare providers, and the public. A globally coordinated EPV framework would not only mitigate environmental hazards but also enhance pharmaceutical stewardship, safeguard ecosystems, and support the United Nations Sustainable Development Goals (SDGs). Advancing such a framework is vital to address the complex intersection of pharmaceuticals, environment, and public health.

**Keywords:** Ecopharmacovigilance, pharmaceuticals in environment, global regulation, environmental risk assessment, sustainable healthcare

**PL-419**

## Nutritional Intervention with HG and FG Seeds in Pre-Diabetes: Evidence from a Wistar Rat Model

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The present study investigates the effects of a high-fat high-sugar (HFHS) diet-induced pre-diabetic model in Wistar rats and evaluates the potential of HG and FG seeds as dietary supplements in preventing the progression of pre-diabetes to diabetes. Pre-diabetes was successfully induced in rats using an HFHS diet, leading to key physiological alterations such as elevated fasting blood glucose (FBG), abnormal lipid profiles, and impaired glucose tolerance observed during the oral glucose tolerance test (OGTT). These changes closely mimic the clinical and pathophysiological characteristics of human pre-diabetic conditions, validating this model as a reliable tool for testing antidiabetic interventions. Supplementation with HG and FG seeds produced significant improvements in glucose metabolism and lipid parameters in pre-diabetic rats. Regular consumption of these seeds lowered FBG levels, improved lipid profiles, and enhanced glucose tolerance. These findings suggest that HG and FG seeds may play a beneficial role in modulating insulin sensitivity and supporting overall metabolic health. In conclusion, this study supports the efficacy of the HFHS diet-induced pre-diabetic model and highlights the therapeutic potential of HG and FG seeds as natural, food-based interventions to delay or prevent the onset of type 2 diabetes. Further research into the bioactive compounds of these seeds and their mechanisms of action could provide deeper insights. Incorporating such functional foods into daily diets may represent a cost-effective and accessible strategy for diabetes prevention.

**Keywords:** Pre-diabetes, High-fat high-sugar (HFHS) diet, Wistar rats, HG and FG seeds, Type 2 diabetes prevention.

**PL-420**

## CASE STUDY ON CELLULITIS IN 60 YEARS MALE: DIAGNOSIS, MANAGEMENT AND PATIENT COUNCELLING

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Cellulitis is a common bacterial skin and soft tissue infection characterized by localized erythema, swelling, warmth, and tenderness. It is often caused by Streptococcus pyogenes or Staphylococcus aureus and may lead to systemic complications if untreated. We present the case of a 50-year-old male with painful swelling and redness over the left lower limb for five days, associated with fever and malaise. Clinical examination revealed diffuse erythema, edema, and tenderness. Laboratory investigations showed leukocytosis and elevated CRP. The patient was treated with intravenous antibiotics, analgesics, and supportive care, leading to gradual resolution of symptoms. This case highlights the importance of prompt recognition, appropriate antimicrobial therapy, and supportive management to prevent complications and ensure complete recovery.

**Keywords:** Cellulitis, skin infection, antibiotics, case study

**PL-421**

## KNOWLEDGE, ATTITUDE AND PRACTICE TOWARDS THE USE OF VITAMINS AND DIETARY SUPPLEMENTS AMONG GERIATRIC POPULATION

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The research was done in relation with the beneficial effects that older adults get while administering vitamins and supplements. Vitamins and supplements are widely used among the population irrespective of the age category. Here, the research is based on intake in older adults as they comes under the category who needs regular supplements for the maintenance of their health, for energy boosting and to prevent diseased conditions. A wide range of usage of vitamins and supplements are seen in older adults, mainly multivitamins which is more commonly consumed among the population.The beneficial effects are a lot more as they lack vitamins as well as other nutritional supplements due to the poor absorption of these elements from the diet they consume. The supplements to be given differ from person to person based on their health and lifestyle and it should be taken special care while prescribing supplements in order to prevent its misuse. A survey is taken in order to understand about the usage of the same among older population. The study concludes that the intake of vitamins and supplements in older adults are having a great prevalence in the current era with beneficial effects of it.

**Keywords:** Vitamins, Supplements, Older Adults, Beneficial effects.

**PL-422**

## EVALUATE THE SYNERGISTIC EFFECT OF ROSMARINIC ACID & QUERCETIN FOR PAIN MANAGEMENT

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ISBN: 978-81-980623-8-3

Pain is a physical discomfort ranging from mild to severe usually caused by injury, illness or nerve condition. Pain may arise from wide range of causes, categorized broadly into injuries, diseases and functional pain syndromes. Pain categorized into acute, chronic, neuropathic and nociceptive. It can be managed by various forms of combination with major side effects. So, the synergistic effect of Rosmarinic acid and quercetin can improve the pain relief effect, wound healing specially for chronic pain. Rosmarinic acid from Basil (Ocimum basilicum), Indian Borage (Plectranthus amboinicus), these are mainly from Lamiaceae family. It inhibits COX-2, LOX, and pro-inflammatory cytokines (TNF-α, IL-1β) and reduces inflammation around the wound, preventing excessive swelling and pain. Also inhibits the growth of bacteria and fungi at the wound site, lowering the risk of infection. Quercetin is a flavonoid from Allium cepa (Amaryllidaceae), Phyllanthus Nuri (Phyllanthaceae). It inhibits enzymes like cyclooxygenase (COX) and lipoxygenase, which are involved in inflammation, reduces levels of pro-inflammatory cytokines such as TNF-α, IL-6, and IL-1β. Influences pathways involved in nociception (pain perception), potentially providing relief in conditions like joint pain or muscle soreness. Also exhibits antibacterial, antiviral, and antifungal effects, inhibit the growth of certain pathogens, reducing infection risks.

**Keywords:** Pain management, synergistic effect, Rosmarinic acid, Quercetin

**PL-423**

## A COMPARATIVE STUDY BETWEEN THE EFFICACY OF CLOMIPHENE CITRATE AND LETROZOLE FOR THE INDUCTION OF OVULATION IN PATIENTS WITH PCOD AND PRIMARY INFERTILITY

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Polycystic ovarian disease (pcod) is a leading cause of infertility largely due to an ovulation. two common drugs, clomiphene citrate(cc) and letrozole, are used to induce ovulation, but their comparative effectiveness remains a topic of debate. The aim of study was to evaluate and compare their outcomes in women with PCOD and primary infertility. Women diagnosed with infertility related to PCOD and prescribed either CC or letrozole were included. Data were collected using a predesigned form that recorded demographics, diagnosis, endometrial finding and treatment outcomes .out of 432 women who visited the study site,200 were analyzed for efficacy of the two drugs. Endometrial thickness at the time of ovulation was greater with letrozole (8.95 0.84mm) compared to CC (6.17 0.74mm).The mean number of mature follicles ( 18mm) was higher in the CC group (1.64 0.9) than with letrozole (1.23 0.61).However, ovulation and pregnancy rates were better with letrozole (84.7% and 65.8%) compared to CC (79.1% and 51.3%) Importantly, letrozole promoted more frequent mono-ovulation, lowering the risk of multiple pregnancies. Our findings suggest that letrozole is more effective than clomiphene citrate in improving ovulation and pregnancy rates in women with PCOD and primary infertility.it also provides a safer profile where single follicle development is preferred. Letrozole may therefore be considered the first-line option for ovulation induction in this patient group.

**Keywords:** PCOD, Infertility, Ovulation induction, Clomiphene citrate, Letrozole

**PL-424**

## LEVEL OF ADHERENCE AND PRESCRIBING PATTERN OF GLAUCOMA MEDICATION AMONG GLAUCOMA PATIENTS IN LAMAHI EYE HOSPITAL, NEPAL: A CROSS-SECTIONAL STUDY.

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Glaucoma is chronic eye disease characterized by progressive optic nerve damage leading to permanent visual impairment and blindness when left untreated early. Adherence to antiglaucoma medications is a key component to slow the progression of disease. Poor adherence to medication can lead to progressive optic nerve damage and deterioration of the visual field. On the other hand, prescribing pattern involves monitoring, evaluation and necessary modifications in the prescribing practices of the prescribers to achieve rational and cost-effective medical care. The study assessed medication adherence and prescribing pattern of glaucoma medication among glaucoma patients. A three-month cross-sectional study was conducted involving 379 eligible candidates in the outpatient department. Before starting the data collection, the researcher took the written inform consent from the patients who were willing to participate in the study. Pertinent data were collected from patient case sheets and patient interviews.Patients were assisted, where required, in completing the questionnaires. A structured close-ended questionnaire was designed to obtain information on patient socio-demographic data, prescription pattern and clinical characteristics. The medication adherence was measured by using Nepali version of 8 items Morisky Medication Adherence Scale (MMAS-8) (© 2007 Donald E. Morisky). The eight questionnaires were exploring the various aspects of adherence behavior, including forgetfulness, altering medication without consultation, and other factors influencing medication compliance. Of the 379 eligible patients, about (37.5%) had high, (36.1%) had medium and (26.4%) had low adherence to antiglaucoma medication. Overall adherence level to the antiglaucoma medication, as found in our study was (73.6 %). The most therapeutic categories of drugs prescribed in glaucoma patients were ANS (69.1%) followed by autacoids (21.1%) and diuretic (4.6%) drugs. Similarly, the common class of prescribed medication for glaucoma patients were β-blockers (37.6%) followed by α- agonist (35.5%) and prostaglandin analogues (21.9%). Logistic regression analysis showed that patients without comorbidity were more likely to adhere to glaucoma medication with an adjusted odds ratio of 1.718 (1.054-2.802) and a p-value < 0.05. The adherence level to the prescribed antiglaucoma medications was found to be sub-optimal according to the MMAS-8, and influenced by comorbidity. Beta blockers remain the foremost prescribed drug for the treatment of glaucoma.

**Keywords:** Adherence level, prescribing pattern, Glaucoma, Antiglaucoma medication

**PL-425**

## A CASE STUDY ON CHRONIC PANCREATITIS: CLINICAL PRESENTATION, MANAGEMENT AND PATIENT COUNSELLING

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Pancreatitis is a progressive inflammatory disorder of the pancreas that results in permanent structural damage and impaired function. It is characterized by recurrent episodes of severe abdominal pain, digestive disturbances, and systemic complications. This case study presents a 40-year-old male patient admitted with fever, dry cough, vomiting, and abdominal pain. His medical history included type 2 diabetes mellitus for 10 years and pulmonary tuberculosis for 2 years. Clinical findings revealed elevated pulse rate, fever, and abnormal appetite and sleep patterns. Diagnostic evaluation confirmed chronic pancreatitis. The patient was managed with antibiotics, analgesics, antiemetics, proton pump inhibitors, and supportive care. Patient counselling emphasized strict avoidance of alcohol, adherence to prescribed medications, and lifestyle modifications including low-fat diet. This case highlights the importance of early diagnosis, appropriate pharmacological management, and continuous monitoring to prevent complications such as malnutrition, infections, and pancreatic cancer.

**Keywords**: Chronic pancreatitis, case study, abdominal pain, diabetes mellitus, pulmonary tuberculosis, pharmacological management, patient counselling, complications, alcohol avoidance, low-fat diet.

**PL-426**

## EFFECT OF DOSE AND FREQUENCY OF ADMINISTRATION OF PHENYLHYDRAZINE ON DURATION OF ANEMIA IN RATS

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ISBN: 978-81-980623-8-3

Anaemia is a condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiological needs in human body. Anaemia is a global public health problem affecting both developing and developed countries with major consequences for human health. In the world population about 1.62 billion people are affected by anaemia. The main objective is to estimate the spontaneous recovery of anemia and duration of anemia by differential dose administration and frequency of administration. Rats weighing about 200-250g were used. Animals were divided into 5 groups (n=6). Group 1 (Anemic Control) – Received single dose of PHZ (40mg/kg i.p) with maintenance dose of 20 mg/kg on every 7th day of the week throughout the study. Group 2(Anemic Control) - Received PHZ (40mg/kg i.p) for 2 days. Group 3(Anemic Control) – Received single dose of PHZ (80mg/kg i.p). Group 4(Anemic Control) - Received PHZ (60mg/kg i.p) for 2 days. Group 5 (Anemic Control) - Received PHZ (40mg/kg i.p) for 4 days. In the present study administration of Phenylhydrazine at various doses has significantly decreased RBC count, Heamoglobin, Heamatocrit levels, MCH, MCHC and increased MCV on day 2/3 when compared to day 0 indicating successful induction of anemia. However on 14th day the values have returned to normal values in group 1(40mg/kg i.p + 20mg/kg i.p) and group 2 (40mg/kg i.p 2 days) indicating spontaneous recovery from the anaemia where as in group 3 (80mg/kg single dose) the values have not returned to normal values indicating the sustainment of anaemia till 14 days and further study need to be done. Phenylhydrazine induced anemia is an effective model to study and evaluate various new therapeutic modalities. Experimental models on wistar rats is a suitable model for the study of anemia.

**Keywords:** Phenylhydrazine, Anemia

**PL-427**

## GENE THERAPY IN RARE DISEASE

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Gene therapy has emerged as a transformative approach for the treatment of rare diseases, many of which are caused by single-gene mutations. Conventional therapeutic strategies often provide only symptomatic relief without addressing the underlying genetic defect. In contrast, gene therapy aims to correct or replace the faulty gene, offering the potential for long-term or even curative outcomes. Advances in molecular biology, viral vector engineering, and genome editing technologies such as CRISPR-Cas9 have significantly accelerated the development of gene-based treatments. Clinical trials in conditions like spinal muscular atrophy, haemophilia, and certain inherited retinal disorders have demonstrated encouraging results, highlighting the promise of gene therapy to alter the natural course of disease. Furthermore, the use of adeno-associated viral vectors and lentiviral systems has improved the safety and efficacy of gene delivery. Despite these advances, challenges remain in terms of high treatment costs, immune responses to vectors, durability of therapeutic effects, and ethical considerations surrounding genetic modification. Regulatory frameworks and long-term follow-up studies are essential to ensure patient safety and establish evidence-based standards for clinical application. Multidisciplinary collaboration among researchers, clinicians, and policymakers is crucial for expanding accessibility and ensuring equitable distribution of gene therapy for rare disease populations. Overall, gene therapy represents a paradigm shift in modern medicine, holding immense potential to provide life-changing solutions for patients with otherwise untreatable genetic disorders.

**Keywords**: Gene Therapy, Rare Diseases, Genetic Disorders, Viral Vectors, Inherited Disorders, Clinical Trials, Personalized Treatment

**PL-428**

## DEVELOPMENT AND EVALUATION OF NOVEL MODEL FOR ANXIETY

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Current anxiety tests enable to provide a pure and complete picture of an animal's emotional profile individually. There is a need to develop an integrated model to assess the wide range of anxiety related parameter. In present study we designed and construct a new model known as light and dark elevated plus maze (LD-EPM) which is an integration of elevated plus maze (EPM) and light and dark box and investigate the potential usefulness of this integrated model to assess the wider range of emotional and non-emotional behaviours within one trial. A protocol was developed in which rats could freely explore for 5 min to a new model LD-EPM. Classical behaviours related to anxiety like number of entries and time spent into the different arm was measured. Administration of anxiolytic agent nicotine (1 mg/kg ip) shows significant increase in the number of entries as well as time spent in the light open arm as compare to the saline treated animals. However, the number of entries and time spent in the other arms like dark open arm, light closed arm and dark closed arm was not significantly changed. The result of present study shows that this new integrated model gives more refined and structured data in anxiety test. In conclusion, this integrated model LD-EPM will be able to give more better, clear and refined results for anxiolytic drug and will be used to assess anxiety in rodent's for future preclinical trials.

**Keywords:** Anxiety, EPM, Light and dark model

**PL-429**

## EFFECT OF COIX LACRYMA-JOBI DERIVED STARCH ON HIGH FAT DIET INDUCED HYPERLIPIDEMIA

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High fat diet consumption altered the lipid profile may leads to several complications. Abrupt body weight gain, hyperglycemia and altered lipid profile was observed in HFD rats. Alteration of these parameters for longer period of time may leads to several health-related complications like hypertension, congestive heart failure, atherosclerosis, etc. Expenditure on drugs for these complications is increased day by day due to chronic treatment which may also have several side effects. Healthy dietary habits may provide some beneficial effect in these complications. Present study provides the useful insight on the effect of starch derived from Adlay seed on HFD induced complications. The high fat diet was given regularly for about 4 weeks and on 5th and 6th the carbohydrates of high fat diet was replaced with starch and this starch containing diet was given to animals. The body weight was measured. For the examination of the Triglycerides level, Cholesterol, HDL-C, LDL-C level, the rats were kept on fasting for about 12-14 hours. The results of the present study shows that Adlay starch revert the changes in lipid profile (Triglycerides, LDL, Cholesterol, HDL), blood glucose level and obesity (body weight gain) caused due to HFD. However, earlier study proves the effect of Adlay seed extract on lipid profile but we represent first time the effect of Adlay seed derived starch on these parameters. Study signifies the role of Coix lacryma-jobi derived starch on high fat diet induced hyperlipidemia and hyperglycemia which implicates that inclusion of such kind of starch in diet may provide the beneficial effect on human health and may be responsible for the maintaining the lipid and sugar profile normal irrespective of their consumed diet (HFD). In conclusion, Coix lacryma-jobi derived starch have potential to revert the changes in lipid profile and blood glucose level due to HFD. Inclusion of adlay seed starch in diet may be helpful in maintaining the lipid and glucose profile.

**Keywords:** Coix lacryma-jobi, HFD, Hyperlipidemia,

**PL-430**

## WOUND HEALING EFFICACY OF STRYCHNOS NUXVOMICA SEED GEL IN EXPERIMENTAL MODELS

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The polyphenolic fraction of Strychnos nux-vomica seeds was prepared by soxhlet extraction with ethanol and formulated into a 5% w/w hydrogel using carbopol 934 as the gelling agent. The gel was topically applied to excision and incision wounds made in Wistar rats (n = 6 per




ISBN: 978-81-980623-8-3

group), with untreated and vehicle gel groups as controls. The treated group showed 92.6% wound contraction on day 14 compared with controls. Time for epithelialization was significantly shortened to 13.2 ± 0.4 days versus 17.6 ± 0.6 days in controls ($p < 0.01$). Histological examination revealed enhanced granulation tissue formation, neovascularization, and re-epithelialization. Compared with the control group (276.5 ± 12.4 g), the gel treatment also increased collagen cross-linking and maturation, as indicated by higher tensile strength (412.3 ± 15.8 g, $p < 0.01$). Phytochemical screening confirmed the presence of alkaloids (strychnine, brucine), flavonoids, tannins, and saponins, which are involved in modulating inflammatory mediators, stimulating fibroblast growth, and promoting matrix production. Thus, the study concludes that the methanolic extract of Strychnos nux-vomica seed gel significantly potentiates wound healing activity in vivo by enhancing wound contraction, reducing epithelialization period, and increasing tensile strength. However, detoxification and careful dose formulation are essential for translational use due to the inherent alkaloid toxicity.

**Keywords**: Strychnos nux-vomica, Excision model, Incision model, Polyphenolic gel, Skin tensile strength

**PL-431**

## PHARMACOVIGILANCE AND DRUG SAFETY

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Pharmacovigilance (PV) and drug safety have emerged as critical pillars in modern healthcare, ensuring the safe and rational use of medicines while protecting public health. With the rapid growth of pharmaceuticals, biologics, and advanced therapies, the need for robust pharmacovigilance systems has become more significant than ever. Traditional PV practices— centered on adverse drug reaction (ADR) reporting—are now evolving to include real-world data integration, patient-centric monitoring, and global regulatory harmonization. The present work explores new curriculum and emerging aspects in pharmacovigilance and drug safety, designed to address the dynamic challenges of modern therapy. The curriculum emphasizes multidisciplinary learning by combining regulatory science, pharmacoepidemiology, risk management, digital health, and big-data analytics. A major focus is given to the use of artificial intelligence (AI), machine learning (ML), and predictive modeling for signal detection and risk assessment. Additionally, real-world evidence (RWE), patient-reported outcomes, and post-marketing surveillance studies are incorporated to strengthen decision-making in clinical practice. Novel aspects include the integration of pharmacogenomics to identify genetic predispositions to ADRs, global pharmacovigilance frameworks to ensure harmonized reporting across regions, and proactive safety monitoring of advanced modalities such as biosimilars, gene therapies, and personalized medicines. Furthermore, the curriculum introduces practical training in digital reporting platforms, social media monitoring, and mobile health technologies to capture patient experiences in real time. This forward-looking approach not only enhances the scientific foundation of PV but also prepares future professionals to adapt to evolving regulatory landscapes, technological advancements, and patient expectations. By aligning education with innovation, pharmacovigilance can progress from a reactive process of ADR collection to a proactive discipline of predictive safety, ultimately contributing to safer therapeutics and improved global health outcomes.

**Keywords**: Pharmacovigilance (PV), Drug safety, Adverse drug reactions (ADR), Real-world evidence.

**PL-432**

## EXPLORING THE PROTECTIVE PROPERTY OF PITHECELLOBIUM DULCE LEAVES EXTRACT AGAINST ISOPROTERENOL INDUCED MYOCARDIAL INFARCTION IN ANIMALS

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Cardiovascular diseases (CVDs) are the leading cause of death in developed and developing countries. Myocardial infarction (MI) is one of the most alarming. MI also called heart attack. The current research was designed to evaluate the cardioprotective activity of methanolic extract of Pithecellobium dulce leaves extract against isoproterenol induced MI in experimental rats. The protective property of methanolic extract of Pithecellobium dulce leaves (MEPDL) extract was carried out in isoproterenol induced MI in experimental rats. The Blood pressure, ECG, cardiac marker enzymes, tissue GSH and LPO and histopathological studies of hereat were studied. The different doses of MEPDL significantly and dose dependently attenuated the altered levels of blood pressure in dose dependent manner, ECG pattern has been brought back to normal level, the serum enzymes were decreased, attenuated the tissue GSH and LPO and exhibited the normal architecture of heart. The current investigation concludes that administration of MEPDL at graded doses against ISO-exposed myocardial infarcted rats demonstrated cardio protective property. This observed cardioprotective activity may be due to the presence of flavonoids and tannins in the test extract and also linked to its antioxidant property.

**Keywords:** AST, LDH, CK-MB, GSH, MDA, Cardioprotective.

**PL-433**

## PHARMACOLOGICAL MECHANISMS AND ANTIDIABETIC POTENTIAL OF ALLIUM PORRUM L.: INSIGHTS INTO PHYTOSOME FORMULATION AND PRECLINICAL EVALUATION

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Allium porrum L. (commonly known as leek) is a traditional medicinal plant belonging to the Amaryllidaceae family, widely utilized for its nutritional and therapeutic properties. Increasing scientific evidence indicates its role in metabolic disorders, particularly diabetes mellitus, owing to its rich phytochemical profile including flavonoids, saponins, and organosulfur compounds. However, limited data exist on its mechanistic pathways and advanced delivery systems such as phytosomes for enhanced bioavailability. This review/experimental overview aims to elucidate the pharmacological mechanisms underlying the antidiabetic activity of Allium porrum L., evaluate its efficacy in animal models, and explore phytosome-based formulations to enhance therapeutic potential. Phytochemical constituents of A. porrum were analyzed with emphasis on bioactive compounds. Pharmacological mechanisms were assessed through reported in vitro and in vivo studies, including enzyme inhibition assays (α-amylase, α-glucosidase), oxidative stress modulation, and insulin-sensitizing pathways. Experimental evidence was compiled from streptozotocin- (STZ) and alloxan-induced diabetic rodent models. Literature on phytosome technology was integrated to highlight improvements in solubility, stability, and targeted delivery of active constituents. Allium porrum L. exhibits antidiabetic activity via multiple mechanisms: inhibition of carbohydrate-hydrolyzing enzymes, improvement of pancreatic β-cell function, reduction of oxidative stress, and modulation of key metabolic enzymes such as glucose-6-phosphatase and sorbitol dehydrogenase. In animal models, administration of aqueous and ethanolic extracts demonstrated significant reductions in fasting blood glucose, improvement of lipid profiles, and restoration of hepatic antioxidant enzyme levels. Phytosome formulations of Allium porrum were found to enhance bioavailability and therapeutic efficacy by facilitating better absorption of flavonoids and saponins compared to conventional extracts. Allium porrum L. holds promising antidiabetic potential through multi-target pharmacological mechanisms. Its efficacy in animal models supports its role as a functional food and herbal therapeutic agent. Incorporation into phytosome delivery systems may overcome bioavailability challenges and pave the way for future clinical applications.

**Keywords:** Allium porrum L., antidiabetic activity, pharmacological mechanisms, phytosome, animal models, oxidative stress, bioavailability.

**PL-434**

## EVALUATING THE BURDEN OF ADVERSE DRUG REACTIONS IN THE GERIATRIC POPULATION: A HOSPITAL-BASED OBSERVATIONAL STUDY

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ISBN: 978-81-980623-8-3

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Elderly individuals are particularly vulnerable to adverse drug reactions due to factors such as multiple medications, age-related physiological changes, and chronic health conditions. This study aimed to evaluate the severity and causality of Adverse Drug Reactions in geriatric subjects. A prospective observational study was conducted over six months involving 250 patients aged 60 years and above. Data on suspected ADRs were collected through patient interviews, clinical records, and physician inputs. Each ADR was assessed using WHO-UMC Causality Assessment Scale**,** and severity was graded with the Modified Hartwig and Siegel Severity Assessment Scale**.** Among 250 patients, 40.4% were on monotherapy and 59.6% on polytherapy. A total of 62 adverse drug reactions (ADRs) were reported, with most classified as "probable" (67.7%) and mild (69.8%). At the time of assessment, 59.7% were recovering, 37.1% had recovered, and 3.2% had not recovered. ADRs remain a major concern in the elderly due to age-related changes, comorbidities, and polypharmacy. Using tools like the WHO-UMC and Hartwig scales in routine care can enhance ADR detection and management, ensuring safer medication use in geriatric patients.

**Keywords:** Adverse drug reactions, Geriatric population, Polypharmacy, Drug safety, Causality assessment

**PL-435**

## IN-VITRO EVALUATION OF ANTI - ASTHMATIC POTENTIAL OF EMBLICA OFFICINALIS SEED EXTRACT IN RAW 264.7 CELL LINES

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This study aims to explore the anti-asthmatic potential of Emblica officinalis seed extract by assessing its effect on inflammatory markers in RAW 264.7 cell line. The preliminary evaluation of Emblica officinalis seed extract performed and characterized by UV, HPLC and GCMS. Molecular docking was carried out using Schrodinger. DPPH, ABTS, Nitric Oxide production determined to study antioxidant effect and cytotoxicity effect by MTT assay. The expression of IL-4, IL-13, TNF-alpha on LPS induced RAW 264.7 cell lines by FACS method. The hydroalcoholic extract produced an extractive and ash values of 2.85% w/w and 3.47 ± 0.15% w/w respectively. The determination total phenolic and flavanoid content was good. The characterization of the extract was performed and analysed through HPLC chromatogram. The GCMS chromatogram showed peaks at various retention times indicating the presence of phytoconstituents. In-silico studies showed good interaction between selected ligands and the target proteins. The antioxidant studies proved that the extract possess free radical scavenging activity; reduce nitric oxide production and MDA levels. The extract proved to be non-toxic by MTT assay. In LPS induced RAW 264.7 cells the expression of the target proteins that actively involved in the asthma pathogenesis was decreased.

**Keyword**: Antiasthmatic activity, Emblica officinalis, Seed Extract, RAW 264.7 cell line, LPS induced

**PL-436**

## COMPUTATIONAL RATIONALITY: CURRENT ADVANCES IN DPRE2 INHIBITORS FOR MYCOBACTERIUM TUBERCULOSIS

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One of the most common infectious agents to cause chronic illness is Mycobacterium tuberculosis (Mtb). DprE2, a crucial enzyme in the production of arabinogalactan and decaprenylphosphoryl-β-d-arabinofuranose (DPA), is a significant novel therapeutic target for tuberculosis. The survival of Mtb depends on the enzymes decaprenylphosphoryl-β-D-ribose oxidase (DprE1) and decaprenylphoryl-β-D-ribose-2-epimerase (DprE2), which catalyse the epimerization of decaprenylphosporyl ribose (DPR) to decaprenylphosporyl arabinose (DPA). In recent investigations, DprE2 has been discovered as a possible target of delamanid and pretomanid. To find possible inhibitors that target DprE2, computer aided drug design in this investigation. Binding affinities were assessed using molecular docking after high-throughput virtual screening. Drug likeness and pharmacokinetic characteristics were evaluated by incorporating ADMET predictions. The promising hits were assessed for general stability by a 100 ns simulation. After that, the selection was further refined using binding free energy calculations. These compounds offer a novel approach to combating drug-resistant tuberculosis and exhibit great promise for future development as DprE2 inhibitors.

**Keywords:** Mycobacterium tuberculosis, drug design, drug resistance, DprE2 inhibitors.

**PL-437**

## EFFECT OF SUB-ACUTE TREATMENT OF SEROTONERGIC AGONIST AND ANTAGONIST ON CLONIDINE INDUCED CATALEPSY IN MICE

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Parkinson's disease (PD) is increasing day by day in elders, catalepsy is an animal models for Parkinsonism, which can be induced in Albino mice. Which is evaluated by wooden bar test, which is placed at 4 cm from floor,where forepaws are placed on bar which were injected by clonidine (1 mg/kg), Trihexyphenidyl (Standard Anti-parkinsonism drug, 10mg/kg), Buspirone (5 mg/kg), Cyproheptadine (1 mg/kg), which were treated for 14 days & on 15 th day clonidine was injected for all groups evaluated at 30 mins, 60 mins, 90 mins, 120 mins, 150 mins & 180 mins, H. Dunnet test was used for comparison of experimental groups against control group.(n=6). P<0.001significant for Buspirone group at 90 mins Buspirone has reduced catalepsy, Cyproheptadine has increased catalepsy, when compared with std drug. So we conclude that serotonergic agonist can be used in treatment to alleviate Parkinsonism symptoms. The research protocol was approved with no. IAEC/TKRCOP/ 2025/01.

**Keywords**: Catalepsy, Bar test, clonidine, Buspirone, Cyproheptadine

**PL-438**

## EVALUATION OF PHARMACOLOGICAL ACTIVITY AND LCMS ANALYSIS OF FLAVONOIDS IN COCONUT EMBRYO

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The present research investigated the pharmacological potential and phytochemical profile of Cocos nucifera L. (coconut) embryo extracts. Methanol and chloroform extracts were subjected to LC-MS analysis, which revealed 27 phytoconstituents, including flavonoids such as apigenin, myricetin, baicalein, and resveratrol. Antioxidant activity of the methanolic extract was evaluated using the DPPH assay, showing 73.3% inhibition at 500 µg/ml, whereas the chloroform extract exhibited negligible activity. Anticancer activity was assessed on human colorectal adenocarcinoma (HT-29) cells by MTT assay and AO/EB staining, confirming apoptosis and cytotoxic potential of the methanolic extract. Antibacterial screening against Bacillus subtilis, Staphylococcus aureus, E. coli, and K. pneumoniae showed no significant inhibition compared to ciprofloxacin. Overall, the study highlights coconut embryo as a nutritive source possessing notable antioxidant and anticancer properties.

**Keywords:** Coconut embryo, LC-MS, Flavonoids, Antioxidant, Anticancer, HT-29.

**PL-439**

## OUTCOME ANALYSIS OF TORSEMIDE VERSUS FUROSEMIDE IN THE MANAGEMENT OF PATIENTS WITH CARDIOVASCULAR DISEASE

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Heart illness encompasses a number of disorders that impact the heart and blood arteries, including coronary heart disease.
due to obstructions in the arteries.Heart failure symptoms primarily include dyspnea and fatigue, leading to exercise intolerance, along with




ISBN: 978-81-980623-8-3

orthopnea and tachypnea. Diuretics, once the only treatment, advanced in the 1950s with acetazolamide, spironolactone, and thiazides, offering better tolerance and fewer side effects like hypotension and electrolyte imbalances. Loop diuretics provide rapid, potent effects and are often used in combination for managing fluid overload, a key cause of heart failure hospitalizations. However, diuretic resistance, driven by factors like high sodium intake, electrolyte imbalances, and renal system activation, is a major challenge, increasing the risk of rehospitalization and death in chronic heart failure. Side effects such as electrolyte disturbances, renal failure, and hypersensitivity highlight the importance of careful therapeutic management. An ambispective study spanning six months (October 1, 2023, to March 31, 2024) was conducted. It involved retrospective data from April to September 2023 and prospective data from October 2023 to March 2024. Patient records and in-patient data were analyzed, adhering to inclusion and exclusion criteria. This study evaluated clinical effectiveness, adverse effects, and cost of therapy to identify optimal therapeutic outcomes in cardiovascular patients. The results highlight that torsemide offers superior benefits for cardiovascular patients, including improved clinical outcomes, fewer hospitalizations, and reduced costs.

**Keywords**: Torsemide, furosemide, clinical benefits, adverse effects, cost effectiveness

**PL-440**

## ANTI-ARTHRITIC AND ANTIOXIDANT EFFECTS OF ß-SITOSTEROL ENRICHED FRACTION FROM THE METHANOLIC LEAF EXTRACTS OF MALLOTUS PHILIPPINENSIS (LAM.) MUELL. ARG AGAINST COMPLETE FREUND'S ADJUVANT ARTHRITIC RAT MODELS

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Mallotus philippinensis (Lam.) Muell. Arg, a shrub growing in high altitudes is found to contain various phytochemicals including phenols, diterpenoids, steroids, flavonoids, triterpenoids etc., in its various parts like fruits, bark and leaves. It has been found to exhibit anti-filarial, antiviral, antifertility and antimicrobial activity. Traditionally the leaf paste has been used to treat a variety of skin conditions in humans which lack scientific confirmation. Arthritis is a common chronic joint disorder, with general symptoms including stiffness and joint pain. Hence the aim of the present study is to evaluate in vivo anti-arthritic and antioxidant effects of ß-sitosterol enriched fraction (ß-SEF) (30 mg/kg) from the methanolic leaf extract of Mallotus philippinensis (Lam.) Muell. Arg in Complete Freund's adjuvant (CFA) induced rheumatoid arthritis in rats. Acute toxicity study was performed as per OECD guidelines 423. CFA-induced arthritis in rats was used as disease model. Diclofenac sodium (5 mg/kg) was used as standard. Measurement of inflammatory nociception, hind paw swelling, arthritic score and body weight were made to assess the anti-arthritic activity. Alterations in hematological parameters (red blood cell (RBC), white blood cell (WBC), hemoglobin (Hb) and lymphocytes (LYM)) parameters were carried out to ascertain the disease progression. The inflammatory mediators tumour necrosis factor-alpha (TNF-a) were measured in blood serum by enzyme-linked immune sorbent assay (ELISA) method. The oxidative stress parameters (Nitrite (NO), Catalase (CAT)) were evaluated in tissues of liver. Spleen index was also assessed. The histological and radiological changes in the knee joint of rats were also studied. ß-sitosterol enriched fraction (ß-SEF) from the methanolic leaf extract of Mallotus philippinensis (Lam.) Muell. Arg significantly alleviated arthritic progression with regards to paw swelling, arthritic score, immune organ indices, hyperalgesic effect and body weight. The anomalous alterations in hemtological parameters were remarkably restored. The phenomenon was correlated with significant suppression of overproduction of inflammatory cytokines (TNF-a), oxidative stress markers (NO and CAT) and spleen index versus arthritic rats without treatment. The histological study revealed decrease in synovial hyperplasia, pannus formation, and cartilage and bone erosion. The X-ray analysis showed decrease in soft tissue swelling, bone resorption and osteophyte formation upon the treatment with β-SEF.

**Keywords**: Mallotus philippinensis, Complete Freund's adjuvant (CFA), Anti-arthritic activity, Antioxidant, Cytokines.

**PL-441**

## EVALUATION OF THE EFFECT OF NATURAL COMPOUNDS IN DEHYDROEPIANDROSTERONE INDUCED POLYCYSTIC OVARY SYNDROME IN MICE

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Polycystic Ovary Syndrome (PCOS) is a common hormonal disorder affecting women of reproductive age. It is characterized by symptoms such as irregular periods, excess androgen levels, and the presence of small cysts on the ovaries. This study investigates the therapeutic potential of Fenugreek extract on Dehydroepiandrosterone (DHEA)-induced PCOS in female Swiss albino mice. A total of 36 mice were randomly divided into six groups of six animals each. The control group received sesame oil, while the PCOS model was induced by DHEA 100mg/kg P.O. Subsequent groups were co-treated with DHEA (100mg/kg, P.O.) and varying doses of Fenugreek extract (100, 200, and 300 mg/kg, P.O.) for 21 days to assess a dose-dependent effect. An additional group received only the mid-dose of Fenugreek. The results of the study demonstrated a significant improvement in the Fenugreek-treated groups compared to the DHEA-induced PCOS group. A steady increase in ovary weight and the number of ovarian cysts as well as uterine weight and thickness in DHEA treated group. Fenugreek treatment led to a normalization of hormonal profiles, including a reduction in elevated testosterone levels and a restoration of the LH/FSH balance. Furthermore, the extract improved metabolic parameters by enhancing insulin sensitivity and correcting dyslipidemia by improving the HDL levels and decreasing the LDL. Histological analysis of the ovaries revealed a dose-dependent reduction in the number of follicular cysts and a more regular ovarian morphology. The findings suggest that Fenugreek extract holds promise as a natural therapeutic agent for managing the symptoms of DHEA-induced PCOS by targeting both hormonal and metabolic aspects of the condition.

**Keywords:** PCOS, DHEA, Fenugreek, FSH, LH

**PL-442**

## DEVELOPMENT OF A DYSBIOSIS-INDUCED HEPATOTOXICITY MODEL USING CEFIXIME AND BILE DUCT LIGATION IN WISTAR RATS

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The gastrointestinal tract hosts a complex microbial community, the gut microbiota, which regulates metabolic, digestive, and immune functions. Alterations in its composition, known as intestinal dysbiosis, have been linked to the onset and progression of liver disorders, yet standardized preclinical models that replicate these interactions remain limited. In the present study, an experimental model was developed to establish the relationship between dysbiosis and hepatotoxicity. Wistar rats were divided into five groups: Negative Control, Cefixime, Sham Surgery, Bile Duct Ligation (BDL), and Cefixime + BDL. Animals in the BDL and Cefixime + BDL groups received cefixime (40 mg/kg/day), with surgery performed on day 7 and treatment continued for 14 days. The combined model induced significant microbial imbalance, a three-fold increase in endotoxin levels, marked elevation of TNF-α and IL-6 ($p<0.01$), higher ALT, AST, and ALP activities, reduced antioxidant enzymes, and elevated MDA content. Histopathology revealed hepatocellular degeneration, inflammatory infiltration, bile duct proliferation, and collagen deposition. These findings confirm that the combination of cefixime and BDL successfully produces a reproducible and stable preclinical model of dysbiosis-induced hepatotoxicity, closely mimicking gut–liver axis pathology observed in human liver diseases, and provides a valuable platform for mechanistic exploration and therapeutic evaluation.

**Keywords**: Bile duct ligation, Cefixime, Dysbiosis, Gut–liver axis, Hepatotoxicity, Preclinical mode

**PL-443**

## NEXT GENERATION CANCER CARE: THE IMPACT OF THERANOSTICS

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ISBN: 978-81-980623-8-3

E.G Dist. AP – 533102 533102 (NAAC Accredited, Approved by AICTE & PCI, New Delhi, Affiliated to Andhra University, Vizag)

Cancer, often called a “silent enemy,” spreads through the body like wildfire, making it one of the most challenging diseases to treat. Traditional treatments often take a broad approach, hitting both good and bad cells in the hope of striking the cancer. But theranostics brings a new weapon to the fight—it combines diagnosis and treatment in one powerful move, like a key unlocking a personalized treatment plan for each patient. This advanced approach is like turning a scattergun into a sniper rifle, offering precise and tailored care. For example, Herceptin in breast cancer and PSMA-targeted therapy in prostate cancer use this method to target only the cancerous cells, minimizing damage to healthy tissue. As theranostics continues to evolve, it holds the promise to change the face of cancer therapy—treating it not as a one-size-fits-all solution but as a highly personalized fight, much like "knowing the enemy before the battle begins." With theranostics, the future of cancer care looks brighter, offering hope and precision in a way we’ve never seen before.

**Keywords**: Personalized Oncology,Targeted Therapy,Molecular Imaging,Precision Medicine.

**PL-444**

**PHARMACIST-LED INTERVENTIONS TO RESOLVE DRUG-RELATED PROBLEMS IN DIABETIC HYPERTENSIVE PATIENTS: A PROSPECTIVE STUDY USING PCNE V9.1**

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Diabetes mellitus and hypertension frequently coexist, requiring multidrug therapy and predisposing patients to drug-related problems (DRPs). Pharmacist-led care may reduce these risks, but prospective Indian data are scarce. To identify and classify DRPs in diabetic hypertensive patients, and to evaluate the impact of clinical pharmacist interventions on their resolution, adherence, blood pressure (BP) control. A Prospective observational study was conducted among 150 adults at a tertiary care hospital. Prescriptions were reviewed by a clinical pharmacist and DRPs classified using PCNE V9.1. Medication adherence was assessed with MMAS-8. Associations between polypharmacy (≥5 drugs) and DRPs were analysed using Chi-square; predictors of DRPs were evaluated with logistic regression. Pharmacist interventions focused on therapy modification, patient counselling, and prevention of drug-drug interactions. A total of 268 DRPs were identified (mean 1.78 per patient). Polypharmacy was significantly associated with DRPs ($\chi 2$=12.4, p20.01). Regression identified insulin use (OR 2.1, 95% CI: 1.2-3.8) and cardiovascular polytherapy (OR 1.9, 95% CI:1.1-3.3) as predictors. Following interventions, 81% of DRPs were resolved, adherence improved (MMAS-8 score +1.6, p<0.0), mean systolic BP reduced by 12mmHg (clinically meaningful for cardiovascular risk), and average monthly medication cost decreased by 14%. Although single-centre, this first Indian study using PCNE V9.1 provides preliminary evidence that pharmacist-led interventions significantly improve DRP management, adherence.

**Keywords:** Diabetes mellitus, hypertension, drug-related problems, clinical pharmacist.

**PL-445**

**NEONATAL SEPSIS MANAGEMENT IN NICUS: EFFECTS OF HYGIENE LAPSES AND LATE DIAGNOSIS – A CASE STUDY**

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Neonatal sepsis continues to be a significant cause of newborn mortality and morbidity, particularly in resource-constrained NICUs. This case study examines the impact of hygiene lapses and delayed diagnosis on neonatal sepsis outcomes in a tertiary care NICU in India. Over 3 months, 30 neonates aged 0–28 days, including both preterm and full-term infants, were monitored for clinical signs of sepsis, laboratory parameters, and treatment outcomes. In several cases, empiric antibiotic therapy was initiated too late because early sepsis symptoms like fever, lethargy, poor feeding, and respiratory distress were missed. Inadequate hand hygiene, overcrowding, delayed blood culture collection, and subpar sterilization of medical equipment were all contributing factors. These lapses resulted in prolonged hospital stays, progression to severe sepsis in 5 neonates, and 2 fatalities during the study period. Supportive care (IV fluids, oxygen therapy, temperature regulation) and reinforcement of strict infection control practices, such as hand hygiene, equipment sterilization, and staff training, were some of the management strategies. Following these interventions, the majority of neonates recovered fully, highlighting the critical role of early diagnosis and stringent hygiene practices in reducing sepsis-related complications. This case study underscores the urgent need for standardized protocols, continuous monitoring, and resource optimization in NICUs to improve neonatal outcomes and prevent avoidable mortality.

**Keywords:** Neonatal Sepsis, NICU, Hygiene, Delayed Diagnosis, Infection Control, Neonatal Mortality

**PL-446**

**AN EFFECTIVE APPROACH OF BUTEA MONOSPERMA FLOWER EXTRACT IN METHOTREXATE INDUCED HEPATOTOXICITY IN WISTER ALBINO RATS**

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Synthetic drugs have many side effects as compared to the traditional herbs used in health benefit. Methotrexate is a disease modifying anti-rheumatic drug & used to treat auto immune disease and some type of cancer. It is having potential side effects of liver & Kidney toxicity. In this current research, as a hypothesis the flower extract of Butea monosperma was used and gave significant result on methotrexate induced hepatotoxicity. The well-Known meditational herb Butea monosperma is an evanescent tree. It is used to treat variety of Illness including cancer, diabetes and Jaundice. The chemical constituents include flavonoids, glycosides, saponins, tannins, phenolic acids are much effective therapeutic agents. The flower extract of Butea monosperma were used against Hepatotoxicity induced by methotrexate. Wistar albino rats were divided into 5 groups. Except the normal control group all the other groups like two treatment groups, one negative control group and one standard drug group, all of them were pretreated with the flower extract orally with dose of 400mg/kg & 600mg/kg for 21 consecutive days. Methotrexate 20mg/kg was administered on day 18. The Rats under standard groups were treated by standard drug Silymarin with the dose of 100mg/kg. Then on day 21st blood samples were collected to determine LFT & KFT. Then histopathological studies were succeeded. The result shows promising response showing 600mg/kg dose to be best. Thus, it can be concluded that this study can be beneficial for the treatment of hepatotoxicity.

**Keywords:** Methotrexate, Butea monosperma, Hepatotoxicity, Flavonoids, Silymarin

**PL-447**

**PROTECTIVE ROLE OF MICHELIA NILAGIRICA LEAF PHYTOCONSTITUENTS AGAINST PARACETAMOL- INDUCED OXIDATIVE DAMAGE IN WISTAR RATS**

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Paracetamol overdose is a leading cause of acute liver injury, primarily driven by oxidative stress and the generation of reactive metabolites. This study evaluates the hepatoprotective potential of Michelia nilagirica leaf extract in mitigating paracetamol-induced oxidative damage in Wistar rats. Liver injury was induced using a single high dose of paracetamol, followed by oral administration of the methanolic leaf extract of M. nilagirica for seven days. Biochemical analysis revealed significant reductions in serum liver enzymes (ALT, AST, ALP) and lipid peroxidation marker (MDA), alongside increased activities of antioxidant




ISBN: 978-81-980623-8-3

enzymes such as superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GPx) in the treated group. Histopathological observations confirmed substantial preservation of liver architecture in extract-treated rats compared to the paracetamol-only group. The findings suggest that phytoconstituents present in Michelia nilagirica leaves confer protection against paracetamol-induced hepatic injury by modulating oxidative stress and enhancing endogenous antioxidant defenses.

**Keyword:** Antioxidant enzymes, Paracetamol-induced hepatotoxicity, Paracetamol-induced hepatotoxicity, Reactive oxygen species (ROS)

**PL-448**

## FORMULATION AND EVALUATION OF PROPOLIS SOLID DISPERSION LOADED ANTI-INFLAMMMATORY CREAM WITH MOLECULAR DOCKING AND IN VIVO ANIMAL STUDY

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A deficiency in drug solubility limits the therapeutic potential of pharmaceutical formulations. Solid dispersion (SD) is a multifaceted strategy to enhance solubility, particularly for BCS Class II compounds. In this study, SDs of propolis were prepared using Kollisolv PEG-8000 (1:2 ratio) via the melting method. Two independent variables were optimized using central composite design. The optimized SD was incorporated into a cream formulation by the fusion method. Additionally, molecular docking was performed to evaluate the interaction of propolis constituents with TNF-α, supporting their anti-inflammatory potential. Drug release, viscosity, and spreadability of the optimized batch were 98.7%, 35,786 cPs, and 16.82 cm/s, respectively, with a 340-fold increase in aqueous solubility. In vivo studies using a carrageenan-induced paw edema model in rats showed significant suppression of inflammation and TNF-α level by the propolis SD cream, comparable to diclofenac gel. Molecular docking revealed strong binding affinities of quercetin, gallic acid, and galangin with TNF-α, reinforcing the biological relevance of the formulation. This investigation demonstrates that SD technology effectively addresses solubility and dissolution challenges of propolis. The integration of molecular docking further validates the mechanistic basis of its anti-inflammatory action, positioning SD-loaded propolis cream as a promising natural topical alternative to conventional therapies.

**Keywords:** Propolis, solid dispersion, central composite design, molecular docking, anti-inflammatory activity.

**PL-449**

## STUDY OF RIBAVIRIN AND PYRAZOMYCIN IN HPV TREATMENT: A PERSPECTIVE TOWARDS DRUG REPURPOSING

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Human papillomavirus (HPV) is a virus that infects skin or mucosal cells. The choice of antiviral medication for HPV treatment is generally based on established treatments such as topical agents, surgical interventions, and immunotherapies. This study focused on analysing the binding interactions of Ribavirin and Pyrazomycin with Inosine Monophosphate Dehydrogenase (IMPDH) using docking simulations, as both compounds showed structural resemblance to each other. The protein structure 1AK5 was selected and prepared by removing heteroatoms and water molecules to ensure accurate docking results. The docking scores revealed that Pyrazomycin exhibited a slightly better binding affinity compared to Ribavirin. In conclusion, the docking studies indicate that Pyrazomycin holds greater potential as an antiviral agent for HPV compared to Ribavirin. These findings suggest that said drug can be repurposed as a potential treatment for HPV infections. Further research, including experimental validation, formulation development & clinical trials, are necessary to confirm these findings and fully explore the therapeutic benefits of Pyrazomycin in HPV treatment.

**Keywords**: HPV, interactions, Ribavirin, Pyrazomycin, drug repurposing

**PL-450**

## BEHENIC ACID AS A NOVEL TOOL FOR DEVELOPING DYSLIPIDEMIA IN RODENTS: A PRECLINICAL ADVANTAGE OVER CONVENTIONAL DIETS

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Hyperlipidaemia is a significant risk factor for cardiovascular diseases, necessitating reliable and efficient animal models to study lipid metabolism and evaluate potential therapeutic interventions. Traditional high-fat diet (HFD) models, while widely used, are time-consuming and require extended durations to produce consistent dyslipidemic. This study aimed to develop and evaluate a time-efficient hyperlipidaemia model using behenic acid and to compare its effectiveness with the conventional HFD model in rats. Sprague Dawley rats were randomly divided into three groups: control, behenic acid-treated (1800 mg/kg orally for 28 days), and HFD-fed (90 days). Biochemical analyses were performed to measure serum lipid parameters, including total cholesterol, triglycerides, and high-density lipoprotein (HDL) cholesterol. Physical observations and changes in body weight were also recorded. Results demonstrated that behenic acid administration significantly elevated total cholesterol and triglyceride levels within 28 days, achieving comparable dyslipidemic profiles to those observed in the HFD group, which required a 90-day feeding period. Notably, HDL cholesterol levels remained unaffected in both models. These findings suggest that behenic acid induces hyperlipidemia more rapidly and effectively than traditional HFD models, providing a valuable and time-efficient alternative for preclinical studies investigating lipid metabolism and potential lipid-lowering therapies.

**Keywords:** Behenic acid, hyperlipidemia, rodent model, high-fat diet, cholesterol.

**PL-451**

## SYNEPHRINE AND ALZHEIMER'S: BRIDGING THERAPEUTICS THROUGH ZEBRAFISH MODELS

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Alzheimer's disease (AD) is a neurological condition that worsens with time and is characterized by behavioral abnormalities, memory loss, and cognitive impairment. Current pharmacological interventions provide only symptomatic relief and are often associated with limited efficacy and adverse effects. The present study explored the therapeutic potential of synephrine, a naturally occurring alkaloid, in mitigating Alzheimer's-like symptoms using zebrafish (Danio rerio) models Molecular docking ADMET and dynamic simulation studies were conducted to evaluate the interaction of synephrine with key Alzheimer's targets. Neurotoxicity was induced through scopolamine and aluminum chloride, followed by direct exposure of zebrafish to synephrine dissolved in aquatic medium. Subsequently, Behavioural experiments, including the radial arm maze, T-maze, light-dark, and novel object recognition tests, acetylcholine level analysis, and histopathological evaluations were carried out to determine the neuroprotective efficacy of synephrine. The molecular docking and dynamics studies revealed that synephrine exhibits favourable binding affinities and stable interactions with key Alzheimer's disease targets, suggesting its potential as an effective acetylcholinesterase inhibitor. ADMET analysis supported these findings, demonstrating acceptable pharmacokinetic and safety profiles, reinforcing synephrine's drug-likeness. Behavioural experiments showed that synephrine treatment significantly improved cognitive and memory performance in zebrafish subjected to scopolamine and aluminium chloride-induced neurotoxicity. These results were further supported by biochemical assays, where synephrine exhibited notable antioxidant activity, as demonstrated by the DPPH assay method indicating its ability to mitigate oxidative stress, a key contributor to Alzheimer's pathology. Histopathological analysis of zebrafish brains revealed that synephrine offered protection against neuronal degeneration, evidenced by reduced vacuolization, better-preserved neuronal structures, and decreased pyknotic nuclei compared to untreated diseased groups. This study highlights synephrine as a promising neuroprotective and antioxidant agent, bridging the gap between natural compound research and therapeutic intervention for Alzheimer's disease.

**Keywords:** Synephrine, Scopolamine, ADMET, T-Maze




ISBN: 978-81-980623-8-3

**PL-452**

**VOICE AS A DIAGNOSTIC TOOL: NON-INVASIVE DETECTION OF POLY CYSTIC OVARIAN CONDITION USING PRAAT ACOUSTIC FEATURES**

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Polycystic Ovarian Condition (PCOD/PCOS), a hormonal imbalance, may affect vocal function due to potential alterations in laryngeal physiology. This study aims to analyze voice changes associated with Polycystic Ovarian Condition by extracting acoustic features using Praat software and evaluating their significance in a case-control framework. Voice recordings were obtained from 20 individuals diagnosed with Polycystic Ovarian Condition and 20 age-matched controls. Participants phonated sustained vowels /a/, /i/, and /u/, and acoustic parameters—Fundamental Frequency ($F_0$), Jitter (local), Shimmer (local), and Harmonics-to-Noise Ratio (HNR)—were extracted using Praat. Mean values across vowels were calculated per participant, followed by group-wise comparison using independent samples t-tests. Significant differences were observed in all measured parameters between the Polycystic Ovarian Condition and control groups. Individuals with Polycystic Ovarian Condition exhibited higher jitter and shimmer values, suggesting increased perturbation in frequency and amplitude, and lower HNR values, indicating increased noise components in the voice signal. Acoustic analysis using Praat effectively distinguished voice alterations in individuals with Polycystic Ovarian Condition. The results support the feasibility of using non-invasive voice measures as early indicators for Polycystic Ovarian Condition. This method offers a promising and accessible tool for screening and monitoring. Further studies with larger sample sizes and multilingual populations are recommended to enhance generalizability and diagnostic precision.

**Keywords**: Voice Analysis, Polycystic Ovarian Condition, PRAAT, Jitter, Shimmer, HNR, Non-Invasive Method.

**PL-453**

**ROLE OF SLEEP QUALITY IN SHAPING HEALTHCARE PERFORMANCE: EVIDENCE FROM PRACTICING AND STUDENT HEALTH PERSONNEL**

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Sleep quality is a crucial determinant of the physical, emotional, and cognitive performance of healthcare personnel, whose efficiency directly impacts the quality of healthcare services delivered to the population. Poor sleep is hypothesized to negatively influence daily functioning, concentration, and well-being. This study aimed to evaluate sleep quality among healthcare personnel and students to analyze its relationship with professional and academic performance, mood, and the use of substances affecting sleep. A cross-sectional study was conducted in June 2025 among 68 participants, including active healthcare personnel and trainees from hospitals, clinics, health centers, and educational institutions in the region. Data were collected using structured questionnaires consisting of 18 items addressing sleep duration, rest quality, mood, and lifestyle factors. Findings revealed that 36.8% of participants reported sleeping only 6 hours during workdays, while only 11.8% achieved the recommended 8 hours of rest. Upon waking, 55.9% described themselves as “tired but functional,” and only 4.4% reported feeling “very rested and energized.” These results indicate a prevalent perception of fatigue and accumulated stress among healthcare workers and students. Sleep deprivation is common among healthcare personnels with most experiencing inadequate rest and associated fatigue. The findings highlight the urgent need for interventions and institutional strategies that promote healthy sleep habits as part of comprehensive healthcare workforce support and training.

**Keywords:** Sleep quality, healthcare personnel, fatigue, performance, stress.

**PL-454**

**ANTI-ALZHEIMER EFFECT OF LIRIODENDRON TULIPIFERA ON STREPTOZOTOCIN IN RATS**

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The present study was to test the effect of Liriodendron tulipifera seed extract on biochemical markers of brain in amnesic rats (streptozotocin induced amnesia). Streptozotocin (STZ) is a glucosamine-nitrosourea compound which was originally identified as an antibiotic. It is toxic to beta cells of pancreas and usually transported through glucose transporter 2 and commonly used to induce experimental diabetes in animals. STZ administration through route such as intracebroventricular or intraperitoneal injection produces reduced cognition and increased cerebral aggregated Aβ fragments, total tau protein, and Aβ deposits. These changes were accompanied with decreased glycogen synthase kinase (GSK-3) alpha/beta ratio (phosphorylated/total) in the brain. The extract of Liriodendron tulipifera seed extract was administered in two doses (100 and 200 mg/kg) for 7 days. Piracetam (120 mg/kg) was used as a standard agent. Orally supplementation of Liriodendron tulipifera seed extract showed significant elevated brain antioxidant enzymes CAT (15.5 ± 2.8**and 14.0 ± 1.12**), SOD (13.5 ± 1.4**and 18.3 ± 1.7**) GSH (203.3 ± 15.3**and 218.0 ± 13.5**), TBARS (200.3 ± 7.3** and 208.0 ± 11.0**) for Liriodendron tulipifera seed extract 100 mg/kg and 200mg/kg respectively. Orally supplementation of Liriodendron tulipifera seed extract also showed significant inhibited AChE activity 4.907±0.31** and 4.967±0.31** respectively.

**Keywords:** Liriodendron tulipifera seed extract, Superoxide dismutase (SOD), catalase (CAT), contents of thiobarbituric acid reactive substances (TBARS) and reduced glutathione (GSH)

**PL-455**

**A STUDY OF COMPLICATIONS IN PATIENTS UNDERGOING MAINTENANCE HAEMODIALYSIS: AN EXPERIENCE IN TERTIARY CARE HOSPITAL**

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Haemodialysis is a good choice when the kidneys are unable to remove harmful compounds (wastes or impurities) from the blood. The continuous process of haemodialysis takes about four hours to finish. It is unable to continuously monitor bodily functioning like regular kidneys can.On the other hand, it can eliminate waste and restore electrolyte and pH levels following a haemodialysis session. During the surgery, the fluid and mineral compartment undergoes numerous changes, leading to a variety of problems for patients, ranging from minor to potentially lethal. The study’s goals are to determine the prevalence of issues.The study was prospective in nature. Demographic information, surgical information, comorbidities, and the self-designed severity rating to record during haemodialysis were all gathered using a data collecting form. Findings: Of the total 190 patients, 120 (63.15%) were men and 70 (36.6%) were women. An arterio venous fistula (AVF) was the venous access used for haemodialysis in 166 (88%) of the patients who were interviewed. The dialyser used to administer F6HPS was given to 82 individuals (43.15%). According to the results of our own assessment tool, 30 patients (15.78%) had mild difficulties, 23 patients (12.105%) had moderate complications, and 141 patients (74.21%) had severe complications. In a separate study, 12.5% of patients had cramps, while 37.5% had An arterio venous fistula (AVF) was the venous access used for haemodialysis in 166 (88%) of the patients who were interviewed. The dialyser used to administer F6HPS was given to 82 individuals (43.15%). According to the results of our own assessment tool, 30 patients (15.78%) had mild difficulties, 23 patients (12.105%) had moderate complications, and 141 patients (74.21%) had severe complications. In a separate study, 12.5% of patients had cramps, while 37.5% had hypotension.In our study, 18 patients (28%) experienced cramps, and 25% of patients experienced hypotension as an intra-dialytic consequence. These two problems were the main difficulties in our research of patients with CKD and AKI. Age and the distribution of




ISBN: 978-81-980623-8-3

sexes do not appear to be related in our study. Our study's conclusions indicate that muscle cramps (43.6%), hypotension (47.8%), and hypertension (30.5%) are common occurrences and that, in the event of an emergency, appropriate precautions must be taken. 3.6% fever, 1.57% hypoglycemia, and 12.6% nausea and vomiting. While there was no significant correlation between sex and type of access, there was a strong correlation between problems and age and renal failure.

**Keywords**: Hemodialysis complications, Dialyzer, AVG, AVF, Catheter.

**PL-456**

## PROMPT RECOGNITION AND EVIDENCE-BASED MANAGEMENT OF ACUTE EXACERBATION OF COPD COMPLICATED BY MULTIDRUG-RESISTANT ACINETOBACTER INFECTION

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A 71-year-old man with a decade-long history of chronic obstructive pulmonary disease (COPD) and hypertension presented with worsening breathlessness, cough with yellow expectoration, mild fever, and features of hypoxemia. Physical examination revealed tachypnea and low oxygen saturation. Investigations showed leukocytosis, neutrophilia, elevated liver enzymes, and sputum culture positive for Acinetobacter species. The patient received oxygen supplementation, combined inhaled bronchodilators (formoterol, budesonide, glycopyrrolate), dexamethasone, and targeted antimicrobial therapy (cefoperazone-sulbactam, levofloxacin), alongside supportive management for constipation and urinary symptoms. Pharmacist involvement ensured monitoring for adverse effects, review of drug interactions, and patient education on inhaler use, adherence, and lifestyle changes. The patient's clinical status improved with this comprehensive, multidisciplinary approach. This case underlines the importance of early recognition, prompt, evidence-based intervention, and the role of pharmacists in managing acute COPD exacerbations, particularly when complicated by multidrug-resistant bacterial infection.

**Keywords:** COPD, Case Report, Acute Exacerbation, Acinetobacter, Pharmacist Intervention

**PL-457**

## SYNERGISTIC STUDIES ON THE COMBINED ACTION OF S-ALLYL CYSTEINE AND TAURINE IN STREPTOZOTOCIN-NICOTINAMIDE INDUCED TYPE-II DIABETIES

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Diabetes mellitus (DM) is one of the common metabolic disorders affecting worldwide population. In the modern system of medicine, there is still no satisfactory effective therapy available to cure diabetes mellitus. However, there are so many medicines available in the market (like insulin & OHAs) for the treatment of DM but they have several drawbacks/side effects in their usage. To overcome the evil consequences of these drugs some phyto-nutrients and bio-nutrients are being investigated for possible use in the treatment of DM and related complications. S-Allyl cysteine (SAC, a phyto-nutrient) and Taurine (TAU, a bio-nutrient) have been reported to have not only antioxidant and anti-inflammatory activities but also multiple beneficial effects in combating several metabolic disorders in both human and animals. Despite numerous pharmacotherapeutic properties of SAC and TAU, their combined beneficial effects against type 2 DM using STZ/NA model has not been explored and scientific data is also lacking to be exposed as yet. This study is comprised of an attempt to explore the anti-diabetic & antioxidant effects of combined action of SAC and TAU in in vitro & in vivo models. As a result, the investigations confirmed that SAC/TAU combination had potential antioxidant and anti-diabetic properties.

**Keywords:** Diabetes mellitus, Garlic, Streptozotocin, Nicotinamide, Taurine.

**PL-458**

## HEPATOPROTECTIVE EVALUATION OF N-ACETYLCYSTEINE LOADED SOLID LIPID NANOPARTICLES IN HEPATIC CELL LINE MODELS

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N-acetylcysteine (NAC) is a potent antioxidant and hepatoprotective agent, but its clinical use is limited by poor bioavailability and rapid clearance. Solid lipid nanoparticles (SLNs) provide a promising nanocarrier system to enhance stability, sustain release, and improve cellular uptake. NAC-SLNs were prepared using glyceryl monostearate (GMS) as lipid and Tween 20 as surfactant by the hot homogenization method. The formulation was evaluated for particle size, zeta potential, polydispersity index (PDI), entrapment efficiency, and in vitro drug release. Hepatoprotective activity was assessed in HepG2 cells exposed to [toxicant] to induce oxidative stress. Cell viability (MTT assay), reactive oxygen species (ROS), lipid peroxidation (MDA), and antioxidant enzyme activities (SOD, catalase, GSH) were measured. The optimized NAC-SLNs exhibited a mean particle size of <220 nm, PDI of 0.25, zeta potential of −30 mV, and entrapment efficiency of 75%. In vitro release studies revealed an initial burst of 25% followed by sustained release up to 75% over 24 h. In HepG2 cells, NAC-SLNs preserved cell viability up to 84% under oxidative stress, compared with 55% for free NAC. ROS generation was reduced by 62% relative to toxicant controls, while MDA levels decreased by 45%. Antioxidant enzyme activities were significantly restored toward normal levels ($p < 0.05$). NAC-loaded SLNs demonstrated favorable physicochemical characteristics, controlled release, and superior hepatoprotective efficacy compared to free NAC in cell-based models. These findings highlight the potential of NAC-SLNs as a novel nanotherapeutic approach for the management of oxidative stress–mediated liver disorders.

**Keywords:** N-acetylcysteine, solid lipid nanoparticles, hepatoprotection, oxidative stress, HepG2 cells, antioxidant therapy

**PL-459**

## TOPICAL APPLICATION OF DEXAMETHASONE ENHANCES WOUND HEALING IN RAT EXCISION MODEL

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Wound healing is a complex biological process involving inflammation, proliferation, and tissue remodeling. This study investigates the effect of topical dexamethasone—a well-established corticosteroid—on wound healing in a standardized rat excision model. Male Wistar rats (n=24) were randomly assigned to control and treatment groups. Full-thickness excision wounds were created under anesthesia, and topical dexamethasone (0.1%) was applied once daily for 14 days. Parameters assessed included wound contraction rate, epithelialization time, and histopathological features such as collagen deposition, fibroblast activity, and inflammatory cell infiltration. Dexamethasone-treated wounds exhibited significantly faster contraction and reduced epithelialization time compared to untreated controls ($p<0.05$). Histological analysis revealed enhanced collagen alignment, reduced neutrophil infiltration, and improved granulation tissue organization. These findings suggest that dexamethasone promotes a favorable microenvironment for tissue regeneration by modulating local inflammation and accelerating the transition to the proliferative phase. This study supports the therapeutic potential of topical corticosteroids in wound management and provides a foundation for further exploration of their mechanisms in skin repair. The results may inform formulation strategies for clinical use in chronic or delayed-healing wounds.

**Keywords:** Dexamethasone, wound, epithelization period, contraction, inflammation

**PL-460**

## PRESCRIPTION PATTERN OF IMMUNOSUPPRESSANT USED IN POST TRANSPLANT PATIENTS

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ISBN: 978-81-980623-8-3

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Organ transplantation is a life-saving procedure where a diseased or failing organ is replaced with a viable graft from a donor. This study aimed to systematically assess and document prescription patterns of immunosuppressant medications in post-transplant patients, identifying common practices and variations, as well as analyzing dosing regimens and combinations used. A retrospective observational study was conducted over 6 months with a sample size of 107. Patients included were 18 years or older and had undergone a transplant (e.g., kidney, liver, heart, lung) or were on maintenance immunosuppressive therapy, with or without acute rejection episodes. Dual and triple therapy regimens were observed. The study found that triple therapy was more prevalent among participants. The most common combination was Tacrolimus, Prednisolone, and Mycophenolate Mofetil, prescribed to 24 patients (22.4%). Another common regimen was Tacrolimus, Mycophenolate Sodium, and Prednisolone, prescribed to 20 patients (18.7%). The incidence of transplantation was more common in males. This study contributes valuable insights into the evolving prescription patterns of immunosuppressants in post-transplant care, highlighting the importance of regimen selection to ensure optimal outcomes and minimize complications.

**Keywords:** Immunosuppressants, prescription pattern, maintenance therapy, organ transplantation.

**PL-461**

## INCIDENCE AND CLINICAL PROFILE OF CARDIAC AND ENDOCRINE DISORDERS IN PREGNANT WOMEN: A PROSPECTIVE HOSPITAL-BASED STUDY

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Cardiac and endocrine complications during pregnancy, such as hypertensive disorders, gestational diabetes mellitus (GDM), thyroid dysfunction, and cardiomyopathy, are rising contributors to maternal and fetal morbidity. Early recognition and multidisciplinary management are crucial to improving outcomes.To evaluate the incidence, clinical profile, and outcomes of cardiac and endocrine disorders in pregnant women, and to identify risk factors influencing maternal and neonatal health. A prospective, observational study was conducted at SCCL Main Hospital, Kothagudem, with 300 pregnant women diagnosed with or suspected of cardiac and/or endocrine complications. Data on demographics, clinical features, maternal and neonatal outcomes were collected and analyzed. The majority of participants were aged 26–35 years, with 97.7% having normal BMI. Primiparous women accounted for 52.8%. Hypertensive disorders were the most common cardiac complication, showing progressive increases in systolic and diastolic BP across gestational hypertension to eclampsia. Endocrine disorders were dominated by thyroid dysfunction and GDM. Hypothyroidism was more prevalent than hyperthyroidism, with typical biochemical alterations (↑TSH, ↓T3/T4). Diabetes was observed in 18% of cases. Hypertensive pregnancies had higher rates of preterm birth (48.8%) and renal complications compared to non-hypertensive groups. Family history of hypertension was present in nearly 50% of cases, suggesting genetic predisposition. Hypertensive and endocrine disorders are significant threats to maternal and neonatal health. Early screening, integrated antenatal care, and guideline-driven interventions are essential to reduce complications and improve outcomes.

**Keywords**: Pregnancy, Hypertensive disorders, Gestational diabetes, Thyroid dysfunction, Maternal outcomes

**PL-462**

## INFLUENCE OF CO-MORBIDITIES ON THE PRESCRIBING TRENDS AND UTILIZATION OF ANTI-HYPERTENSIVE DRUGS IN HOSPITALIZED PATIENTS

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Hypertension frequently coexists with diabetes, chronic kidney disease (CKD), and dyslipidemia, which strongly influence therapeutic choices. Evaluating prescribing patterns and adherence to international guidelines is essential for optimizing outcomes. To assess the impact of co-morbidities on anti-hypertensive prescribing, evaluate guideline adherence, and analyze outcomes including blood pressure control and adverse drug reactions (ADRs). A prospective, observational study was carried out for six months in a tertiary care hospital. Hospitalized patients aged ≥18 years with hypertension and at least one comorbidity were included. Data on demographics, comorbidities, prescriptions, and outcomes were collected from medical records. Statistical analysis employed Chi-square tests, ANOVA, and logistic regression. A total of 210 patients were enrolled (mean age 58 ± 12 years; 56% male). The most common comorbidities were diabetes (42%), CKD (28%), and dyslipidemia (24%). ACE inhibitors (35%) and calcium channel blockers (30%) were most frequently prescribed, followed by ARBs (22%) and diuretics (18%). Combination therapy was used in 62% of patients. In diabetes, ACE inhibitors/ARBs were significantly preferred ($p<0.01$), whereas CKD patients often received CCBs. Overall, 78% of prescriptions adhered to guidelines. Blood pressure control improved in 70% of cases, with ADRs reported in 6%. Co-morbidities significantly shape anti-hypertensive prescribing trends. While guideline adherence was generally high, deviations remain in specific populations. Continuous monitoring is necessary to ensure safe and effective hypertension management.

**Keywords:** Hypertension, Comorbidities, Prescribing patterns, Anti-hypertensive drugs

**PL-463**

## EMPOWERING MATERNAL HEALTH THROUGH CLINICAL INNOVATION: PREVALENCE, DETERMINANTS, AND OUTCOMES OF ANAEMIA IN PREGNANCY – A HOSPITAL-BASED STUDY

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Anaemia in pregnancy remains a critical public health concern in India, with profound maternal and neonatal implications. This prospective, hospital-based study was conducted over six months among 300 antenatal women to assess the prevalence, incidence, determinants, and outcomes of anaemia. Findings revealed a 100% prevalence of anaemia, with mild (60–66%), moderate (30–38%), and severe (up to 8.9%) cases across trimesters. The incidence of new anaemia cases was 12.8%, peaking in the 2nd trimester (28.6%). Major risk factors included younger age (≤20 years, $p<0.05$), short interpregnancy interval (<18 months, $p=0.02$), vegetarian diet ($p=0.014$), and irregular IFA compliance ($p=0.002$). Iron-deficiency anaemia (40%) was the most common subtype, followed by megaloblastic (25%) and anaemia of chronic disease (15%). Maternal consequences included preterm delivery (32.3%), miscarriage (29.3%), and gestational complications (9%), while neonatal outcomes showed low birth weight (38.7%), NICU admissions (22.7%), and low Apgar scores (14%). This study underscores the urgent need for early antenatal registration, routine haemoglobin/ferritin screening, and pharmacist-led counselling to improve compliance and nutritional practices. Aligning with IPC-2025's theme, integration of AI-driven risk prediction, mobile health tools, and digital education platforms can enhance anaemia surveillance, empower patients, and strengthen evidence-based maternal care.

**Keywords**: Anaemia in pregnancy, Iron deficiency, Maternal outcomes, AI in healthcare, Pharmacist intervention

**PL-464**

## ANTIBIOTIC PROPHYLAXIS IN SURGERY: UTILIZATION, EFFECTIVENESS, AND IMPLICATIONS FOR ANTIMICROBIAL STEWARDSHIP

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Surgical site infections (SSIs) are a major cause of postoperative morbidity, prolonged hospitalization, and increased healthcare costs. Rational and timely administration of antibiotic prophylaxis plays a key role in infection prevention while minimizing antimicrobial resistance. To




ISBN: 978-81-980623-8-3

evaluate the prescribing patterns, appropriateness, and effectiveness of antibiotic prophylaxis in surgical patients admitted to a tertiary care hospital. A prospective observational study was conducted in the surgical wards of a tertiary care teaching hospital. Patients aged 10–60 years undergoing general and gynecological surgeries were included. Pediatrics, ophthalmic surgeries, and topical antibiotic use were excluded. Data on demographics, type of surgery, wound classification, and antibiotic prophylaxis were collected and analyzed using descriptive statistics. The study included patients with a mean age of 38 years, of whom 54% were female. The majority of cases were from gynecology and general surgery departments. Clean wounds were the most common, and over 50% of surgeries lasted less than one hour. Ceftriaxone was the most frequently prescribed antibiotic, either alone or in combination with metronidazole or sulbactam. Patients received an average of 2–3 antibiotics perioperatively. The ceftriaxone–metronidazole combination demonstrated broad coverage and reduced SSI incidence. However, frequent and prolonged ceftriaxone use raises concerns regarding antimicrobial resistance. Antibiotic prophylaxis, particularly ceftriaxone-based regimens, was effective in preventing SSIs. Nevertheless, adherence to evidence-based guidelines—administration within 120 minutes before incision and discontinuation within 24 hours—is essential for rational use. These findings emphasize the need for antimicrobial stewardship strategies to optimize surgical outcomes and preserve antibiotic efficacy.

**Keywords**: Surgical prophylaxis, antibiotics, ceftriaxone, metronidazole, antimicrobial resistance.

**PL-465**

## UTILIZATION PATTERNS OF ANTIPLATELET AGENTS IN CARDIOVASCULAR PATIENTS: A STUDY ON CLOPIDOGREL AND ASPIRIN AT A TERTIARY CARE HOSPITAL

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To evaluate the prescribing trends and utilization patterns of Clopidogrel and Aspirin in cardiovascular patients and assess their rationality against evidence-based treatment guidelines. Drug Utilization Evaluation (DUE) is a systematic quality improvement process that promotes rational prescribing, enhances therapeutic outcomes, and reduces adverse events. Clopidogrel and Aspirin are widely used antiplatelet agents for the prevention and management of cardiovascular diseases such as acute coronary syndrome (ACS), myocardial infarction, and coronary artery disease (CAD). Evaluating their prescribing patterns ensures optimal use in clinical practice. A prospective observational study was conducted at SCCL Main Hospital, Kothagudem. A total of 251 prescriptions containing Clopidogrel and/or Aspirin were collected over the study period. Data were obtained from patient case sheets and drug charts during routine ward rounds. Prescriptions were analyzed for indication, dosage, frequency, duration, and co-prescribed medications. Demographic and clinical data were also documented. Of 251 prescriptions analyzed, Clopidogrel and Aspirin were predominantly prescribed for ACS, STEMI, NSTEMI, and CAD. Most prescriptions adhered to guideline-recommended protocols, although some instances of potential drug–drug interactions were noted. Antiplatelet monotherapy was more frequently prescribed compared to dual antiplatelet therapy. The study highlights rational prescribing practices of Clopidogrel and Aspirin in cardiovascular patients, with a preference for monotherapy. Strengthening awareness about drug interactions and reinforcing guideline-based therapy can further optimize patient care.

**Keywords**: Clopidogrel, Aspirin, cardiovascular disease, prescribing patterns, antiplatelet therapy, drug utilization evaluation.

**PL-466**

## EVALUATION OF DRUG PRESCRIBING TRENDS IN THE MANAGEMENT OF BRONCHIAL ASTHMA AT A TERTIARY CARE HOSPITAL

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Bronchial asthma is a chronic airway disorder marked by inflammation, bronchial hyperresponsiveness, and recurrent episodes of wheezing, coughing, and breathlessness. Despite the availability of standardized treatment guidelines, variations in prescribing practices may compromise disease control and quality of life. To analyze the prescribing trends of medications used for bronchial asthma, assess adherence to guideline-based therapy, and study demographic and clinical profiles of patients. A prospective observational study was conducted over six months in the Pulmonology Department of a tertiary care hospital. A total of 210 patients across pediatric, adult, and geriatric age groups were enrolled. Demographic, clinical, and prescription data were collected and evaluated using descriptive statistics. Among 210 participants, 33.3% were pediatric and 66.6% adults, with peaks in the <10 years and >60 years age groups. Gender distribution was nearly equal. Smoking (52.3%) and alcohol use (28.5%) were notable risk factors. Inhalational therapy was the most preferred approach, ensuring higher efficacy with minimal systemic effects. Prescriptions revealed balanced use of monotherapy (50.4%) and combination therapy (49.6%). Hydrocortisone (60.8%) was the most common systemic corticosteroid, while Montelukast (51.9%) was the preferred leukotriene antagonist. The study emphasizes rational prescribing practices with strong reliance on inhalational therapy. However, modifiable lifestyle factors such as smoking, and variations in drug selection highlight the need for patient counseling and stricter adherence to evidence-based guidelines.

**Keywords:** Bronchial asthma, prescribing patterns, inhalational therapy, corticosteroids, leukotriene antagonists, drug utilization, tertiary care hospital.

**PL-467**

## THE PROTECTIVE EFFECT OF HYDROALCOHOLIC EXTRACT OF ROOTS OF WITHANIA SOMNIFERA ON DAUNORUBICIN-INDUCED CARDIOTOXICITY AND HEPATOTOXICITY

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Daunorubicin, a widely employed anthracycline chemotherapeutic, is clinically constrained by its pronounced cardiotoxic and hepatotoxic effects. Withania somnifera (Ashwagandha) root extract, abundant in antioxidants and bioactive phytoconstituents, has been proposed as a natural protective agent. The present study evaluated its cardioprotective and hepatoprotective potential in male Wistar rats. Animals received oral Ashwagandha root extract at doses of 300 and 600 mg/kg for 14 consecutive days, while silymarin (60 mg/kg) served as the standard reference. To induce toxicity, a single intraperitoneal dose of daunorubicin (10 mg/kg) was administered on day 1. Physiological parameters, serum biomarkers (ALP, SGOT, SGPT, LDH, CK-MB), and histopathological changes in cardiac and hepatic tissues were systematically assessed. Both treatment doses improved biochemical and histological profiles, with the higher dose (600 mg/kg) demonstrating pronounced protective effects comparable to silymarin. In addition, cavity-based molecular docking provided mechanistic validation by confirming interactions of Ashwagandha phytoconstituents with toxicity-related targets. Collectively, these findings highlight the potential of Withania somnifera root extract as a natural adjuvant to mitigate daunorubicin-induced hepatic and cardiac injury, thereby enhancing the therapeutic safety of anthracycline-based chemotherapy.

**Keywords:** Daunorubicin, Withania somnifera, Cardioprotective, cbdocking, Hepatoprotective.

**PL-468**

## DRUG UTILISATION REVIEW AND THERAPEUTIC ASSESSMENT OF ROSUVASTATIN IN CARDIOVASCULAR DISEASE MANAGEMENT

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Cardiovascular diseases (CVDs) remain a major global health burden, with statins forming the cornerstone of therapy for lipid control and risk reduction. Rosuvastatin, a potent statin, requires continuous evaluation for its prescribing patterns, clinical outcomes, and safety. To assess the utilisation pattern, therapeutic outcomes, and safety profile of Rosuvastatin in cardiovascular patients. A six-month prospective




ISBN: 978-81-980623-8-3

observational study was conducted at SCCL Main Hospital, Kothagudem. A total of 250 inpatients diagnosed with CVD and prescribed Rosuvastatin were included. Data on demographics, indications, dosing, surgical interventions, blood pressure, and glycemic control were analyzed using descriptive and inferential statistics. The majority of patients were aged 51–60 years (31.2%), with nearly equal gender distribution (females 50.8%, males 49.2%). Hypertension alone (50.8%) and hypertension with CAD (36%) were the leading indications. Most prescriptions were from the General Medicine department (80.4%). Surgical interventions included PTCA in 23.2% and CABG in 12.1%. The 10 mg dose was most commonly prescribed (61.2%), followed by 20 mg (28%). Blood pressure control was achieved in 53.2% of patients, whereas 32.8% remained hypertensive. Importantly, 89.6% of patients had abnormal blood sugar values, reflecting significant metabolic comorbidity. Rosuvastatin was rationally prescribed, predominantly at 10 mg/day, with favourable blood pressure outcomes. However, high prevalence of glycaemic abnormalities highlights the need for individualized therapy and careful monitoring to optimize cardiovascular outcomes.

**Keywords**: Rosuvastatin, Cardiovascular diseases, Drug utilisation review, Hypertension, Prescribing trends, Therapeutic outcomes

**PL-469**

## COMMUNITY-BASED EVALUATION OF ASTHMA BURDEN AND MANAGEMENT PRACTICES IN A COAL MINING TOWNSHIP OF TELANGANA, INDIA

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Asthma remains one of the most common chronic respiratory diseases worldwide, with rising incidence particularly in developing countries. Occupational and environmental exposures in coal mining regions further contribute to the disease burden. India accounts for 15–20 million asthma cases, with rural and industrial townships being disproportionately affected. To evaluate the prevalence, demographic distribution, risk factors, and therapeutic management of asthma in a coal mining township of Telangana. A community-based cross-sectional study was conducted in the field practice area of The Singareni Collieries Company Ltd. Main Hospital, Kothagudem. Thirty-six patients with clinically diagnosed asthma were enrolled using a predesigned and pretested protocol. Demographic, occupational, lifestyle, and therapeutic data were collected and analyzed. Of 36 patients, 52.8% were female and 47.2% male. The majority of cases (77.8%) were in the 19–60 year age group. Housewives accounted for the largest occupational group affected (36.1%), while labourers contributed the least (5.6%). Educational status showed higher prevalence among graduates and academic staff (66.7%). Notably, asthma was observed even among non-smokers (80.6%) and non-alcoholics (88.9%), indicating the influence of environmental exposures. In terms of therapy, 61.1% of patients were prescribed 3–5 medications, while 25% required more than five drugs. Asthma poses a significant burden in coal mining townships, affecting adults irrespective of smoking or alcohol habits. Strengthening patient counselling, ensuring rational pharmacotherapy, and adherence to evidence-based guidelines are essential to improve disease control and quality of life in such high-risk communities.

**Keywords:** Asthma, coal mining township, prevalence, risk factors, therapeutic management.

**PL-470**

## EVALUATION OF DIABETES RISK AND HEALTHCARE MANAGEMENT BASED ON ADA STANDARDS IN A COLLIERY TOWNSHIP OF TELANGANA, INDIA

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Diabetes mellitus is one of the fastest growing public health challenges, with global cases expected to double by 2025, particularly in India and China. Early detection of risk factors and adherence to evidence-based guidelines such as those of the American Diabetes Association (ADA) are essential to improve outcomes in resource-limited rural communities. To assess the prevalence of diabetes risk factors and evaluate healthcare management practices in line with ADA standards among residents of a colliery township in Telangana. A community-based cross-sectional study was conducted in the field practice area of The Singareni Collieries Company Ltd. Main Hospital, Kothagudem, Telangana. A total of 511 individuals were screened using a predesigned and pretested protocol, including demographic, lifestyle, and clinical parameters. ADA risk factor scoring was applied, and BMI, family history, physical activity, and socioeconomic status were analyzed. Of 511 respondents, 352 (56.7%) were female. Nearly half (262, 51.3%) were aged 35–55 years. Most (202, 67%) engaged in mild to moderate physical activity. Overweight status (BMI >25) was noted in 249 (49.6%) participants, with 25% of them exhibiting high diabetes risk scores. A positive association was observed between higher BMI and elevated risk. Gaps were identified in adherence to ADA-recommended standards of screening and preventive care. The study highlights inadequate compliance with ADA guidelines in rural diabetes care. Strengthening awareness, implementing structured screening programs, and integrating ADA standards into routine care are critical to reduce the future burden of diabetes in such communities.

**Keywords:** Diabetes mellitus, ADA guidelines, risk factors, obesity, rural health.

**PL-471**

## ECOPHARMACOVIGILANCE: A TOOL FOR SUSTAINABLE HEALTH CARE SYSTEM

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Ecopharmacovigilance (EPV) is a rapidly evolving field that focuses on detecting, assessing, and mitigating the environmental impact of pharmaceuticals. As pharmaceuticals are increasingly detected in water bodies and soil, EPV aims to promote sustainable practices and minimize harm to ecosystems and human health. This highlight the importance of EPV in understanding the environmental fate and effects of pharmaceuticals, its role in informing regulatory decisions, promoting green pharmacy practices, implementing safe and environmentally responsible drug disposal practices and protecting the environment. This work also discusses greener drugs, which are pharmaceuticals designed with environmental sustainability in mind. These medications aim to minimize ecological exposure and harm while maintaining therapeutic efficacy. Key aspects of green drugs include designing less environmentally impactful drugs, developing pharmaceuticals with reduced environmental toxicity and eco-friendly packaging. This review analyzed the literature published in the last decade about occurrence, bioaccumulation, and possible environmental risks of benzalkonium chlorides (BKCs), presence of psychoactive drug in aquatic environment and drugs used in COVID-19 therapy and their effects on the environment. This review also highlights the importance of knowledge and awareness regarding safe drug disposal system among the general population. The work also focuses on USFDA initiated 'Drug Take Back Programme' to prevent the entry of medication into environment. By examining the latest research and regulatory developments, this review provides a comprehensive overview of ecopharmacovigilance, offering insights into its applications, challenges, and future directions for protecting environmental and human health.

**Keywords:** Ecopharmacovigilane, drug disposal, green drugs, Drug Take Back Programme.

**PL-472**

## IDENTIFICATION OF RISK FACTORS OF ADVERSE EVENTS ASSOCIATED WITH CONTRAST AGENTS IN A TERTIARY CARE HOSPITAL: A CROSS-SECTIONAL STUDY

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Adverse events associated with contrast agents, though infrequent, pose significant clinical challenges during diagnostic imaging in tertiary care hospitals. This cross-sectional study aimed to identify and statistically analyse the key risk factors influencing such adverse events to enhance patient safety. Data were collected from patients receiving iodinated and non-iodinated contrast media over six months. Adverse event incidence




ISBN: 978-81-980623-8-3

was recorded along with demographics, comorbidities, contrast agent type, and prior reaction history. Statistical analyses using Pearson chi-square test and logistic regression revealed a significant association of adverse events with previous history of contrast agent reaction (Odds Ratio [OR]=4.2, 95% Confidence Interval [CI]: 2.8–6.3, p<0.01), renal impairment (OR=3.5, 95% CI: 2.2–5.1, p<0.01), concomitant use of nephrotoxic drugs (OR=2.9, 95% CI: 1.6–4.7, p=0.02), and administration of high-osmolality contrast agents (p=0.005). Age above 60 years showed an increased risk trend, though less statistically robust (p=0.07). Female gender was not found significantly associated. Most adverse events were mild to moderate, with dermatological symptoms predominant. Logistic regression predicted prior adverse reaction and renal dysfunction as independent risk factors for severe events (Area Under Curve=0.70, p<0.001). These findings underscore the importance of rigorous pre-procedural risk assessments, especially focusing on patient history and renal function, to tailor safer contrast agent selection. Incorporating these risk factors in clinical protocols can reduce the incidence of adverse events, improving patient outcomes in tertiary care settings. This study contributes vital statistical evidence to optimize contrast media safety practices in Indian hospitals.

**Keywords:** contrast agents, adverse events, risk factors, hospital, cross-sectional

**PL-473**

## EXPLORING THE THERAPEUTIC POTENTIAL OF ANTIDIABETIC DRUGS IN NAFLD: A RESEARCH ANALYSIS

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A prevalent disorder known as non-alcoholic fatty liver disease (NAFLD) is marked by an excess of fat in the liver. The increasing prevalence of obesity and type II diabetes is making NAFLD a public health issue that requires novel remedies. Drug repurposing can speed up drug discovery by finding new uses for existing drugs. Because the pharmaceuticals are already on the market and the safety concerns have been studied in clinical trials, repurposing them is an excellent strategy to save money. Due to the correlation between insulin resistance and inflammation of the liver, we repurposed anti-diabetic medications in the present research to treat NAFLD. The molecular docking technique was used to repurpose anti-diabetic medications for the treatment of NAFLD. The interactions were visualized using BioVia Discovery Studio. This research made use of the Peroxisome Proliferator Activated Receptor (PPAR-α) antagonist receptor (PDB ID: 6LJX). Alpha-glucosidase inhibitors, thiazolidinediones, sulfonyl ureas, PPAR-α agonists, sodium-glucose co-transporter 2 (SGLT2) inhibitors, and dipeptidyl peptidase-4 (DPP-4) inhibitors were utilized in this study, all of which were approved by the FDA as antidiabetics. Our findings indicate that DPP-4 inhibitor sitagliptin exhibits a higher binding affinity (-10.2 kcal/mol) with the receptor protein (6LJX) when compared to the standard drug saroglitazar (-7.4 kcal/mol) interacting with the same receptor. To completely comprehend the actual potential of DPP4 inhibitors in relation to PPAR-α, additional in vitro and in vivo studies are necessary.

**Keywords:** Drug repurposing, DPP-4 inhibitors, PPAR- antagonist, Auto Dock Vina.

**PL-474**

## CANCER PHARMACOTHERAPY: INTEGRATING TARGETED THERAPY, IMMUNOMODULATION, AND RESISTANCE MANAGEMENT

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Cancer pharmacotherapy has evolved from non-specific cytotoxic agents to precision-targeted and immune-based interventions. This review outlines the pharmacological landscape of anticancer agents, including tyrosine kinase inhibitors, monoclonal antibodies, immune checkpoint inhibitors, and CAR-T therapies. Mechanisms of action are analyzed alongside resistance pathways such as efflux transporters, oncogenic mutations, and tumor microenvironment modulation. The review emphasizes combination therapies and biomarker-guided treatment strategies. Nanotechnology-enabled delivery systems and RNA-based therapeutics are explored as next-generation solutions. Clinical trial design, regulatory pathways, and real-world evidence integration are discussed. By synthesizing molecular insights with translational oncology, this article offers a roadmap for future cancer drug development and personalized medicine.

**Keywords**: Cancer therapy, Targeted drugs, Immunotherapy, Drug resistance, Tumor microenvironment, Tyrosine kinase inhibitors

**PL-475**

## DRUG UTILIZATION AND POTENTIAL DRUG RELATED PROBLEMS IN VULVOVAGINAL CANDIDIASIS-A PROSPECTIVE INTERVENTIONAL STUDY

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Vulvovaginal candidiasis (VVC) is one of the most common gynecological infections affecting women of reproductive age, often resulting in significant discomfort and impaired quality of life. Appropriate drug utilization is essential for effective management, yet irrational prescribing, self-medication, and potential drug-related problems (DRPs) remain major concerns. Evaluating prescribing trends and identifying DRPs can help promote rational drug use and improve patient outcomes. The study aims to conduct a prospective interventional study on drug utilization patterns and potential drug-related problems in patients with vulvovaginal candidiasis in a tertiary care hospital. A prospective interventional study was conducted over one year at Rajiv Gandhi Cooperative Multi-Super-Specialty Hospital, Kerala, India. 240 women were included in the study. Their past medical and medication history was recorded on a data entry form, and they were followed up after the course of treatment. VVC was more prevalent among women of reproductive age (84%) and during pregnancy (17%). Antifungals were most commonly prescribed in the 15-49 age group. Hypothyroidism (41.12%) and DM (23.38%) were the most common comorbidities found in the patients. Multidrug therapy (12.75) was the most drug-related problem in VVC. Using WHO core indicators, prescribing patterns were assessed. Results were reported on the rational utilization of drugs. This study found that VVC is more common in women with higher BMI levels (overweight). Prevalence of VVC is higher in women with a BMI ranging between 25-29.9 (59.58%), which indicates that being overweight is the main reason for developing VVC. Past medical history includes Diabetes mellitus (12.08%), hypothyroidism (21.25%), Urinary tract infection (7.91%), PCOD (Polycystic Ovarian Disease) (7.08%), and anemia (2.08%). Others (8.75%). Past medication history, such as administration of antibiotics (15.41%) was the major risk factor for VVC. The results indicate that married women (82.91%) had a higher incidence of candidiasis than single women. The study shows that antifungal agents, especially azoles, are widely used in the treatment of vulvovaginal candidiasis. However, issues like inappropriate dosing, self-medication, and recurrence highlight the need for rational prescribing and patient education. Promoting proper drug use and awareness can help reduce drug-related problems and improve treatment outcomes. Vulvovaginal candidiasis was found to be more common among women of reproductive age, mainly due to hormonal factors and sexual activity.

**Keywords:** Vulvovaginal Candidiasis (VVC), Drug utilization evaluation, Potential Drug-Related Problems, Prevalence, Candida albicans, Quality of life, VSQ, VDQoL, Risk factors of VVC.

**PL-476**

## ORPHAN DRUGS: BEACON OF HOPE FOR HUMANITY

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Orphan drugs are the pharmaceutical preparations or drugs that are used to treat, diagnose or prevent rare diseases in human beings. In India Orphan drugs are given to people having an illness that affects less than 500,000 people. In spite of their less commercial value, these drugs are a beacon of hope for thousands of patients who suffer from rare diseases formerly neglected or disregarded by prevalent pharmaceutical researches. Recent advancements show high progress in technology as well as policy. National Policy for Rare Diseases (NPRD) – 2021 is the first structured framework for rare diseases in India. Regulatory Support:




ISBN: 978-81-980623-8-3

New drugs and Clinical Trials Rules (2019) is the first legal framework for orphan drugs in India. Other advances like general therapy and a novel formulation (for example hydroxyl urea syrup which is made to give to children suffering from sickle cell disease) have improved affordability, accessibility and promise a better future. Regardless of these advancements orphan drugs can be very expensive and are not accessible to middle- and lower-income families of India. Thus, the accessibility and manufacturing of orphan drugs not only exhibit scientific progress but also acts as a beacon of hope – making pharmaceutical sector act in a humanitarian mission.

**Keywords:** Orphan drugs, rare diseases, pharmaceutical preparations, NPRD

**PL-477**

## DUAL ACTION OF NITRIC OXIDE IN THE NEUROPROTECTION OF METFORMIN PLUS VITAMIN E DURING CHRONIC PRE-TREATMENT OF CEREBRAL ISCHEMIA–REPERFUSION INJURY

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Nitric oxide (NO) exerts a paradoxical influence in cerebral ischemia–reperfusion injury, with endothelial NO (eNOS) largely protective and neuronal/inducible NO (nNOS/iNOS) potentially harmful. This study explored the NO-dependent and dual effects of Metformin (MET), Vitamin E (Vit-E), and their combination during chronic pre-treatment in a rat model of bilateral common carotid artery occlusion (BCCAO). Rats received 21-day pre-treatment with MET (200 mg/kg; i.m.), Vit-E (100 mg/kg; i.m.), or MET+Vit-E prior to BCCAO. L-NAME (10 mg/kg; i.m.), a non-selective NOS inhibitor, was co-administered to delineate NO involvement. Neurological scores, infarct volume, myeloperoxidase (MPO), acetylcholinesterase (AChE), NO levels, BBB permeability, and hippocampal histology were evaluated. MET+Vit-E achieved the strongest neuroprotection, reducing infarct size, neurological deficits, MPO, AChE activity, and BBB leakage while restoring NO levels and hippocampal architecture. L-NAME blunted the benefits for infarct size, neurological score, and MPO—confirming NO dependence—yet paradoxically improved BBB integrity and AChE activity, revealing a dual action of NO likely linked to different NOS isoforms. Chronic MET+Vit-E therapy exerts potent but partially NO-dependent neuroprotection. The dual and opposing effects observed with L-NAME underscore the complex, isoform-specific role of NO and highlight the need for targeted NO modulation to optimize metformin-based stroke interventions.

**Keywords:** Metformin; Vitamin E; Nitric oxide; Acetylcholinesterase; L-NAME; Myeloperoxidase

**PL-478**

## THE ROLE OF PHARMACOVIGILANCE IN ENSURING DRUG SAFETY IN INDIA

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Pharmacovigilance (PV), is very significant and inevitable part of drug discovery and development, which requires comprehensive documentation process and severe monitoring at every phase of drug development including risk management and pre & post-authorization safety studies. The number of Adverse Drug Reaction (ADR) reported resulted in an increase in the volume of data handled, and to understand the pharmacovigilance, a high level of expertise is required to rapidly detect drug risks as well as to defend the product against an inappropriate removal. Though India has its own Pharmacovigilance Program since 2010, there are certain deficiencies in the framework for ADR from the perspective of pharma industry, healthcare professional and general public due to which adverse events for marketed drugs are highly underreported. This necessitates an utmost requirement for effective regulations of the drug approval process and conscious pre and post approval vigilance of the undesired effects, especially in India. In response, strategies to improve the collection, integration and analysis of data related to post-marketing drug safety are being initiated or enhanced. There are certain provisions through which the PV in India can be strengthen by evaluating knowledge & perception of people related to healthcare towards ADR reporting and about PV, creating awareness about PV, developing a tool for easy reporting and a better regulatory system. Hence, PV helps to the patients get well and to manage optimally or ideally, avoid illness is a collective responsibility of industry, drug regulators, clinicians and healthcare professionals to enhance their contribution to public health.

**Keywords**: Pharmacovigilance, Adverse Drug Reaction, Drug Safety

**PL-479**

## INVESTIGATION OF NEUROPROTECTIVE POTENTIAL OF MUSA PARADISIACA: GC–MS AND IN SILICO APPROACHES AGAINST ALZHEIMER'S DISEASE"

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Alzheimer's disease (AD) is a progressive neurodegenerative disorder marked by memory loss, cognitive decline, and behavioral disturbances, mainly driven by amyloid-β plaques, tau hyperphosphorylation, oxidative stress, and cholinergic dysfunction. Current therapies, including acetylcholinesterase (AChE) inhibitors and NMDA antagonists, offer only symptomatic relief and are often limited by side effects, emphasizing the need for safer natural alternatives. This study explored the anti-Alzheimer's potential of Musa paradisiaca (plantain/banana), a plant rich in flavonoids, phenolics, fatty acids, and phytosterols. Ethanolic extracts were analyzed using Gas Chromatography–Mass Spectrometry (GC–MS), which identified more than 40 bioactive phytoconstituents. Molecular docking was performed against AChE (PDB ID: 4EY7) to evaluate inhibitory potential. Among the compounds, γ-sitosterol showed the strongest activity, with a binding energy of −12.78 kcal/mol and an inhibition constant of 427.18 pM. Interaction studies revealed stable hydrophobic, hydrophilic, and cation–π interactions, confirming its strong affinity within the enzyme's active site. Other phytoconstituents displayed moderate activity. These findings validate the traditional use of Musa paradisiaca and highlight γ-sitosterol as a promising natural AChE inhibitor with neuroprotective and antioxidant potential. The results suggest that Musa paradisiaca may serve as a cost-effective, safe therapeutic source for AD management, warranting further in vitro, in vivo, and clinical investigations.

**Keywords:** Alzheimer disease, acetylcholinerterase, musa paradisiaca.

**PL-480**

## ASSESSMENT OF CLINICAL PROFILE OF THYROID DISORDERS IN A TERTIARY CARE TEACHING HOSPITAL

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AIM: Assessment of clinical profile of thyroid disorders in a tertiary care teaching hospital. METHODS: It was a prospective, observational Cross-sectional study conducted in GGH, Kadapa from August 2023 to January 2024, based on the subjects willingness and inclusion criteria. The Institutional Human Ethical Committee of the GGH, Kadapa approved the study. The statistical analysis was performed with descriptive statistics, chi-square test and paired t-test. RESULTS: Among 200 subjects, the predominant age group was 31-45 years and females were more affected with thyroid disorders i.e; Hypothyroidism. The ratio of male to female was 1:7. Obesity and no physical activity may prone to thyroid disorders. Most common symptoms were menorrhea, weight gain, weight loss, fatigue, hair loss. A significant (0.05) difference was shown in the comparison of hypothyroidism and hyperthyroidism symptoms across different systems. There is no significant (0.05) difference in TSH values in subjects of hypothyroidism using thyroxine and levothyroxine. CONCLUSION: Our study concluded that a higher prevalence of thyroid disorders among females, primarily hypothyroidism, with middle age and physical inactivity being common risk factors. Symptoms such as hair loss, fatigue, and weight changes are prevalent, along with non- thyroid manifestations like headache and skin allergies. Hypertension and T2DM frequently coexist with thyroid disorders. Timely identification and management can mitigate associated risks with other diseases.

**Keywords:** Thyroid disorders, hypothyroidism, hyperthyroidism, TSH, levothyroxine, demographics.

**PL-481**




ISBN: 978-81-980623-8-3

**UNRAVELLING THE LIVER DISEASE: PATHOPHYSIOLOGICAL INSIGHTS AND EMERGING THERAPEUTIC FRONTIERS**

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Liver diseases, including non-alcoholic fatty liver disease (NAFLD), viral hepatitis, autoimmune liver diseases, cirrhosis, and hepatocellular carcinoma (HCC), pose significant global health challenges. This review focuses on the emerging strategies used to treat different liver-related diseases according to their Pathophysiology. The "two-hit" model of NAFLD pathogenesis involves lipid accumulation followed by inflammation and oxidative stress. Stem cell-based therapies, such as mesenchymal stem cells (MSCs) and amniotic fluid-derived stem cells, promote liver regeneration and reduce fibrosis. Bioengineered liver tissues, including organoids and decellularized scaffolds, provide novel platforms for studying liver diseases and developing personalised treatments. Oxidative stress plays a crucial role in the pathogenesis of liver diseases, triggering inflammatory cascades and fibrogenic pathways. Therapeutic strategies targeting oxidative stress include antioxidants (e.g., N-acetylcysteine, vitamins, polyphenols), mitochondria-targeted antioxidants (e.g., MitoQ, SkQ1), nano-antioxidants (e.g., cerium oxide nanoparticles), and modulators of endogenous antioxidant pathways (e.g., Nrf2 activators). Challenges in liver disease treatment include poor bioavailability, non-specificity, and redox imbalance risks. Emerging strategies, such as nanoparticle-based drug delivery and cell-specific targeting, aim to overcome these limitations. Artificial intelligence (AI) has shown potential in diagnosing and assessing liver diseases, predicting treatment response, and improving patient outcomes. Telemedicine offers opportunities for remote monitoring and care of liver disease patients. Future research should focus on developing targeted therapies, optimizing stem cell and bioengineering approaches, and integrating AI and telemedicine into clinical practice to improve the management of liver diseases.

**Keywords:** Liver diseases, pathophysiology, emerging therapies, stem cell therapies, nanoparticles, and artificial intelligence

**PL-482**

**SAFETY AND EFFICACY OF ANTI-HYPERTENSIVE DRUGSIN PATIENTS WITH MULTIPLE COMORBIDITIES - A PROSPECTIVE STUDY**

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Hypertension is a major public health concern affecting 1.28 billion adults,significantly increasing the risk of cardiovascular diseases, stroke, and kidney failure. The burden is higher in low- and middle-income countries due to inadequate healthcare access. Hypertension frequently coexists with diabetes mellitus, cerebrovascular accident, and chronic kidney disease, complicating management and increasing adverse health risks. Despite JNC 8 guidelines, an optimal treatment approach for hypertensive patients with multiple comorbidities remains unclear. This study evaluates the safety and efficacy of antihypertensive drugs using WHO-UMC causality assessment and WHO ATC coding for drug utilization review. A prospective, observational, cross-sectional study was conducted over six months at Government General Hospital, Kadapa. Data were collected from treatment charts and medication history interviews at baseline, 40-day, and 80-day follow-ups. Patients aged 20–80 years on antihypertensive therapy with DM, CVA, or CKD were included, while pregnant women and those with COPD, TB, or seizures were excluded. Descriptive statistics, inferential statistics, and two-way ANOVA were used for analysis. Among 126 hypertensive patients, 68.25% were male. Diabetes (40.5%) was the most common comorbidity. 25 ADRs were reported, primarily with calcium channel blockers (CCBs), with 12 requiring hospitalization. Blood pressure reductions were observed, but no statistically significant difference was found across treatments (P>0.5). ARBs and CCBs were more effective in reducing blood pressure. Telmisartan was safer than amlodipine due to fewer ADRs. JNC 8 implementation, DUR, and clinical pharmacist interventions are crucial for optimizing therapy and ensuring patient safety.

**Keywords:** Antihypertensive therapy, Comorbidities, Adverse Drug Reactions (ADRs), Cerebrovascular Accident, Chronic Kidney Disease,

**PL-483**

**PHARMACOVIGILANCE OF ANTIBIOTICS IN THE DEPARTMENT OF GENERAL MEDICINE -A PROSPECTIVE STUDY**

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Antibiotics are among the most frequently prescribed therapeutic agents among hospitalized patients of all age groups. Adverse drug reactions are the fifth leading cause of death worldwide. The prime role of the Pharmacovigilance system is to ensure patient safety due to its involvement in comprehension, recognition, and prevention of ADEs. The present study aimed to screen, analyze and report suspected Adverse Drug Reactions in the inpatients receiving antibiotic treatment from the General Medicine Department in a tertiary care hospital. It is a prospective observational study conducted over a period of 6 months in Government General Hospital. The suspected ADRs are reported to the adverse drug reaction monitoring center. The causality assessment of those ADRs was done by using the WHO-UMC causality assessment scale. A total of 539 antibiotics were prescribed to 316 patients and 37 ADRs were found with the predominance of female gender. Anatomically the most affected organ systems were GIT followed by the nervous system. Type A reactions were more compared to Type B reactions. The causality assessment was done using the WHO Casualty scale which showed that 11 were probable, 26 were possible, definite, and unlikely were 0. More ADRs were found among patients having a longer length of stay in the hospital. The incidence of ADRs in our study was found to be 11.7%. The present study concludes that early detection and prompt reporting of the detected ADRs to the adverse reaction monitoring center (AMC) helps to improve the pharmacovigilance system in India.

**Keywords:** Pharmacovigilance, Antibiotics, ADRs, Length of stay, Causality assessment

**PL-484**

**EVALUATION OF NEUROPROTECTIVE ACTIVITY OF COUMARIN AGAINST ROTENONE INDUCED PARKINSON'S DISEASE IN ZEBRAFISH MODEL**

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The degeneration of dopaminergic neurons within the substantia nigra of the brain leads to Parkinson's disease (PD), a progressive neurodegenerative disorder that significantly affects motor capabilities. This research employed a Rotenone-induced zebrafish model of Parkinson's disease to explore the neuroprotective effects of natural phytochemicals. Utilizing PyRx and AutoDock Vina, promising compounds (Coumarin, Allicin) were virtually screened against proteins associated with PD (α-synuclein, Nrf2, BDNF, NfkB, and CCL2). Coumarin exhibited the highest binding affinity with BDNF (-7.1 kcal/mol), indicating its potential for therapeutic application. Consequently, zebrafish were administered Coumarin (100 µg/L, 200 µg/L) as the test substance and Amantadine (500 µg/L) as the standard treatment for a duration of 14 days after exposure to rotenone (4 µg/L) for 14 days. Histopathological assessments were conducted to determine the integrity of dopaminergic neurons, while behavioral tests (locomotor activity, T-Maze) were performed to assess motor and cognitive functions. Statistical analysis was carried out using Dunnett's post hoc test and Two-way ANOVA. Compared to the negative control and standard treatment groups, the findings indicated that Coumarin at 100 µg/L effectively preserved dopaminergic neurons and significantly enhanced locomotion, cognitive abilities, and PD-related depressive symptoms. These findings suggest that Coumarin represents a promising neuroprotective candidate for the management of Parkinson's disease.

**Keywords:** Parkinson's Disease, Rotenone, Coumarin, Neuroprotection, Cognitive Function.

**PL-485**




ISBN: 978-81-980623-8-3

**EXPLORING THE IMPACT OF VITAMIN E SUPPLEMENTATION ON NEUROBEHAVIORAL ALTERATIONS INDUCED BY MATERNAL HYPOTHYROIDISM IN RAT OFFSPRING**

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Thyroid hormones (TH) are vital for brain development and maturation. Hypothyroidism is a common hormonal disorder during pregnancy, affecting 2–5% of women with clinical and 3–5% with subclinical hypothyroidism. Maternal hypothyroidism is associated with neurobehavioral deficits in offspring, including impaired learning and memory, motor incoordination, and increased seizure susceptibility. The present study investigated the neuroprotective role of vitamin E supplementation during adolescence (PND 35–62) in rat offspring of hypothyroid mothers. Pregnant Sprague Dawley rats were administered 6-propyl-2-thiouracil (PTU, 10 mg/kg, orally) from GD03 to PND 21 to induce hypothyroidism. Offspring from hypothyroid mothers exhibited neurobehavioral alterations such as reduced locomotor activity (PND 63), anxiety-like behaviour (PND 64), motor incoordination (PND 65), impaired spatial working memory (PND 66), reduced attention (PND 67), and increased seizure susceptibility (PND 68). Vitamin E supplementation (100, 200, 400 mg/kg) significantly attenuated these alterations. It reduced lipid peroxidation and nitrite levels, while enhancing antioxidant defences through increased superoxide dismutase (SOD) and glutathione (GSH) activity. Vitamin E also exerted anti-inflammatory effects by lowering TNF-α and IL-6 and elevating IL-10 levels. Additionally, it improved neurochemical parameters by increasing brain-derived neurotrophic factor (BDNF) and reducing acetylcholinesterase, monoamine oxidase-A, and monoamine oxidase-B activities in the prefrontal cortex, hippocampus, and cerebellum. Histopathological examination (H&E staining) further revealed improved neuronal morphology in these regions with vitamin E treatment. These findings suggest that vitamin E supplementation during adolescence mitigates maternal hypothyroidism-induced neurobehavioral and neurochemical alterations, highlighting its therapeutic potential against developmental brain deficits.

**Keywords:** Maternal hypothyroidism, Vitamin E, Memory, Attention, Motor incoordination.

**PL-486**

**EVALUATION OFANTI - ARTHRITIC ACTIVITY OF BARK EXTRACT OF MAMMEA SURIGA KOSTERM IN COLLAGEN INDUCED EXPERIMENTAL RATS**

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Arthritis is inflammation of one or more joints, causing pain and stiffness that can worsen with age. The inflamed synovium leads to erosion of the cartilage and bone and sometimes leads to joint deformity. Sometimes RA causes problems in other parts of the body such as eyes, heart, lungs and circulatory system. The aim of this study was to evaluate the effect of ethanolic bark extract of Mammea Suriga Kosterm (MSBE) on Collagen induced arthritis in Rats. Collagen type II (2 mg/ml) was dissolved in 0.05 M acetic acid by gently stirring overnight at 4 °C. Equal amount of collagen (2 mg/ml) and Complete Freund's Adjuvant (CFA) was mixed in an ice-water bath, adding the collagen drop-wise to the CFA while mixing. Mixing was continued until a stiff white emulsion evident and was able to congeal when dropped in water. The arthritis-inducing emulsion is prepared immediately before immunization using an electric homogenizer. Rats were immunized with 0.2 ml (200 µg) of the emulsion by subcutaneous (SC) injection at the base of the tail under diethyl ether aesthesia. To ensure a high incidence and severity of arthritis a booster injection 0.1, ml (100 µg) emulsion was given 7 days after immunization. Vehicle treated group animals were treated with sterile phosphate-buffered saline (PBS), standard group of rats were treated with dexamethasone (1 mg/kg i.v.). All test groups animals were treated with MSBE with respective doses one day before administration of Type II collagen. The treatment is continued for 20 more days. Paw volume and body weightwas measured at different time intervals. All animals were measured before immunization. The collected blood samples were sent for the estimation of biochemical parameters. The collected ankle joints were subjected for histological assessment. Paw volume, body weight was measured. The protective role of MSBE is confirmed by histopathological examination. The present study suggests the use of Mammea Suriga Kosterm plant for amelioration of arthritis

**Keywords:** RA, Paw volume, Mammea suriga kosterm

**PL-487**

**EVALUATION OF HYPOLIPEDEMIC ACTIVITY OF ETHANOLIC EXTRACT OF BLEPHARIS BOERHAVIIFOLIA IN HIGH FAT DIET INDUCED IN WISTAR ALBINO RATS**

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This study evaluates the hypolipidemic potential of ethanolic extract of Blepharis boerhaviifolia in albino Wistar rats with high-fat diet (HFD)-induced hyperlipidemia. The plant, rich in phytosterol flavonoids with known antioxidant and hepatoprotective properties, was phytochemically screened and confirmed to contain key bioactive compounds. Thirty-six rats were allocated into six groups: normal control, HFD control, standard drug (Simvastatin 4 mg/kg), and three test groups receiving 100, 200, or 400 mg/kg of the extract orally for 21 days. Serum lipid profiles were assessed for total cholesterol (TC), triglycerides (TG), low-density lipoprotein (LDL), very low-density lipoprotein (VLDL), and high-density lipoprotein (HDL). Results indicated a significant reduction in TC, TG, LDL, and VLDL levels in extract-treated groups compared to HFD controls, with the highest dose (400 mg/kg) demonstrating superior lipid-lowering efficacy. Statistical analysis supported the dose-dependent activity. In conclusion, the ethanolic extract of B. boerhaviifolia shows promising hypolipidemic effects, particularly at higher doses, and may serve as a potential natural therapeutic agent for hyperlipidemia management associated with high-fat diets.

**Keywords**: Blepharis boerhaviifolia, hypolipidemic activity, cholesterol, triglycerides, albino rats.

**PL-488**

**STUDY OF RIBAVIRIN AND PYRAZOMYCIN IN HPV TREATMENT: A PERSPECTIVE TOWARDS DRUG REPURPOSING**

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Human papillomavirus (HPV) is a virus that infects skin or mucosal cells. The choice of antiviral medication for HPV treatment is generally based on established treatments such as topical agents, surgical interventions, and immunotherapies. This study focused on analysing the binding interactions of Ribavirin and Pyrazomycin with Inosine Monophosphate Dehydrogenase (IMPDH) using docking simulations, as both compounds showed structural resemblance to each other. The protein structure 1AK5 was selected and prepared by removing heteroatoms and water molecules to ensure accurate docking results. The docking scores revealed that Pyrazomycin exhibited a slightly better binding affinity compared to Ribavirin. In conclusion, the docking studies indicate that Pyrazomycin holds greater potential as an antiviral agent for HPV compared to Ribavirin. These findings suggest that said drug can be repurposed as a potential treatment for HPV infections. Further research, including experimental validation, formulation development & clinical trials, are necessary to confirm these findings and fully explore the therapeutic benefits of Pyrazomycin in HPV treatment.

**Keywords**: HPV, interactions, Ribavirin, Pyrazomycin, drug repurposing

**PL-489**

**UNRAVELLING THE MECHANISM OF CYP 450 ISOFORMS DOWNREGULATION DRIVEN ALTERATIONS IN METFORMIN PHARMACOKINETICS BY A HERBAL DIETARY SUPPLEMENT**

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ISBN: 978-81-980623-8-3

Herbal products are widely used for medicinal and dietary purposes, often concomitantly with prescription and over-the-counter medications. While they are considered as natural and safe, herbs possess bioactive compounds that can modulate drug metabolism, potentially leading to altered pharmacokinetics and therapeutic outcomes. This study investigated the impact of guava dietary supplement on the oral exposure of metformin, a first-line treatment for type 2 diabetes, in Sprague-Dawley rats. Additionally, the inhibitory effects of guava dietary supplement on hepatic cytochrome P450 (CYP450) enzymes were assessed through in vitro CYP450 inhibition assays. The gene and protein expression levels of major CYP450 isoforms were analyzed via RT-PCR and Western blotting in rat liver tissue. Pharmacokinetic parameters were evaluated following oral administration of metformin (100 mg/kg) with or without dietary supplement (250 mg/kg). Co-administration of guava dietary supplement significantly increased the oral exposure (AUC) of metformin, with a reduced Tmax from 2 h to 1 h, leading to elevated plasma drug concentrations in the initial two hours. A significant increase in Cmax was also observed, suggesting enhanced drug absorption. Furthermore, guava dietary supplement downregulated CYP1A1, CYP3A2, CYP2C11, and CYP2C22 gene expression, potentially slowing metformin metabolism and increasing the risk of drug accumulation and associated adverse effects. These findings indicate that guava dietary supplement enhances metformin exposure, likely through CYP450 inhibition, highlighting the need for careful monitoring of potential herb-drug interactions when these agents are used concomitantly.

**Keywords:** Dietary supplement, Pharmacokinetic, Diabetes, CYP450, Herb-drug interactions

**PL-490**

**THE ROLE OF CONTINOUS GLUCOSE MONITORING TECHNOLOGY**

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Diabetes mellitus (DM) is a chronic condition affecting millions worldwide and is a major contributor to morbidity and mortality. Inadequate management can result in severe complications, underscoring the importance of continuous monitoring of blood glucose levels. Conventional blood glucose monitoring (BGM) has long been a cornerstone of diabetes care, yet the advent of continuous glucose monitoring (CGM) technology has transformed glycemic management by enabling real-time assessment of glucose trends. Since its approval by the FDA in 1999, CGM has evolved significantly, allowing clinicians and patients to gain deeper insights into glucose variability, reduce the incidence of hypo- and hyperglycemia, and optimize therapeutic interventions.For patients with type 1 diabetes mellitus (T1DM), CGM plays an essential role in achieving optimal glycemic control. Clinical studies demonstrate that CGM, particularly real-time (RT-CGM) and intermittent is (CGM) systems, improves outcomes compared with traditional BGM, especially in those requiring multiple insulin injections or pumps.Overall, CGM technology represents a paradigm shift in diabetes management, enhancing glycemic control, supporting lifestyle changes, and empowering patients. Its integration into care strategies for T1DM is well established, while its role in prediabetes management continues to be explored.

**Keywords**: Pharmacotherapy, Diabetes Mellitus, Blood Glucose Monitoring, Glycemic control

**PL-491**

**IMPACT OF DEPRESSION ON QUALITY OF LIFE AND MEDICATION ADHERENCE IN RHEUMATOID ARTHRITIS PATIENTS**

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Rheumatoid arthritis (RA) is a chronic autoimmune inflammatory disorder characterized by joint pain, stiffness, and swelling, often leading to disability and reduced quality of life. Depression is a common comorbidity in RA and is associated with frequent disease flare-ups, poor prognosis, and diminished treatment outcomes. Identifying depression early using standardized tools such as the Hamilton Depression Rating Scale can help improve overall patient care. A cross-sectional observational study was conducted at Medicover Hospital, Hyderabad, over a period of six months. The study aimed to determine the prevalence of depression among RA patients and evaluate inflammatory markers in those with and without depression. Data analysis was performed using the unpaired t-test with GraphPad Prism software. A total of 550 RA patients were enrolled. Of these, 465 (84.5%) were diagnosed with depression, while 85 (15.5%) had no depression. Depression was significantly more prevalent in females (86.6%) than in males (13.4%). Furthermore, 88% of the study population demonstrated poor medication adherence, which was strongly influenced by advanced age and low socioeconomic status. The study highlights a high prevalence of depression among RA patients, particularly in women. Early diagnosis and management of depression are crucial to improving quality of life, enhancing medication adherence, and achieving better long-term treatment outcomes.

**Keywords:** Hamilton Depression Rating Scale, Rheumatoid Arthritis, Depression, Medication Adherence

**PL-492**

**A PROSPECTIVE INTERVENTIONAL STUDY ON THE ATTITUDE OF ADOLESCENT GIRLS TOWARD HPV INFECTION AND VACCINATION**

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Cervical cancer is the fourth most common cancer among women globally, with an estimated 6,04,000 new cases and 3,42,000 deaths in 2020. Vaccination against HPV and screening and treatment of pre-cancer lesions are a cost-effective way to prevent cervical cancer. The main objectives of the study were to assess the awareness and knowledge of HPV infection, cervical cancer, and attitude toward vaccination among adolescent girls and to provide educational intervention programs to improve their knowledge and awareness of HPV and cervical cancer. This was an interventional study in which 786 subjects were enrolled based on the inclusion and exclusion criteria from selected high schools and colleges in the western part of Bengaluru. The majority of the population had never heard of HPV and were unaware of cervical cancer. Only 25.61% knew about HPV cervical cancer and HPV vaccinations, and only 20% of them were aware that it could lead to cervical cancer. A significant number of respondents answered that there isn't an HPV vaccine available in India. Only 16% of them knew about cervical cancer screening, 7% were aware of Pap smear tests, and just 13.6% of them had ever received a cervical cancer screening. Over 75% of the participants did not have adequate knowledge regarding HPV infection, vaccination, and cervical cancer. The study revealed a significant gap in HPV infection and cervical cancer awareness among adolescent girls. However, a health education intervention can improve knowledge and attitude. This comprehensive approach can lead to positive health outcomes, increased HPV vaccination rates, and reduced cervical cancer incidence. Educating the public is key to addressing this critical health issue.

**Keywords:** Cervical cancer, HPV (Human papillomavirus), HPV Vaccination, Screening.

**PL-493**

**ASSESSMENT OF POTENTIALLY INAPPROPRIATE MEDICATIONS BY USING BEERS' CRITERIA IN ELDERLY CHRONIC KIDNEY DISEASE PATIENTS UNDERGOING HEMODIALYSIS.**

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Chronic kidney disease (CKD) patients undergoing hemodialysis exist at high risk of polypharmacy as well as potentially inappropriate medications (PIMs) use and this risk can worsen morbidity, can increase adverse drug reactions (ADRs). Beers' Criteria, identifies PIMs in comorbid and elderly patients. Lack of information about PIMs prevalence for CKD patients undergoing hemodialysis. This prospective




ISBN: 978-81-980623-8-3

observational study was conducted in the dialysis unit of a tertiary care hospital for a period of 6 months. Seventy-two patients aged ≥60 years with CKD undergoing hemodialysis were enrolled. The Beers' Criteria (2023 update) was used to review prescriptions for PIMs. Descriptive statistics were used to determine prevalence, and clinical variables were assessed using chi-square test and logistic regression. Seventy-two patients, an average age of 70.24 ± 7.03 years were enrolled. 75% were male patients. Each of the patients were prescribed an average of 11.86 ± 3.4 medications and 54% of them had PIMs as per Beers' Criteria including [drug classes; sedative-hypnotics, anticholinergics, NSAIDs, long-acting sulfonylureas, antidepressants]. Patients with multiple comorbidities and higher drug counts had a higher PIM risk ($p < 0.05$). PIM use is common among elderly CKD patients undergoing hemodialysis, and it is strongly associated with polypharmacy as well as comorbidities. Early identification of inappropriate prescriptions as well as prevention of adverse drug reactions can be achieved among this vulnerable population by applying Beers' Criteria. For improving patient safety, there are strategies like regular prescription review along with deprescribing and prescriber awareness.

**Keywords:** Beers' Criteria, Chronic Kidney Disease, Hemodialysis, Polypharmacy, Potentially Inappropriate Medications.

**PL-494**

## AGMATINE ALLEVIATES SIMULATED MICROGRAVITY-ASSOCIATED CEREBROVASCULAR DYSFUNCTION

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Exposure to microgravity presents significant challenges, as both the short- and long-term biological impacts on the human body remain incompletely understood. Investigating these effects and developing protective strategies is essential for astronaut health. agmatine, a known neuromodulator in the mammalian brain, interacts with multiple receptor systems, suggesting diverse roles in neuronal regulation. This study explored the therapeutic potential of agmatine in a rat model of simulated microgravity-induced brain injury, focusing on its interaction with the eNOS and nNOS pathways. Microgravity was mimicked using the hind limb unloading (HU) method in rats, with agmatine administered at various doses, and L-arginine, an agmatine modulator. To assess the neurological and cerebrovascular impact, neurochemical profiling (via HPLC), biochemical assays, analysis of pro-inflammatory markers (IL-6), and histopathological evaluations were conducted. Rats subjected to 28 days of HU exhibited marked neurological disturbances, characterized by cognitive impairment, increased anxiety and depressive-like behaviours, reduced motor coordination, neurotransmitter imbalances, altered oxidative/antioxidant status, changes in inflammatory mediators, and significant morphological abnormalities in the brain and middle cerebral arteries. Agmatine administration, both alone and in modulation with L-arginine, noticeably alleviated these deficits, producing improvements in motor coordination, reductions in anxiety and depressive symptoms, and restoration of cognitive function. Additionally, Agmatine treatment was associated with reduced oxidative stress and normalization of key biochemical and morphological markers, underscoring its neuroprotective and cerebrovascular benefits under simulated microgravity conditions.

**Keywords**: Simulated microgravity, Agmatine, Middle cerebral arteries, eNOS and nNOS

**PL-495**

## A PROSPECTIVE OBSERVATIONAL STUDY ON ERADICATION OF H. PYLORI AND REOCCURRENCE OF GASTROINTESTINAL SYMPTOMS AND FUNCTIONAL DYSPEPSIA

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Helicobacter pylori (H. pylori) eradication has been widely used. The recurrence rate of H. pylori after eradication and its related factors are gaining more and more attention. Our study aimed to determine the recurrence rate of H. pylori infection after successful eradication, and analyze its influential factors. This is a Prospective and Observational study and was conducted over a period of six months in IP and OP department and patient relevant data were collected from the patient case sheet in gastro department at Prathima Institute of Medical Sciences. The data collection form was prepared and used. The data collection form contains demographic details like age, gender, occupation, area, past history, symptoms, laboratory diagnosis like RUT, endoscopy were taken. A total number of 180 patients are diagnosed with H. Pylori. Among them 58% are male and 41% are female The most common symptoms seen are Heart burn 92% and least is anemia 22%. Based on the symptoms, scores were given to know symptoms reoccurrence and H. Pylori eradication. When comes to the treatment pattern to eradicate H. Pylori are primarily antibiotics like amoxicillin /clavulonate/ esomoprazole 75%, pantaprazole 53%, syrup sucralfate 50% are prescribed. Eradication of H. Pylori is more important than to relieve symptoms. By our study we observed eradication rate was successful in male 73% compared to female with 54%. Overall, H. Pylori eradication provides significant improvement of symptoms in functional dyspepsia patients regardless of H. Pylori prevalence. Predicting the success of H. pylori eradication therapy and choosing the appropriate therapy based on clinical parameters and symptoms will benefit patients and improve health care.

**Keywords**: Helicobacter Pylori, Eradication, Reoccurrence, Functional Dyspepsia.

**PL-496**

## THERAPEUTIC NANOGELS: DUAL IN VITRO AND IN VIVO STUDIES FOR ENHANCED DIABETIC WOUND HEALING

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The present work was proposed to prepare the atorvastatin nanogels to promote the wound healing in diabetic condition using animal model. Atorvastatin nanogels were prepared by precipitation polymerisation technique using hydroxy propyl methacrylate as polymer in the drug: polymer ratios 1:1, 1:2, 1:3, 1:4, 1:5, 1:6, 1:7 and 1:8 and characterized for particle size, entrapment efficiency, in vitro drug release and in vivo study. The particle size of the various formulations (F1-F8) showed the size range of 68 to 80nm, entrapment efficiency ranges from 58.36 to 86.75 %, in vitro study was carried out using phosphate buffer at pH 7.4 and the cumulative percentage release ranges from 61.96 to 73.760 for a period of 12hrs and followed non-fickian mechanism of release and in vivo comparative study showed wound healed completely for hydrogel nanoparticle on 11th day whereas for conventional gel on 15th day. This study indicates that hydrogel nanoparticle formulation heals the diabetic wound at a faster rate and completely, and also the drug atorvastatin can be used for diabetic wound healing.

**Keywords:** Nanogel, Atorvastatin, Diabetic wound healing

**PL-497**

## A PHOTOTHERAPEUTIC COMPOSITION OF RASNAGUDUCHYADI VATI AND A RANDOMIZED CLINICAL TRIALS OF AYURVEDIC PROCEDURES IN THE TREATMENT OF VIRAL ARTHROPATHY IN CHIKUNGUNYA

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The present invention relates to an Ayurvedic Phyto-therapeutic composition and integrative treatment protocol for the management of viral arthropathy associated with Chikungunya infection. Chikungunya presents with symptoms such as high fever, joint pain, fatigue, and long-term inflammatory complications. Conventional treatments offer only symptomatic relief, with limited impact on post-viral manifestations. This invention discloses a standardized, pharmaceutically optimized composition of Rasnaguduchyadi Vati in granule form, formulated using dry granulation with 95% ethanol, and evaluated for disintegration time, compressibility, and flow properties. Optimized batch were identified as the most suitable formulation, exhibiting superior pharmaceutical characteristics. The composition is integrated with external Ayurvedic therapies—Patrapottali Sweda, a herbal steam fomentation for pain relief, and Shunthyadi Lepa, an anti-inflammatory topical paste—for holistic symptom management. A simple randomized clinical trial on 30




ISBN: 978-81-980623-8-3

patients aged 20–70 demonstrated complete resolution of fever and fatigue by Day 30, with progressive improvement in joint-related symptoms and negative virological tests in all subjects. Hematological markers indicated reduced inflammation, confirming clinical efficacy. This invention provides a validated, safe, and effective alternative for Chikungunya management, bridging traditional Ayurvedic knowledge with modern clinical and pharmaceutical standards. It addresses the urgent need for long-term management of viral arthropathy through an integrative and evidence-based approach.

**Keyword:** Chikungunya, viral arthropathy, Rasnaguduchyadi Vati, Shunthyadi Lepa, Patrapottali Sweda, randomized clinical trial

**PL-498**

**EARLY VERSUS DELAYED RENAL DOSE ADJUSTMENT OF MEROPENEM IN SEPSIS-INDUCED ACUTE KIDNEY INJURY: A RANDOMIZED CONTROLLED TRIAL**

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Sepsis-induced acute kidney injury (AKI) significantly alters meropenem pharmacokinetics, complicating optimal dosing in critically ill patients (study conducted at Amrita Institute of Medical Sciences and Research Centre, Kochi, Kerala, India; IEC-AIMS-2024-PHARMA-222). This study evaluated the effect of early versus delayed renal dose adjustment on meropenem pharmacokinetics and attainment of pharmacodynamic targets. In an open-label randomized controlled trial, 20 adults with sepsis and AKI were randomized to two groups: early adjustment (2 g meropenem followed by renal modification within 24 h) or delayed adjustment (2 g every 8 h for 48 h before modification). Plasma concentrations were quantified by HPLC-UV, and pharmacokinetic modeling was performed using Monolix Suite 2020R1. Pharmacodynamic target attainment was assessed against pathogen minimum inhibitory concentrations. The mean age of patients was 66 years; 70% were male. Positive cultures were obtained in 70%, predominantly respiratory isolates. Compared with the early group, the delayed adjustment group achieved higher trough concentrations (1.06 vs 0.18 µg/mL; p=0.035) and greater pharmacodynamic target attainment (50% vs 10%). Mortality at 28 days was equal in both groups (10%), but the delayed group showed more vasopressor- and ventilator-free days and more stable renal function trends. No patient in either group required renal replacement therapy. These findings suggest that delaying renal dose adjustment improves pharmacokinetic exposure and pharmacodynamic target attainment without additional toxicity. This strategy supports the use of therapeutic drug monitoring and PK/PD modeling to guide individualized β-lactam dosing in critically ill patients.

**Keywords:** Meropenem, sepsis, acute kidney injury, pharmacokinetics, therapeutic drug monitoring

**PL-499**

**CASE STUDY OF CORONARY ARTERY DISEASE**

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A 58-year-old male patient with CAD, a condition that was exacerbated by his underlying risk factors, including hypertension, hyperlipidaemia, and a family history of cardiovascular disease. The patient presented with typical symptoms of angina, often exacerbated by physical activity, and was subsequently evaluated using electrocardiogram (ECG) and coronary angiography, which revealed significant stenosis in the left anterior descending artery. Initial management focused on pharmacological interventions, including the use of aspirin, statins, and beta-blockers to control symptoms and reduce the risk of further ischemic events. Following discussions with the patient, coronary artery bypass grafting (CABG) was recommended to address the critical blockage and improve blood flow to the heart. The patient underwent surgery without complications and experienced a marked improvement in symptoms during the postoperative recovery period. This case highlights the importance of early recognition, risk factor management, and timely intervention in the treatment of CAD. Despite advances in medical therapy, surgical options like CABG remain a cornerstone in managing advanced coronary artery disease. Regular monitoring and lifestyle modifications are crucial to improving patient outcomes and reducing the long-term risks associated with this chronic condition.

**Keywords**: Coronary artery disease, chest pain, risk factors, diagnostic evaluation, angiography, surgical management, recovery.

**PL-500**

**ANTI-ALZHEIMER'S DISEASE ACTIVITY SCREENING OF PERSEA AMERICANA EXTRACT AND ITS CHITOSAN NANOPARTICLES**

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Alzheimer's disease (AD) is a progressive neurodegenerative disorder that causes memory loss, cognitive decline, and behavioural changes, with currently available therapies providing only limited relief. The present study evaluated the neuroprotective and anti-tubercular potential of Persea americana (avocado) seed extract and its chitosan nanoparticles (PACNPs). Seeds were extracted using a hydroalcoholic solvent system and the extract was incorporated into chitosan nanoparticles by controlled mixing of chitosan in acetic acid, pH adjustment, and blending with the extract under optimized conditions. Literature reports indicate that Persea americana seeds are rich in bioactive constituents such as flavonoids, alkaloids, tannins, phenolic compounds, and saponins, which may contribute to their therapeutic activity. Characterization of PACNPs using UV–Visible spectroscopy and transmission electron microscopy revealed predominantly spherical particles with an average size of 39.7 nm. Neuroprotective potential was assessed using the MTT assay on SH-SY5Y cells exposed to oxidative stress, where PACNPs improved cell viability in a concentration-dependent manner. Anti-tubercular activity was evaluated through the Microplate Alamar Blue Assay (MABA), which showed inhibitory effects against Mycobacterium tuberculosis at a minimum inhibitory concentration of 250 µg/ml. Molecular docking studies further confirmed favourable interactions of catechin and quercetin, reported phytoconstituents of Persea americana, with acetylcholinesterase (PDB ID: 4EY7). These findings suggest that PACNPs possess dual therapeutic potential against AD and tuberculosis and may serve as a promising natural candidate for further preclinical evaluation.

**Keywords:** Persea americana, chitosan nanoparticles, Alzheimer's disease, tuberculosis, neuroprotection

**PL-501**

**CASE STUDY OF CHRONIC KIDNEY DISEASE**

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Chronic Kidney Disease (CKD) is a long-term illness where kidney function slowly worsens over time, often complicated by other health problems like high blood pressure, diabetes, and heart disease. This case study focuses on a 66-year-old man with stage 5 CKD who was on regular hemodialysis. He came to the hospital with fever, nausea, and breathing difficulties. His past medical history included thyroid cancer and repeated infections, which made him more vulnerable to complications, even after vaccinations. Tests showed that he had anemia, very high blood urea levels, and lung changes. He was treated with antibiotics, dietary changes, and supportive care. This case highlights how difficult it can be to manage CKD when multiple health issues are present. It shows why a team-based approach is so important to improve patient outcomes. It also stresses the need for early detection, patient awareness, and personalized treatment to slow disease progression and maintain a better quality of life.

**Keywords:** Chronic kidney disease, hemodialysis, anemia, multimorbidity, quality of life

**PL-502**

**OBSESSIVE-COMPULSIVE DISORDER: CASE STUDY AND THERAPEUTIC APPROACH**

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Obsessive-compulsive disorder (OCD) presents as a persistent combination of intrusive thoughts and repetitive behaviours, often causing substantial disruption in daily life. This report details the case of a 24-year-old man admitted for recurrent hand washing, habitual




ISBN: 978-81-980623-8-3

checking, and preoccupation with cleanliness. The patient's medical and family histories were unremarkable, and routine laboratory results did not reveal abnormalities. After clinical confirmation of OCD, treatment was initiated with fluoxetine alongside B-complex supplementation. The regimen was complemented by counselling on lifestyle changes such as cessation of tobacco and alcohol use, dietary improvements, and consistent follow-up. Over the course of management, the patient showed progress, with a decline in compulsive episodes and improved coping with obsessive urges. This case highlights the importance of individualised care and integrated strategies in the management of OCD.

**Keywords**: Obsessive-compulsive disorder, case report, fluoxetine, compulsions, management.

**PL-503**

**ADVERSE DRUG REACTION MONITORING: PROSPECTS AND IMPENDING CHALLENGES IN PHARMACOVIGILANCE FOR CHEMOTHERAPEUTIC AGENTS**

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Chemotherapy is one of the important components of treatment for many cancers. Anti-neoplastic agents are used with caution due to their high toxicity and narrow therapeutic window. Studies describing pattern of adverse drug reactions in cancer chemotherapy patients are less in India. This study aims to evaluate the pattern of Adverse Drug Reactions (ADRs) due to cancer chemotherapy in hospitalized patients and to assess the causality and severity of these reactions. This hospital-based prospective observational study was conducted at Sri Aurobindo Hospital, Indore, and Madhya Pradesh among the newly diagnosed cases of different type of cancers of both genders between the ages of (25-70) years who required chemotherapy treatment. The prescribing pattern of chemotherapy drugs associated adverse effects and potential risk factors for the development of adverse effects was studied. An ADR causality was assessed by the World Health Organization-Uppsala Monitoring Centre (WHO-UMC) Naranjo algorithm was used to identify the predictors related to chemotherapy-induced adverse effects. Most common ADR observed were peripheral neuropathy, shivering, anemia, neutropenia, thrombocytopenia and needle phobia. In this study, gastric cancer was most commonly seen followed by esophageal cancer.

**Keywords**: Chemotherapy, Adverse drug reactions, Causality assessment, Cancer

**PL-504**

**POLYCYSTIC OVARIAN SYNDROME (PCOS) AND SLEEP DISTURBANCES**

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Polycystic ovary syndrome (PCOS) is a widespread reproductive disorder that encompasses many associated health conditions and has an impact on various metabolic processes. The characteristic features of PCOS are Hyperandrogenism, Insulin resistance and anovulation. It increases the risk of insulin resistance (IR), type 2 diabetes, obesity, and cardiovascular disease. The etiology of the disease remains unclear, and the subjective phenotype makes a united diagnosis difficult among physicians. It seems to be a familial genetic syndrome caused by a combination of environmental and genetic factors. It can be linked with metabolic disorders in first-degree family members. PCOS is the cause of up to 30% of infertility in couples seeking treatment. Currently, there is no cure for PCOS. Despite the growing incidence of this syndrome, limited research has been done that encompasses the entirety of PCOS spectrum.

**Keywords:** Polycystic ovary syndrome, PCOS, Obesity, Insulin Resistance, Diabetes.

**PL-505**

**INFECTION ON SURGICAL SITE POST-OPERATION AND THE USE OF ANTIMICROBIALS TO TREAT THE INFECTION**

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Surgical site infections (SSIs) are infections occurring within one month after a surgery or up to one year following implant surgery, either at the surgical site or in its proximity. SSIs remain a significant global health concern, particularly in developing countries, contributing to increased morbidity and mortality. Despite their importance, there is limited data on the magnitude, bacteriological causes, and associated risk factors of SSIs in this hospital setting. The present hospital-based prospective observational study was conducted at Sri Aurobindo Hospital, Indore, Madhya Pradesh, among newly diagnosed cases of various surgical site infections in both sexes, aged 25–70 years, who required antimicrobial treatment. The study evaluated the prescribing patterns of antimicrobials and potential risk factors associated with SSIs. Out of 63 cases studied, the incidence of SSIs following amputation was 36.50%. The most commonly affected age groups were 51–60 years and 61–70 years, each accounting for 20.14% of cases. Among risk factors, diabetes mellitus was present in 25 patients (39.70%) and was significantly associated with SSIs. Gangrene leading to amputation was the most frequent clinical condition (36.50%). Microbiological analysis revealed Escherichia coli as the predominant organism, isolated in 12 cases (34.90%). The prevalence of multidrug-resistant organisms in this study highlights the emerging threat of antibiotic resistance. Accurate identification of SSIs requires careful interpretation of clinical and laboratory findings. Consistent and standardized definitions are crucial for surveillance programs; otherwise, reported SSI rates may be inaccurate or uninterpretable.

**Keywords:** Surgical site infections, Antimicrobials, Antibiotic resistance, Diabetes mellitus, Multidrug resistance

**PL-506**

**TOPIC: "A SURVEY ON PATIENT KNOWLEDGE, ATTITUDES, AND PRACTICES REGARDING OVER-THE-COUNTER (OTC) DRUGS"**

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Over-the-counter (OTC) drugs are medications that can be purchased without a prescription and are widely used for self-medication. While they offer convenience, inappropriate use may lead to adverse effects, drug interactions, and delayed diagnosis of serious conditions. This study aims to assess patients' knowledge, attitudes, and practices regarding OTC drug use. A cross-sectional, questionnaire-based survey will be conducted among patients visiting community pharmacies and outpatient clinics. The questionnaire will evaluate patients' understanding of drug indications, dosage, side effects, and the importance of consulting healthcare professionals before use. Data will be analyzed using descriptive and inferential statistics to identify gaps in knowledge and unsafe practices. The findings are expected to inform strategies for patient education and promote rational use of OTC drugs, thereby minimizing potential risks associated with self-medication.

**PL-507**

**PHARMACOLOGICAL EVALUATION OF HERBAL EXTRACTS: BEHAVIORAL AND NEUROCHEMICAL INSIGHTS IN ANIMAL MODELS**

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The increasing global interest in plant-based therapeutics has led to a surge in research exploring herbal extracts as potential treatments for neurological disorders. Many medicinal plants are rich in bioactive compounds capable of modulating neurotransmitter systems, yet their pharmacological profiles remain underexplored.This study aims to evaluate the behavioral and neurochemical effects of selected herbal extracts using validated animal models, with a focus on their potential central nervous system (CNS) activity.Methanolic and aqueous extracts from selected medicinal plants were prepared and administered to rodents. Behavioral assessments were conducted using the open field test (OFT), elevated plus maze (EPM), forced swim test (FST), and seizure models (PTZ and MES) to evaluate anxiolytic, antidepressant, and anticonvulsant activities. Neurochemical analysis was performed using high-performance liquid chromatography (HPLC) to quantify levels of key




ISBN: 978-81-980623-8-3

neurotransmitters such as serotonin, dopamine, GABA, and glutamate in brain tissue. The tested herbal extracts demonstrated significant dose-dependent effects on behavior, including increased exploratory behavior, reduced anxiety-like and depressive-like responses, and delayed seizure onset. Neurochemical analysis revealed modulation of neurotransmitter levels consistent with the observed behavioral outcomes, suggesting CNS-active phytoconstituents. The findings provide evidence that the evaluated herbal extracts possess promising neuropharmacological properties. These results support their potential as alternative or adjunct therapies for CNS disorders. Further studies are warranted to isolate active constituents and investigate underlying mechanisms of action.

**Keywords**: Herbal extracts, Behavioral studies, CNS disorders, Neurochemical analysis.

**PL-508**

**AN OBSERVATIONAL PROSPECTIVE STUDY ON PREVALENCE OF ADVERSE DRUG REACTION AND MEASURES TO IMPROVE AWARENESS AMONG HEALTH CARE MEMBERS IN TERTIARY CARE HOSPITAL**

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The purpose of the study was to find out the prevalence of Adverse drug reactions (ADR's) in the in-patient departments of General medicine, Pediatrics, Dermatology and to assess the knowledge, Attitude, Practice of Pharmacovigilance (KAP) and ADR reporting among health care members and to evaluate the impact of an educational intervention. An Observational Prospective Study was designed from February to July 2025 in which Prevalence of ADR was calculated. A total of 107 cases of ADR's were taken from 1334 patients. ADR's were evaluated for causality by WHO-UMC, Naranjo's scale, Severity by Hartwig and Siegel scale, Preventability by Schumock & Thornton and classification by Rawling & Thompson criteria. A suitable validated Knowledge, Attitude, Practice (KAP) questionnaire based survey was conducted among healthcare professionals & the impact of effectiveness of educational intervention was evaluated by using Chi square test & Fischer exact test in graph pad prism version (5.04). Prevalence of ADR's was found to be 8.02% and male to female ratio was 0.81. ADR's mostly occurred in the age group 31-40 (27.10%). Skin was found to be the most commonly affected organ system (24.29%) among which rashes and urticaria were the most common type of ADR'S reported, majority of the adverse drug reactions were due to Antimicrobials (22.42%). For Casuality of ADR's according to Naranjo Scale 26.16% of adverse drug reactions were assessed to be probable, using WHO-UMC scale 33.64% were considered as probable. Similarly, Severity assessment shows majority of the reactions as moderate (53.27%). The overall response rates between pre intervention and post intervention was statistically significant for medical interns and nurses (P value < 0.0001). By early detection of adverse drug reactions, necessary action can be taken to prevent mortality & morbidity from such reactions. Imparting the knowledge and awareness of pharmacovigilance among healthcare professionals by means of continuous educational intervention would bring update knowledge of practice for drug safety.

**Keywords:** Adverse Drug Reactions (ADRs), Pharmacovigilance, Knowledge Attitude Practice (KAP), Educational Intervention

**PL-509**

**OXYCODONE VS MORPHINE FOR CANCER PAIN AND PHARMACOECONOMIC EVALUATION**

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To evaluate the efficacy, safety and cost-effectiveness of Oxycodone Hydrochloride Controlled-release Tablets (CR oxycodone) and Morphine Sulfate Sustained-release Tablets (SR morphine) for moderate to severe cancer pain titration. Randomized controlled trials meeting the inclusion criteria were searched through Medline, Cochrane Library, Pubmed, EMbase, CNKI, VIP and WanFang database from the data of their establishment to June 2019. The efficacy and safety data were extracted from the included literature. The pain control rate was calculated to eatimate efficacy. Meta-analysis was conducted by Revman5.1.4. A decision tree model was built to simulate cancer pain titration process. The initial dose of CR oxycodone and SR morphine group were 20mg and 30mg respectively. Oral immediate-release morphine was administered to treat break-out pain. The incremental cost-effectiveness ratio was performed with TreeAge Pro 2019. 19 studies (1680 patients) were included in this study. Meta-analysis showed that the pain control rate of CR oxycodone and SR morphine were 86% and 82.98% respectively. The costs of CR oxycodone and SR morphine were and. The incremental cost-effectiveness ratio per unit was approximate. At the willingness-to-pay threshold, CR oxycodone was cost-effective, while the corresponding probability of being cost-effective at the willingness-to-pay threshold of was One-way sensitivity analysis confirmed robustness of results. CR oxycodone could be a cost-effective option compared with SR morphine for moderate to severe cancer pain titration in China, according to the threshold defined by the WHO.

**PL-510**

**EFFECT OF METHANOLIC EXTRACT OF TERMINALIA CATTAPA FRUIT ON ADVANCE GLYCATION END PRODUCTS IN EXPERIMENTAL STZ DIABETIC RATS**

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Arjuna Bark (White Murdah) has been reported as folklore medicine for treatment of various types of disease and disorders in alone as well as in combination with other herbal medicines. Many investigators have been reported activity of Chebulic Myrobalan in hyperglycemia, wound healing, ulcers, diarrhea, immunity and digestive disorders of GIT. In present study we investigated effect of methanolic extract of TERMINALIA cattapa fruit on advance glycation end products in streptozotocin induced diabetic rats. The diabetic rats were treated with methanolic extract of TERMINALIA cattapa fruit at a dose of 100 mg/kg orally for 14 days and found significant decrease in blood glucose, glycated hemoglobin, glycated albumin and serum glycated fructosamine level in treated diabetic rats as compared to non treated diabetic rats

**Keywords:** Diabetes, HbA1c, Glycated Hemoglobin, Advance Glycation end products, Glycated Fructosamine Glycated Albumin

**PL-511**

**ONLINE PHARMACY IS THE CURSE FOR PROFESSION**

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Online pharmacy is a medium of information that extensively used in commercial activity & communication that results in selling of Schedule H drugs Names- pharmacy Bazar, Apollo, Netmeds etc. E-commerce is new business model in pharmaceutical & medical practice. Online pharmacy facilitated sales of drug & medical services that have many prescription drugs in different types & mode of action but some of the online pharmacies found to dispense drug without prescription. In online commercial activity personal information may not confidential can expose the personal data. Online pharmacy also provides the unapproved substances which may harm to the patient many risk generate to buying drugs online. The drug may sell with foreign labels and different drug name. A purchasing drug from online pharmacy may issue in purity and quality of drugs due to unknown manufacturing address or their origin. Many harmful & adverse effect associated with the online pharmacies which curse for the profession.

**Keywords:** E-commerce sale, unapproved substance, quality of drugs, confidential data.

**PL-512**

**COMMUNITY PHARMACIST LED-INTERVENTION: A STUDY EVALUATED THE EFFECTIVENESS OF A COMMUNITY PHARMACIST-LED PROGRAM FOR EARLY DETECTION OF GIAES ASSOCIATED WITH DPP-4-INHIBITORS**

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An overview of a community pharmacist-led intervention program was shown to be effective for the early detection and management of gastro-intestinal adverse events (GIAEs) associated with Dipeptidyl peptidase-4inhibitors.and the OBJECTIVE is to early detection of GIAEs by ensuring patient safety and fostering better collaboration between pharmacist and physician. Here the METHODOLOGY the intervention group patients newly prescribed a DPP-4 inhibitors were monitored through a structured, pharmacist-led program from March to August 2024.and pharmacist used check list and provide follow-up treatment began. they also provide ongoing monitoring during routine pharmacist visit. if a GIAEs was identified, the pharmacist sent a detailed "Tracing report" to the patient's physician which helps to ensure co-ordination care. the KEY FINDINGS shown Higher intervention rate, and increased GIAE's detection were identified in 13 of 35 of patient in the intervention group." this suggests that proactive follow -up by pharmacists can detect mild symptoms that are often missed". The most common GIAEs are constipation (47.8 percent of reported GIAEs)and diarrhea (26.1 percent)the clinical outcomes including the discontinuation of the DPP-4inhibitors in one patient and the addition of supportive therapy in others.it RESULT 's to early detection of adverse events improves patient quality of life.and helps to ensure the continuation of a diabetes treatment regimen.finally we CONCLUDE that helps in the intervention, prompt action and communication, early detection of GIAEs, expansion of pharmacist role, informing future practices.

**Keywords:** DPP-4inhibitors, GIAE's, Pharmcovigilance, pharmacist-led program.

**PL-513**

**PHYSIOTHERAPY AND LIFESTYLE MODIFICATION INTEGRATED TO HEALTH: A PHARMACOLOGICAL PERSPECTIVE**

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Physiotherapy and lifestyle modification have emerged as cornerstone strategies in the prevention and management of chronic diseases, offering a non-pharmacological complement to conventional drug therapy. From a pharmacological standpoint, both approaches can be envisioned as "biological interventions" that modulate the body's internal environment much like pharmacokinetic and pharmacodynamic processes. For instance, physiotherapy interventions such as exercise and posture correction influence cardiovascular efficiency, glucose metabolism, and neuromuscular coordination in ways comparable to drug mechanisms targeting the same systems. Lifestyle modifications—healthy nutrition, stress management, and regular activity—further act synergistically with pharmacological therapies, optimizing drug absorption, distribution, metabolism, and excretion (ADME) by improving organ function and reducing metabolic stress. This integration promotes rational therapeutics, minimizes drug doses and side effects, and enhances overall health outcomes. Thus, viewing physiotherapy and lifestyle changes through a pharmacological lens reveals their role as "natural therapeutics," redefining modern healthcare by merging pharmaceutical sciences with holistic wellness strategies.

**Keywords**: Physiotherapy, Lifestyle Modification, Pharmacological Integration, ADME, Non-Pharmacological Therapy, Preventive Healthcare

**PL-514**

**PHYSIOTHERAPY AND LIFESTYLE MODIFICATION INTEGRATED TO HEALTH: A PHARMACOLOGICAL PERSPECTIVE**

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**Keywords**: Physiotherapy, Lifestyle Modification, Pharmacological Integration, ADME, Non-Pharmacological Therapy, Preventive Healthcare

**PL-515**

**POST-MARKETING SURVEILLANCE OF DAPAGLIFLOZIN (FARXIGA): A THREE YEAR FAERS ANALYSIS OF ADVERSE EVENTS (2023–2025)**

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Dapagliflozin, an SGLT2 inhibitor for diabetes, heart failure, and kidney disease, offers cardiorenal benefits. However, real-world data are crucial to identify rare or serious adverse events not fully observed in clinical trials. Evaluate the safety profile of dapagliflozin by analyzing spontaneous adverse event reports submitted to the FAERS from 1 Jan 2023 to 31 Mar 2025. Retrospective pharmacovigilance study was conducted on de-identified FAERS line-listing data. Reports with dapagliflozin or Farxiga listed as a suspect or interacting product were extracted. Descriptive statistics were applied to assess AE frequency, seriousness (FDA criteria), patient demographics, concomitant medications, and clinical outcomes. Out of 1,057 unique reports, 42% were serious, including 19 deaths (1.8%). Common AEs included genital/urinary fungal infections (14.2%), renal impairment/AKI (11.4%), DKA (8.0%), hypotension/dehydration (8.5%), Fournier's gangrene (2.1%, all males, median age 67). Median patient age was 70 years; sex was unspecified in 55%. Loop diuretics, colchicine, and other SGLT2 inhibitors were common concomitants. FDA flagged 35% as "expedited," suggesting regulatory concern. FAERS data confirm known risks (DKA, genital infections) and highlight severe events like Fournier's gangrene, especially in elderly males with polypharmacy. Routine renal monitoring and infection awareness are advised.

**Keywords:** Dapagliflozin, SGLT2 inhibitors, Post-marketing surveillance, FAERS, Pharmacovigilance, Adverse drug reactions, Fournier's gangrene

**PL-516**

**PREVALENCE OF ANEMIA AND ITS EFFECTS ON GESTATIONAL TERM AND NEONATAL BIRTH WEIGHT IN PREGNANT WOMEN VISITING A SECONDARY CARE HOSPITAL**

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Anemia is one of the most common complications during pregnancy, contributing significantly to maternal and neonatal morbidity. This retrospective observational study aimed to evaluate the prevalence of anemia among pregnant women attending a secondary care hospital and its association with gestational term and neonatal birth weight. A total of 120 pregnant women aged 18–45 years with singleton pregnancies beyond 24 weeks were included. Hemoglobin levels were assessed and anemia classified according to WHO criteria. Maternal age, parity, nutritional status, gestational age at delivery, and neonatal birth weight were analyzed using descriptive statistics, chi-square test, and multivariate regression. The prevalence of anemia was 65%, with mean hemoglobin of 10.2 ± 1.2 g/dL. Anemic mothers had a higher incidence of preterm deliveries (35.9%) compared to non-anemic mothers (11.9%). Low birth weight (<2.5 kg) was significantly more common among neonates of anemic women (41.0%) than non-anemic women (9.5%). The mean neonatal birth weight in the anemic group was 2.75 ± 0.45 kg, lower than that of the non-anemic group. Odds ratio analysis revealed that anemic mothers were 3.75 times more likely to deliver low birth




ISBN: 978-81-980623-8-3

weight infants. The study concludes that maternal anemia is highly prevalent and strongly associated with adverse pregnancy outcomes, particularly preterm delivery and low neonatal birth weight. Strengthening antenatal screening, improving nutritional interventions, and timely management of anemia can reduce perinatal complications and improve maternal and child health outcomes.

**Keywords**: Anemia, pregnancy, gestational term, neonatal birth weight.

**PL-517**

**AGMATINE ATTENUATES ETHANOL WITHDRAWAL INDUCED AUDIOGENIC SEIZURES IN RATS**

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Agmatine signalling plays a pivotal role in the endogenous response to mitigate seizures and associated neurodegeneration. Rats were exposed to varying ethanol concentrations (20% v/v) for 7 days followed by abrupt withdrawal, coupled with high-frequency sound exposure (92-100 dB, 90 sec.) to induce audiogenic seizures which are characterized by wild running, myoclonic jerks, and tonic-clonic episodes. Notably, alterations in GABA, glutamate, and pro-inflammatory cytokines were observed in the brain of withdrawn rats. The study demonstrated that agmatine administration (40 & 80 mg/kg, i.p.) and other agmatinergic agents such as L-arginine (100 mg/kg, i.p.), aminoguanidine (50 mg/kg, i.p.), and arcaine (25 mg/kg, i.p.) significantly attenuated ethanol withdrawal-induced seizure scores. Furthermore, agmatine and its endogenous modulators effectively lowered increased pro-inflammatory cytokine levels in withdrawn rats. Additionally, agmatine was found to decrease elevated glutamate levels and increase GABA levels in ethanol-withdrawn rats. These results emphasize the possible therapeutic usefulness of agmatine as a targeted biological intervention for alcohol withdrawal-induced seizures in rats. By elucidating the intricate molecular mechanisms underlying the induction of seizures during ethanol withdrawal and demonstrating the effectiveness of agmatine in mitigating these seizures, this study contributes to the understanding of neurobiological responses to ethanol withdrawal and suggests novel avenues for therapeutic intervention.

**Keywords:** Agmatine, ethanol withdrawal, audiogenic seizure, cytokines, GABA, Glutamate

**PL-518**

**ONCOPHARMACOLOGY: ADVANCES IN TARGETED CANCER THERAPIES**

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Cancer remains a leading cause of morbidity and mortality worldwide, demanding continuous innovation in treatment strategies. Traditional chemotherapy, though effective, is limited by its non-selective toxicity on healthy tissues. Oncopharmacology has transformed this landscape by introducing targeted cancer therapies, which act on specific molecular pathways responsible for tumour initiation, growth, and metastasis. This approach enhances therapeutic precision, reduces systemic toxicity, and improves patient outcomes. With genomic profiling, biomarker discovery, and nanotechnology-based delivery, targeted therapies have become a cornerstone of precision medicine. To highlight the role of oncopharmacology in advancing targeted therapies, compare their benefits with conventional chemotherapy, and emphasize the contributions of precision medicine and biomarker discovery. Data from clinical trials, oncology databases, and drug development studies were analyzed to assess the efficacy, mechanisms, and safety of targeted agents such as monoclonal antibodies, tyrosine kinase inhibitors, and angiogenesis inhibitors. Advances in nanotechnology and personalized medicine were also reviewed. Targeted therapies showed superior survival outcomes and fewer toxicities compared to chemotherapy. Genomic and proteomic profiling enabled personalized treatment strategies, leading to improved patient quality of life. Challenges including drug resistance, tumour heterogeneity, and high treatment costs were identified. Emerging trends highlight the promise of combination regimens, next-generation inhibitors, and novel delivery systems in addressing these limitations. Oncopharmacology has revolutionized cancer therapy by shifting toward precision-based targeted approaches. Continuous innovation in personalized medicine and bioinformatics ensures that targeted therapies will remain central to the future of oncology.

**Keywords:** Oncopharmacology, Targeted therapy, Precision medicine, Cancer, Molecular pathways

**PL-519**

**THE ROLE OF CLINICAL PHARMACIST IN GERIATRIC PATIENT MANAGEMENT: ENHANCING SAFETY AND OPTIMIZING THERAPY**

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Geriatric patients are particularly vulnerable to medication-related problems due to polypharmacy, age-related physiological changes, multiple comorbidities, and altered pharmacokinetics. Adverse drug reactions and poor adherence are common in this population, often resulting in increased morbidity, frequent hospitalizations, and rising healthcare costs. Clinical pharmacists play a vital role in identifying, preventing, and resolving drug-related problems, thereby improving therapeutic outcomes and enhancing the quality of life for elderly patients. To highlight the importance of clinical pharmacists in geriatric patient care. To assess the pharmacist's role in minimizing drug-related problems and improving adherence. To emphasize collaborative care for optimizing therapeutic outcomes in elderly patients. A narrative review of published literature and clinical practice reports was conducted, focusing on pharmacist interventions in geriatrics. Core activities included medication reconciliation, patient counselling, drug–drug interaction monitoring, adverse drug reaction reporting, and dose adjustments based on renal and hepatic function. Evidence indicates that clinical pharmacist interventions significantly reduce hospital readmissions, enhance medication adherence, and improve patient satisfaction. Pharmacist-led geriatric care models demonstrated notable reductions in inappropriate prescribing, adverse drug events, and overall healthcare costs. Case studies further highlighted effective management of polypharmacy and improved clinical outcomes through active pharmacist involvement. Clinical pharmacists play a pivotal role in geriatric care by optimizing pharmacotherapy, preventing medication-related problems, and contributing to multidisciplinary healthcare teams. Strengthening pharmacist-led interventions in geriatrics can improve patient safety, ensure therapeutic success, and enhance overall quality of care.

**Keywords:** Clinical pharmacist, Geriatrics, Polypharmacy, Medication adherence, Patient safety

**PL-520**

**USNIC ACID AMELIORATES DSS-INDUCED ULCERATIVE COLITIS IN FEMALE C57BL/6 MICE**

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Ulcerative colitis (UC) is a chronic inflammatory bowel disease characterized by relapsing inflammation of the colon, leading to symptoms such as abdominal pain, diarrhea, and weight loss. Current therapeutic options often remain inadequate due to limited efficacy and safety concerns, highlighting the need for novel treatment approaches. Usnic acid, a dibenzofuran derivative isolated from lichens, possesses established antioxidant, anti-inflammatory, and antimicrobial properties, but its potential in UC remains underexplored. This study evaluated the protective and therapeutic effects of usnic acid in dextran sulfate sodium (DSS)-induced ulcerative colitis in female C57BL/6 mice. Experimental groups included normal control, DSS control, sulfasalazine-treated, and usnic acid-treated cohorts at different dosages (25, 50, and 100 mg/kg). Usnic acid administration significantly reduced colonic inflammation, improved colon length, and lowered disease activity index scores compared to the DSS control group. Biochemical analysis revealed a marked suppression of proinflammatory cytokines (IL-6, IL-1β, TNF-α). Additionally, histopathological evaluation confirmed reduced mucosal damage in treated groups. These findings suggest, For the first time, treatment with usnic acid at a dose of 100 mg/kg was shown to alleviate




ISBN: 978-81-980623-8-3

DSS-induced ulcerative colitis in mice by significantly ($P < 0.001$) reducing tissue inflammation through the suppression of proinflammatory cytokines (IL-6, IL-1β, and TNF-α), while also reducing mucosal damage, thereby attenuating the severity of colitis.

**Keywords:** Dibenzofuran derivative, Cytokines, Colon length, Disease activity index

**PL-521**

## EVALUATION OF NEUROPROTECTIVE ACTIVITY OF DIOSMETIN USING ALUMINIUM CHLORIDE INDUCED OXIDATIVE STRESS IN RAT MODEL OF ALZHEIMER'S DISEASE

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Alzheimer's disease (AD) is a complex neurodegenerative disorder characterized by several pathological features, including oxidative stress, cholinergic dysfunction, and amyloid plaque accumulation. This study utilized a rat model of AD induced by aluminum chloride ($AlCl_3$) to investigate the neuroprotective effects of diosmetin. A comprehensive methodology was employed, integrating behavioral tests, biochemical analyses, and histopathological evaluations to elucidate the impact of diosmetin on AD-like symptoms. The findings of this study revealed that diosmetin administration led to significant improvements in several domains affected by AD. Behaviorally, the treated rats showed enhanced memory performance in tasks such as the Y-maze and Radial arm maze. Biochemically, diosmetin treatment reduced oxidative stress markers and modulated the activity of antioxidant enzymes, including superoxide dismutase (SOD) and catalase. Furthermore, the study observed that diosmetin contributed to the preservation of neuronal structures and exhibited effects comparable to those of donepezil, a widely used medication for AD. These findings suggest that diosmetin may be a promising therapeutic candidate for AD, potentially addressing multiple facets of the disease pathology and providing neuroprotective benefits.

**Keywords:** Alzheimer's disease, Aluminium chloride, Oxidative stress, Diosmetin, Flavonoid

**PL-522**

## IN VIVO AND INVITRO ASSESMENT OF ANTICOAGULANT ACTIVITY OF BLUMEA BALSEMIFERA LEAVES FOR HERBAL THERAPEUTICS

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Blumea balsamifera (sambong) is a medicinal plant traditionally used in Asia and known for its antioxidant, antimicrobial, and anti-inflammatory properties. The present study investigated the anticoagulant potential of B. balsamifera leaf extracts through both in vitro and in vivo models. Extracts at concentrations of 50, 100, and 200 µg/mL were evaluated for anticoagulant activity. In vitro assays, including clotting time, prothrombin time (PT), and activated partial thromboplastin time (aPTT), revealed a dose-dependent increase in coagulation time when compared with negative control (1% DMSO). The prolongation was more prominent in the aPTT assay, suggesting that the extract primarily influences the intrinsic coagulation pathway. In vivo studies, conducted using rat models, further supported these results. Oral administration of the extracts led to significant prolongation of bleeding time and clotting time relative to controls, with activity comparable to standard heparin at higher doses. The combined findings demonstrate that Balsamifera possess anti coagulant activity attributable of its phyto constituents, particularly flavonoids and phenolics. This study concludes that balsamifera may serve as a promising natural coagulant source, though detailed phytochemical isolation and mechanism-based studies are necessary for clinical transalation.

**Keywords**: Blumea balsamifera, biological activities, Herbal authentication, Phytochemical standardization, Wound healing.

**PL-523**

## METABOLIC COMPLICATIONS IN ISCHEMIC STROKE: PREVALENCE AND CLINICAL IMPACT OF HYPONATREMIA AND HYPOGLYCEMIA

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Ischemic stroke remains one of the most common causes of neurological disability and mortality worldwide. Metabolic complications such as hyponatremia and hypoglycemia often occur in stroke patients and can significantly worsen clinical outcomes. However, limited retrospective data are available on their prevalence, management, and impact on recovery. To investigate the prevalence, clinical profile, management strategies, and outcomes of hyponatremia and hypoglycemia in patients with ischemic stroke. A retrospective observational study was conducted on 180 ischemic stroke patients admitted between June 2023 and July 2024. Clinical records were reviewed for demographic data, comorbidities, presenting features, laboratory values, neuroimaging findings, therapeutic interventions, and treatment outcomes. Stroke severity was assessed using the NIH Stroke Scale (NIHSS) and functional outcomes using the Modified Rankin Scale (mRS). The majority of patients were aged 50–70 years, with a slight male predominance (62.2%). Hyponatremia was identified in 62.2% of patients, most frequently due to SIADH (63.4%). Hypoglycemia was noted in 25.6% of cases. Patients with hyponatremia had significantly higher NIHSS scores (mean: 13.6 vs 8.4, $p < 0.01$) and worse mRS outcomes compared to normonatremic patients. Hypoglycemia was associated with increased incidence of seizures (19.5%) and altered sensorium (30.4%) ($p < 0.05$). Common comorbidities included coronary artery disease (83.3%), diabetes mellitus (66.6%), and hypertension (77.7%). Despite treatment, mortality remained high at 27.8%. Hyponatremia and hypoglycemia are frequent and clinically significant complications in ischemic stroke patients. Both conditions are independently associated with increased stroke severity and poorer functional outcomes. Early recognition and prompt management of metabolic disturbances should be prioritized to improve survival and recovery in stroke patients.

**Keywords:** Ischemic stroke, hyponatremia, hypoglycemia, electrolyte imbalance, neurological outcomes, retrospective study

**PL-524**

## TARGETING BEDWETTING WITH PRECISION: THE CLINICAL ROLE OF DESMOPRESSIN IN PAEDIATRIC CARE

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Nocturnal enuresis is a prevalent paediatric disorder that significantly affects the psychosocial well-being of children and their families. Among pharmacological treatments, desmopressin has gained prominence due to its efficacy in reducing nocturnal urine production. This study evaluates the role of desmopressin in the management of paediatric nocturnal enuresis, highlighting its mechanism of action, clinical effectiveness, safety, and place in therapy. A comprehensive study conducted among 125 children based on recent clinical trials, guidelines, we conducted study to summarize current evidence regarding the use of desmopressin in monosymptomatic nocturnal enuresis (MNE) and nocturnal polyuria. Desmopressin demonstrates a response rate of 60–75% in children with MNE, particularly in those with nocturnal polyuria. Its mechanism involves selective V2 receptor activation and aquaporin-2 channel regulation, leading to reduced nighttime urine output. Combination therapy with behavioural interventions or enuresis alarms enhances treatment outcomes. The drug is generally safe; however, rare cases of hyponatremia may occur if fluid restriction is not followed. Relapse remains common after discontinuation, though intermittent or flexible dosing strategies may improve long-term outcomes. Desmopressin remains a cornerstone in the management of paediatric nocturnal enuresis, providing rapid symptom relief, improved sleep quality, and better quality of life. Future research should address relapse prevention, optimize combination strategies, and evaluate long-term safety in diverse populations.

**Keywords:** Desmopressin, Pediatric nocturnal enuresis, Bedwetting, Monosymptomatic nocturnal enuresis (MNE), Nocturnal polyuria, Vasopressin analogue

**PL-525**

## MATERIOVIGILANCE: STRENGTHENING PATIENT SAFETY THROUGH DEVICE SURVEILLANCE




ISBN: 978-81-980623-8-3

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Materiovigilance, the medical device counterpart of pharmacovigilance, plays a pivotal role in safeguarding patient health by systematically monitoring, identifying, reporting, and analysing adverse events related to medical devices. With the growing global reliance on devices ranging from simple syringes to advanced implants, ensuring their safety has emerged as a significant public health priority. This discipline addresses risks associated with design flaws, manufacturing defects, improper use, or inadequate instructions, thereby reinforcing quality assurance and fostering patient confidence. The scope of materiovigilance extends to post-marketing surveillance, causality assessment, and benefit–risk evaluation, all aimed at reducing device-associated complications. This project focuses on familiarising the concept of materiovigilance, its need, implementation, importance in enhancing device quality, preventing adverse outcomes, and its impact in Indian healthcare system. Data were gathered through analysis of reporting practices, documented case reports, and hospital-based surveys. International frameworks, such as those of the FDA (US) and MHRA (UK), demonstrate strong vigilance systems, while the Materiovigilance Programme of India (MvPI), launched in 2015, remains in a developmental phase. Under MvPI, the Indian Pharmacopoeia Commission functions as the National Coordination Centre, supported by collaborating institutes, to collect, analyse, and disseminate device safety data. Underreporting of adverse events continues to hinder progress, largely due to limited awareness among healthcare professionals. Real-world examples including microbial keratitis from contact lenses, faulty hip implants, and catheter misplacements illustrate the implications of weak vigilance. Strengthening reporting culture, enhancing regulatory oversight, and improving stakeholder education remain essential to minimize risks, improve surveillance, and achieve safer healthcare outcomes.

**Keywords:** Materiovigilance, Medical Devices, Adverse Event Reporting, Patient Safety, Post-Marketing Surveillance

**PL-526**

## REVIEW ON EFFECTIVE USE OF PROTON PUMP INHIBITORS (PPIS) IN CLINICAL PRACTICE

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Proton pump inhibitors (PPIs), are widely prescribed" drugs used for conditions of "excessive stomach acid, including gastroesophageal reflux disease (GERD), peptic ulcers, and Zollinger- Ellison syndrome". Although PPIs are effective in acid related disorders management, the appropriate use of PPIs especially concerning proper dosage is a significant problem in clinical practice. which are powerful "inhibitors of gastric acid secretion, are invaluable in the treatment of acid-related disorders" but their extensive and sometimes prolonged use creates concerns about patient safety and the utilization of healthcare resources. This review integrates current evidence and guidelines to overcome the problems with inappropriate use of PPIs. It emphasizes the need for patient-related strategies, such as careful clinical evaluation and compliance with evidence-based guidelines, to best optimize PPI therapy. Strategies like deprescribing protocols, patient education, and prescription audits are brought to the advance to counteract the risks of long-term PPI use. "Although PPIs have been generally considered safe, emerging evidence has linked these medications to numerous adverse outcomes, including community-acquired pneumonia, dementia, bone fractures, Clostridium difficile and other enteric infections, hypomagnesaemia, kidney diseases and more. Despite the fact that most conditions require only short-term treatment, many patients continue therapy for longer periods, raising concerns about potential associated risks. In addition," the need to create and execute context-specific guidelines, along with concerted efforts by healthcare teams, is emphasized to promote judicious use of PPIs and enhance patient outcomes.

**Keywords:** Proton PumpInhibitors (PPIs), Inappropriate Use of PPIs, Acid-Related Disorders, Long-Term PPI Use.

**PL-527**

## VITAMIN B12 SUPPLEMENTATION: PREVENTING ONSET AND IMPROVING PROGNOSIS OF DEPRESSION

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Depression is the most common and complex mental health condition that occurs in all ages, genders, and populations. It may be present not only as a psychological disorder but it can also associated with metabolic dysfunction and endocrine imbalances, cardiovascular diseases and chronic inflammatory conditions, nutritional deficiencies, and neurodegenerative disorders. Despite that the availability of various treatment options and depression remains the significant global health concern that the continues to require greater attention and more effective interventions. This review article was also developed by thoroughly researching multiple studies and data sources to explore the relationship between the Vitamin B12 and depression and some other Numerous studies were carefully reviewed, and based on the accumulated evidence it was concluded that early supplementation with Vitamin B12 can help delay the onset of depressive symptoms and may enhance the effectiveness of conventional antidepressant treatments when used. Although other vitamins, such as Vitamin B6 and folate, are also known to influence mood and depressive states, this review primarily focuses on Vitamin B12. The goal is to provide healthcare providers with solid foundation to adequately address the risk of depression in patients who are prone to it or who have experienced a major depressive episode during their lifetime. Vitamin B12 plays vital role.

**Keywords:** serum vitamin B12, depression prevention, hyperhomocysteinemia, neuro-psychiatric

**PL-528**

## DRUG REPURPOSING: A RAPID AND COST-EFFECTIVE APPROACH TO COMBAT NEGLECTED TROPICAL DISEASES

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Neglected tropical diseases (NTDs) like schistosomiasis, leishmaniasis, and lymphatic filariasis cause more than one billion cases worldwide and primarily occur in low- and middle-income countries. Nevertheless, drug discoveries to cure these disorders are discouragingly slow and cost prohibitive. Drug repurposing or repositioning provides an innovative and convenient solution to this problem by finding new medical indications from already existing drugs while cutting by a large margin the time, cost, and uncertainty of traditional drug development. This paper discusses what repurposing means as a new NTDs sustainable approach and how big a role it plays for the Indian pharma sector.The researchers have conducted a systematic review of the literature based on publications indexed in PubMed, Scopus, and WHO databases to identify repurposed drugs and ongoing clinical trials of interest. Among the significant results, the researchers report on three already-approved drugs as examples of their study: ivermectin, the drug mostly used in mass drug administration (MDA) interventions against lymphatic filariasis; fexinidazole, the drug that has been given the green light for human African trypanosomiasis; and miltefosine, the anti-cancer drug that has been redeveloped and is the first oral medicine for visceral leishmaniasis.Therefore, drug repurposing is highlighted as a time- and cost-effective method that has the power to change the face of not only national but also whole NTDs intervention programs worldwide.Indian research institutions, pharma companies and public health agencies must collaborate and work more closely together to promote faster innovations, increase the number of patients that may get direct benefits from the innovations, and also be in line with the WHO roadmap for NTD elimination targeted for 2030.

**Keywords:** Drug repurposing, neglected tropical diseases, miltefosine, computational pharmacology, public health.

**PL-529**

## FROM GLUCAGON-LIKE PEPTIDE-1 TO TRIPLE AGONISTS: THE FUTURE LANDSCAPE OF PHARMACOTHERAPY IN OBESITY MANAGEMENT




ISBN: 978-81-980623-8-3

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Due to the prevalence of obesity worldwide, treatments for it have changed quickly. They have shifted from traditional medications to highly effective incretin-based therapies. The first major breakthrough came from glucagon-like peptide-1 receptor agonists (GLP-1 RAs), such as semaglutide and liraglutide. These drugs improved feelings of fullness and slowed stomach emptying, leading to significant weight loss of up to 17%. Since then, the treatment landscape has continued to improve with the introduction of dual agonists, such as tirzepatide. This medication acts as a GLP-1 and glucose-dependent insulinotropic polypeptide (GIP) co-agonist. It can lead to greater average weight loss, often exceeding 20%, along with notable improvements in cardiometabolic health. This class leverages the combined effects of targeting two key hormonal pathways. Currently, researchers are developing triple agonists that also target the glucagon receptor. This area represents the latest advancements in obesity treatment. The leading candidate, retatrutide (GLP-1/GIP/Glucagon RA), showed a remarkable 24.2% reduction in body weight during clinical trials. This improved effectiveness comes from the combined metabolic effects of GLP-1/GIP, which suppresses hunger and improves glucose balance, and glucagon, which increases energy use and fat mobilization.The quick move from single to multi-receptor agonism marks a significant change in how we manage obesity. These new agents could completely change clinical practice by offering patients with obesity and related health issues better weight control, longer-lasting results, and a significant reduction in cardiometabolic risk. They provide non-surgical options that are as effective as bariatric surgery.

**Keywords:** GLP-1 Receptor Agonists (GLP-1 RAs), Triple Agonists, Incretin based therapies, Obesity Pharmacotherapy

**PL-530**

## MONITORING AND REPORTING OF SUSPECTEDADVERSE DRUG REACTIONS IN PATIENTS TREATED WITH CORTICOSTEROIDS IN TERITIARY CARE HOSPITAL-A COHORT STUDY

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Corticosteroids are the extensively used as an anti-inflammatory and immunosuppressive agents. However, their administration is often linked with adverse drug reactions (ADRs). This prospective was observational cohort study was conducted at the Government General Hospital (GGH), Kadapa, between November 2024 and April 2025, to monitor and analyze the suspected ADRs among 150 patients receiving short-term and long-term corticosteroid therapy in the General Medicine and Dermatology departments. Then the ADR causality was assessed using the World Health Organization–Uppsala Monitoring Centre (WHO-UMC) criteria and Naranjo's scale. Among these study population, males (66.6%) and elderly patients aged 69–78 years reported the highest incidence of ADRs. The Long-term use of corticosteroid therapy and intravenous administration (42.8%) emerged as significant risk factors. Central nervous system (CNS)-related ADRs, such as mood alterations, insomnia, and agitation, were the most frequently observed (42.8%). The Causality assessment are to classified the majority of reactions as Possible (71.4%) and while the remainder were categorized as the Probable (28.5%). Although descriptive analysis indicated a higher prevalence among elderly males, statistical evaluation did not demonstrate a significant association between ADR occurrence and patient age or gender ($p > 0.05$). These findings are underscore that corticosteroid-induced ADRs remain a notable clinical challenge, especially with the prolonged and systemic administration. Then the Continuous pharmacovigilance and early recognition, appropriate management strategies are essential to the minimize corticosteroid-related risks and improve the therapeutic outcomes.

**Keywords**: Corticosteroids, Adverse Drug Reactions, WHO-UMC scale, long-term therapy.

**PL-531**

## PIERRE ROBIN SEQUENCE: EPIDEMIOLOGY, CLINICAL MANIFESTATIONS, FEATURES, GENETIC BASIS, COMPLICATIONS, AND MANAGEMENT

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Pierre Robin Sequence (PRS) is a rare congenital craniofacial malformation that mainly affects the mandible and tongue, often creating early feeding and upper airway problems. The lower jaw is unusually small (micrognathia), and tongue tends to fall back into the throat (glossoptosis) and in many children there is also a cleft palate. These anamoly occurs because the jaw doesn't grow properly before birth, which also prevents the roof of the mouth from closing as it should. Then the way of PRS appears is not the same in every child. In some neonates may only find it hard to suck or feed, whereas the others experience in airway obstruction that can be life-threatening. So Parents usually notice these problems soon after birth and doctors confirm them by physical examination. In certain cases, imaging or genetic testing are done to check if the condition is part of a wider syndrome. Management depends on severity. Simple methods like positioning the baby and feeding support can help in mild cases. In more serious cases, surgery may be needed to support the airway or jaw. Long-term follow-up is essential, especially for speech, dental care, and growth. PRS exemplifies why teamwork among doctors, surgeons, and therapists is so important. Early intervention significantly improves outcomes.

**Keywords:** Pierre robin sequence, Micrognathia, Glossoptosis, Cleft palate, Congenital disorder

**PL-532**

## NEUROPROTECTIVE ROLE OF AGMATINE IN A 6-OHDA-INDUCED MOUSE MODEL OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER

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Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder that affects both children and adults and is characterized by persistent patterns of inattention, hyperactivity, and impulsivity. During adolescence, the prefrontal cortex develops connectivity with other brain regions to engage executive functions and impulsive behavior. Thus injecting 6-hydroxydopamine, a neurotoxin results in lesioning of dopaminergic neurons which results in motor and cognitive impairments, similar to the ADHD in humans. This study was planned to investigate the effect of agmatine on 6-OHDA-induced ADHD-like behavior in mice. Animals administered with 6-OHDA on PND 5, exhibited the major ADHD-like symptoms, i.e. hyperactivity in open field test, attention deficit and impulsivity in object-based attention task. Further, the model revealed discrete co-existing symptoms, i.e. memory deficits, anxiety-related compulsive-like behavior, depressive and anti-social behavior in three chamber Social Interaction task. In the present study, 6-OHDA-induced ADHD-like behavior was significantly attenuated by agmatine (20, 40, and 80 mg/kg, i.p.), L-Arginine (60 mg/kg, i.p.), Aminoguanidine (50 mg/kg, i.p.). Additionally, agmatine reduces elevated oxidative stress parameters and increases reduced dopamine level in the 6-OHDA mice brain. These findings suggest that agmatine can be a potential therapeutic target for behavioral alteration associated with ADHD.

**Keywords:** Attention-Deficit/Hyperactivity Disorder, Agmatine, 6-hydroxydopamine, Dopamine, Aminoguanidine.

**PL-533**

## DEPRESCRIBING OF PROTON PUMP INHIBITORS: PROSPECTIVE STUDY

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A six-month prospective observational study was conducted in Government General Hospital, Kadapa, to assess deprescribing of proton pump inhibitors (PPIs) and protect the irrational use by decreasing over-




ISBN: 978-81-980623-8-3

prescription, overdosing, and prolonged use of drug therapy more than standard durations. Total number of 443 subjects were entered from inpatient and outpatient departments, and statistical analysis was done by using MsExcel. Then Deprescribing was equally common in females (9.6%) and males (10.8%), with most frequent among inpatients (13.2%) than outpatients (7.4%). Department-wise deprescribing was 100% in ENT, MICU, Orthopedic, Pulmonary, and Surgical units, with general medicine reporting the lowest rate. Deprescription was more common in younger patients than in older ones, with oral PPIs being deprescribed more than intravenous one, Longer treatment duration, particularly when without clear clinical reason, was significantly associated with greater deprescribing rates. The main reasons for deprescribing was "no clear indication" (5.19%) and "over prescription" (2.93%). The PPIs was most frequently prescribed for cardiovascular disorders and represented 167 subjects in the study sample. The evidence indicates that although PPIs have been used very widely and frequently in an improper manner, there is still scope for better prescribing through the implementation of evidence-based clinical guidelines. The Ongoing therapy review and purpose of deprescribing and especially in situations of no indication, can avoid misuse of Ppis over the long term and decrease harmful effects, and ensure the cost-effective delivery healthcare. This research can highlights the need for physician monitoring and ongoing monitoring to assure maximum patient safety and therapeutic success.

**Keywords:** Proton pump inhibitors, Inappropriate Use of PPIs, Clinical Guidelines, Long-Term PPI Use

**PL-534**

## EDIBLE VACCINES

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Edible vaccines offer a new method of immunization by fusing the ideas of pharmaceutical research and plant biotechnology. Traditional injectable vaccines are produced from edible microbes or genetically modified plants that produce antigenic proteins that, when consumed orally, can trigger mucosal and systemic immune responses. However, their administration approach improves patient compliance, especially in toddlers and needle phobics, and avoids the hazards associated with poor injection technique. From a pharmacy's point of view, edible vaccines solve a number of the shortcomings of traditional vaccines. The manufacture and storage costs of these vaccines are significantly reduced because they are not reliant on cold-chain distribution and may be produced in large quantities by growing genetically engineered plants like potatoes, tomatoes, or bananas. Vaccines are more accessible when administered orally, which makes them perfect for mass immunization efforts, especially in areas with low funding. Pharmacists are essential in improving antigen stability, formulation options, and administration methods to guarantee safety, effectiveness, and regulatory compliance. Variations in antigen expression, protein breakdown in the gastrointestinal environment, and dose adjustment are other difficulties. Current pharmaceutical development addresses issues such as encapsulation, lyophilization, and formulation into unitized standardized dosages. In addition to avoiding infectious infections, edible vaccines are therapeutically interesting for autoimmune disease, allergies, and cancer immunotherapy. In conclusion, as edible vaccines offer a broadly accessible, reasonably priced, and user-friendly alternative, they represent a paradigm shift in vaccine development. Throughout the development, administration, and use of these vaccines in healthcare systems, pharmacists play a crucial role.

**Keywords:** Edible vaccines, Plant biotechnology, Genetically, Injectable, Formulation strategies, Immunotherapy.

**PL-535**

## ROLE OF CORTICOTROPIN-RELEASING FACTOR RECEPTORS AND WITHANIA SOMNIFERA-INDUCED INHIBITION OF NICOTINE ADDICTION

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Nicotine addiction is sustained by withdrawal symptoms that drive relapse. Corticotropin-releasing factor (CRF) signaling, particularly via CRF1 receptors, is implicated in stress-related aspects of drug dependence, but its role in nicotine withdrawal remains unclear. Withania somnifera (WS) is an Ayurvedic adaptogen with anxiolytic and neuroprotective properties. This study evaluated the involvement of CRF receptors in the effects of WS extract on nicotine withdrawal-associated behavioral and neuroendocrine changes in mice. Swiss albino mice were rendered nicotine-dependent by chronic subcutaneous injections (2 mg/kg, four times daily, 6-h intervals, for 10 days). Withdrawal was assessed on day 11 using the open field test (OFT) for somatic signs and the elevated plus maze (EPM) for anxiety-like behavior. CRF peptide (CRF-P, CRF1 agonist), Antalarmin (CRF1 antagonist), Urocortin II (CRF2 agonist), and Astressin-2B (CRF2 antagonist) were administered intracerebroventricularly. Plasma corticosterone levels were measured by HPLC. CRF-P (0.4 nM, icv) exacerbated withdrawal-induced anxiety, while Antalarmin (4 µg, icv) attenuated it. Co-administration of Antalarmin with WS extract (50 mg/kg, ip) produced a significant anxiolytic effect ($p < 0.001$). CRF2 agonist or antagonist did not alter WS effects. WS extract (100–200 mg/kg, ip) also reduced elevated plasma corticosterone in withdrawn mice. CRF–CRF1 signaling is a critical mediator of nicotine withdrawal. The anti-addictive effects of WS extract are mediated, at least in part, through modulation of CRF1 receptors and regulation of corticosterone levels.

**Keywords**: corticotropin-releasing factor; CRF1 receptor; Withania somnifera; nicotine withdrawal; corticosterone

**PL-536**

## IMPROVING VITAMIN D CARE FOR PSYCHIATRIC PATIENTS IN QATAR

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This quality improvement (QI) project aimed to address the widespread issue of vitamin D deficiency in psychiatric patients, a group particularly vulnerable to its effects on brain health and overall well-being. The primary objective was to increase the proportion of patients with corrected vitamin D levels from 25% to 75% within one year by improving prescribing practices and monitoring systems. A multidisciplinary QI team implemented structured interventions at the outpatient pharmacy of RCC2, Mental Health Services, Qatar. Adult psychiatric patients were screened during routine medication visits. The main outcomes included the percentage of patients achieving healthy vitamin D levels and the number of physicians trained in optimized prescribing. Progress was monitored quarterly using Plan-Do-Study-Act (PDSA) cycles and supporting QI tools. Over 12 months, 665 patient records were evaluated. The proportion of patients achieving corrected vitamin D levels rose to 74.8%, representing substantial progress compared to the baseline of 25%. Improvements across phases were as follows: Phase 1 (77.4%), Phase 2 (85.8%), Phase 3 (71.5%), and Phase 4 (60.3%). In parallel, twenty physicians successfully completed training programs that enhanced their prescribing practices. In conclusion, the project achieved its target by significantly increasing the proportion of psychiatric patients with corrected vitamin D levels. The findings demonstrate the effectiveness of structured QI interventions in enhancing patient outcomes within mental health care and highlight the importance of continuous monitoring and capacity-building initiatives.

**Keywords:** Vitamin D, psychiatric patients, quality improvement, prescribing practices, mental health care

**PL-537**

## ORGANS-ON-CHIP: A FUTURE TOOL IN PHARMACOLOGY & DRUG DISCOVERY

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Organs-on-Chip (OoCs) are microfluidic devices lined with human cells that replicate organ-level physiology, offering a transformative platform for drug discovery and pharmacological research. This study evaluates their role across all drug development phases—Discovery, Preclinical, Clinical, and Post-market thus highlighting their ability to simulate tissue–tissue interactions, mechanical forces, and biochemical microenvironments. OoCs have shown potential to reduce R&D costs by 10–26%, with Emulate's cost calculator estimating a 6-month OoC study at ₹8,300 (USD 100) versus ₹83 lakh (USD 100,000) for traditional




ISBN: 978-81-980623-8-3

primate studies. The Indian market generated ₹22.5 crore in 2024 and is projected to reach ₹103 crore by 2030 (CAGR 28.2%). Integration with AI enhances image analysis, PK/PD modelling, and digital twin simulations. JSS College of Pharmacy, Mysuru, is contributing significantly to this field through faculty training at the University of Nebraska Medical Centre and Seton Hall University, USA, along with hosting guest lectures, pre-conference workshops, and translational research initiatives. These efforts foster global collaboration and skill development in advanced pharmacological tools. Despite challenges in cost, expertise, and regulatory standardization, Organs-on-Chip technology stands at the forefront of next-generation pharmacology, offering a precise, ethical, and economically viable pathway for human-relevant drug development.

**Key words:** Organ-on-Chip, Drug Discovery, Microfluidics, AI Integration, Personalized Medicine

**PL-538**

**AN OBSERVATIONAL STUDY ON THE PRESCRIPTION TRENDS IN PATIENT WITH DIABETES AND ASSOCIATED DISEASE IN ADULT**

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Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia and is rapidly increasing in prevalence, particularly in developing nations such as India. The disease is frequently complicated by comorbidities including hypertension, cardiovascular disorders, and kidney disease, which further challenge treatment outcomes. With the continual introduction of new therapies and updated clinical guidelines, understanding prescription patterns in diabetic patients is vital to ensure safe, effective, and evidence-based management. This six-month observational cohort study was conducted in the General Medicine Department of Sri Aurobindo Hospital, Indore, Madhya Pradesh. A total of 100 adult inpatients (≥18 years) with confirmed diabetes mellitus and complete prescription records were enrolled. Data collection included patient interviews, medication histories, caregiver reports, case files, and laboratory findings. Prescribing trends, drug combinations, guideline adherence (ADA, WHO), and potential drug-drug interactions were systematically analyzed. Findings revealed that most participants were middle-aged and frequently presented with comorbidities such as hypertension and diabetic retinopathy. Metformin was the most commonly prescribed agent, either alone or in combination therapy. Importantly, poor medication adherence was strongly associated with higher complication rates, underscoring adherence as a key determinant of treatment success. The study highlights the importance of personalized therapy, patient education, and continuous monitoring to optimize glycemic control, minimize complications, and enhance the quality of life in adults with type 2 diabetes mellitus.

**Keywords:** Diabetes mellitus, Prescription patterns, Medication adherence, Comorbidities, Clinical guidelines

**PL-539**

**A CROSS-SECTIONAL STUDY ON THE ROLE OF COMMUNITY PHARMACISTS FOR PSORIASIS MEDICATION ACCESSIBILITY IN NAGPUR REGION**

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Psoriasis, a chronic autoimmune disease affecting the skin, posed significant challenges for patients, including physical discomfort and psychological distress. Access to appropriate medications is essential for managing symptoms and improving quality of life. However, ensuring medication accessibility remained particularly difficult in regions with limited healthcare resources. In these settings, community pharmacists served as crucial healthcare providers and were often the first point of contact for patients seeking treatment. This cross-sectional study aimed to investigate the role of community pharmacists in facilitating psoriasis medication accessibility in the Nagpur region. The study employed a comprehensive approach to assess various aspects of pharmacist involvement in psoriasis care. A structured questionnaire was administered to community pharmacists practicing in Nagpur to collect data on their knowledge of psoriasis, the availability of psoriasis medications in local pharmacies, counseling practices related to disease management, and collaborations with dermatologists or other healthcare professionals. In addition, semi-structured interviews were conducted with psoriasis patients to gather insights into their experiences with pharmacist support and medication accessibility. By examining pharmacist knowledge, medication availability, counseling practices, and collaborations with healthcare professionals, the study sought to identify opportunities for enhancing pharmacist involvement in psoriasis care and improving patient outcomes. Ultimately, the findings provided a basis for developing targeted interventions to address gaps in medication accessibility and improve the quality of care for individuals living with psoriasis in Nagpur.

**Keywords**: Psoriasis, Community Pharmacist, Medication Accessibility.

**PL-540**

**TO UNDERSTAND THE PHARMACOVIGILANCE ALONG WITH ADR OF INEBILIZUMAB**

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Pharmacovigilance is a crucial for monitoring and ensuring drug safety, particularly for novel therapies. This study investigates adverse events associates with Inebilizumab, monoclonal antibody, in treating Myasthenia Gravis (MG), an autoimmune disorder characterised by muscle weakness and fatigue. Inebilizumab targets CD19 on B cells, reducing the autoimmune response in MG. The project involves a comprehensive review of clinical trial data, post-marketing surveillance reports, and patient registries to assess the incidence, nature, and severity of adverse events linked to Inebilizumab. This study aims to provide a detailed characterization of these adverse events, identify high-risk patient subgroups, and offer recommendations for monitoring and management in clinical practice. Data will be sourced from pharmacovigilance databases such as the FDA Adverse Event Reporting System (FAERS) and Surveillance, alongside clinical trial registries. By examining patient demographics, comorbidities, concomitant medications, and genetic factors, the study seeks to understand the mechanisms underlying the observed adverse events. This analysis is vital for developing targeted strategies to mitigate risks and enhance patient outcomes. The expected outcome is understanding of the risk-benefit profile of Inebilizumab, contributing to improved patient care and informing future clinical guidelines. This research underscores the importance of continuous post-marketing surveillance and the integration of real-world evidence in drug safety evaluation.

**Keywords**: Pharmacovigilance, Inebilizumab, Myasthenia Gravis, Adverse Events, Monoclonal Antibody.

**PL-541**

**“ASSESSMENT OF ADVERSE DRUG REACTIONS OF ANTIDEPRESSANTS IN PSYCHIATRIC PATIENTS AT A TERTIARY CARE HOSPITAL”**

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Antidepressant medications are commonly prescribed for the management of psychiatric disorders, but their use is often associated with adverse drug reactions (ADRs), which may compromise treatment efficacy, patient adherence, and quality of life. Evaluating the safety profile of these agents in routine clinical practice is crucial for optimizing therapy. This prospective observational study was conducted in the Psychiatry Department of Sri Aurobindo Hospital, Indore, including 200 psychiatric patients receiving antidepressant therapy. Patients were monitored for ADRs over a fixed study period through interviews, physical examinations, and review of medical records. The severity and causality of ADRs were assessed using standardized pharmacovigilance tools, including the WHO-UMC criteria and the Naranjo algorithm. A significant proportion of patients experienced ADRs, most commonly gastrointestinal disturbances, weight changes, sexual dysfunction, insomnia, and sedation. Selective serotonin reuptake inhibitors (SSRIs)




ISBN: 978-81-980623-8-3

were associated with the highest incidence of ADRs, whereas tricyclic antidepressants (TCAs) produced more severe but less frequent adverse effects. Most ADRs were mild to moderate in severity and classified as probably related to the antidepressant therapy. These findings highlight that antidepressant treatment is frequently associated with adverse effects, emphasizing the need for vigilant monitoring, patient counseling, and timely management interventions to enhance treatment adherence and therapeutic outcomes. Strengthening pharmacovigilance in psychiatric practice can improve the overall safety, efficacy, and quality of care for patients undergoing antidepressant therapy.

**Keywords:** Antidepressants, Adverse drug reactions, Pharmacovigilance, SSRIs, Tricyclic antidepressants, Psychiatry

**PL-542**

**DIAGNOSTIC CHALLENGES IN MULTISYSTEM SJOGREN'S SYNDROME: A CASE-BASED CLINICAL ANALYSIS WITH LITERATURE REVIEW**

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Sjogren's syndrome (SJS) is a systemic autoimmune disorder primarily affecting exocrine glands but increasingly recognized as a multi-organ disease. Neurological manifestations such as small-fiber neuropathy (SFN) are emerging, and rare cases may involve simultaneous gastrointestinal and thromboembolic complications. To describe a case-based analysis of SJS with multi-system involvement, emphasizing diagnostic challenges and the importance of coordinated management, supported by literature evidence. A 78-year-old woman presented with vomiting, diarrhea, fever, bilateral pedal edema, and erythema. She was hypoxic ($SpO_2$ 85% on room air), hypotensive (BP 86/54 mmHg), and febrile (38.5 °C). Laboratory workup revealed elevated ESR (62 mm/hr), mild anemia (Hb 9.8 g/dL), B12 >2000pg/ml and positive anti-Ro/SSA antibodies. Echocardiography showed mild right-sided chamber dilation with pulmonary artery systolic pressure of 45 mmHg. Initial stabilization included IV fluids, broad-spectrum antibiotics (meropenem, teicoplanin, clindamycin), bronchodilator nebulization, and ICU monitoring. SJS management involved pilocarpine, levothyroxine, pentoxifylline, and anxiolytic support. Clinical suspicion was broadened due to coexisting SFN symptoms, irritable bowel syndrome (IBS), affective speech disorder, and pulmonary embolism. The patient improved with multidisciplinary care. Literature reports describe isolated SFN and management (Mehrnaz, 2024) or thromboembolic events (Pierre, 2025), but simultaneous neurological, gastrointestinal, and thromboembolic manifestations remain rare. This case highlights the need for heightened clinical suspicion of SJS in elderly patients presenting with unexplained multi-system findings. Early recognition and coordinated management across specialties reduce morbidity and optimize outcomes.

**Keywords**: Sjogren's syndrome, Small-fiber neuropathy, Pulmonary embolism, Multisystem involvement.

**PL-543**

**AMELIORATIVE POTENTIAL OF GMELINA ARBOREA IN ALUMINIUM-INDUCED NEUROTOXICITY: INSIGHTS INTO NEUROPROTECTIVE, ANTIOXIDANT, ANTI-AMYLOID, AND CHOLINERGIC MODULATION**

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Alzheimer's disease (AD) is a progressive neurodegenerative disorder and the most common cause of dementia, responsible for 60–80% of cases worldwide. It is clinically characterized by memory loss, cognitive impairment, and motor dysfunction, and pathologically by the accumulation of amyloid-beta (Aβ) plaques and neurofibrillary tangles of hyperphosphorylated tau protein. Oxidative stress and cholinergic dysfunction play central roles in AD pathogenesis, marked by elevated reactive oxygen species (ROS), reduced antioxidant enzymes such as superoxide dismutase (SOD) and catalase (CAT), increased lipid peroxidation, and heightened acetylcholinesterase (AChE) activity. Current therapeutic options offer only symptomatic relief, with limited effects on disease progression. Aluminium chloride ($AlCl_3$) is widely used to induce AD-like pathology in animal models, replicating key features including Aβ accumulation, oxidative stress, cholinergic deficits, and neuroinflammation. Natural products with antioxidant and neuroprotective properties are being increasingly explored for their therapeutic potential. Gmelina arborea Roxb. (Gambhari), a traditional Ayurvedic herb, has shown promise due to its rich phytochemicals including flavonoids, iridoid glycosides, and phenolics. This study evaluates the neuroprotective efficacy of Gmelina arborea fruit ethanolic extract in an $AlCl_3$-induced AD rat model. Behavioral parameters (depression, anxiety, memory), biochemical markers (AChE activity, SOD, MDA), Aβ deposition, and brain-derived neurotrophic factor (BDNF) levels were assessed. The extract significantly improved cognitive and behavioral outcomes, reduced oxidative damage, inhibited AChE activity, increased BDNF levels, and attenuated Aβ pathology. These findings highlight the potential of Gmelina arborea as a multi-target therapeutic agent against AD-related neurodegeneration and support further investigation into its clinical applicability for managing Alzheimer's disease.

**Keywords:** Neuroprotection, Alzheimer's disease, Gmelina arborea, oxidative stress, BDNF

**PL-544**

**COMBINED EFFECT OF SITAGLIPTIN AND SPIRONOLACTONE ON THE MITIGATION OF DIABETIC NEPHROPATHY IN A RAT MODEL OF STREPTOZOTOCIN-INDUCED TYPE 2 DIABETES**

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Diabetic nephropathy (DN) is a leading cause of chronic kidney disease and end-stage renal failure among patients with type 2 diabetes mellitus (T2DM). The current study evaluated the combined effects of sitagliptin, a dipeptidyl peptidase-4 inhibitor, and spironolactone, a mineralocorticoid receptor antagonist, on the progression of DN in a streptozotocin-induced rat model of T2DM. Diabetes was induced by high-fat diet followed by low-dose STZ injection. Rats were divided into control, diabetic control, sitagliptin-treated, spironolactone-treated, and combination therapy groups. After 8 weeks, biochemical parameters including blood glucose, serum creatinine, blood urea nitrogen (BUN), urinary albumin, and total protein were measured. Renal oxidative stress markers (SOD, CAT, MDA), inflammatory cytokines (TNF-α, IL-6), and fibrosis markers (TGF-β1, Collagen IV) were assessed. Histopathological analysis of kidney tissue was performed. Combination therapy significantly improved glycemic control, reduced renal oxidative stress, inflammation, and fibrosis compared to monotherapies. Histology confirmed attenuated glomerular and tubular damage with combined treatment. These findings suggest that sitagliptin and spironolactone act synergistically to protect against diabetic nephropathy through multi-targeted mechanisms, highlighting the potential of combination therapy in managing DN.

**Keywords:** Diabetic nephropathy, Streptozotocin, Sitagliptin, Spironolactone, Oxidative stress, Renal fibrosis, Renoprotection.

**PL-545**

**"PROTECTIVE EFFECT OF HYDROETHANOLIC EXTRACT OF CITRULLUS COLOCYNTHIS FRUIT PULP AND RESVERATROL COMBINATION ON LETROZOLE-INDUCED PCOS IN WISTAR RATS"**

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Polycystic ovary syndrome (PCOS), a prevalent endocrine disorder in women of reproductive age, is characterized by hormonal imbalance, ovarian cysts, and irregular cycles. Current treatments often fail to address its multifactorial manifestations. This study investigates the therapeutic effects of Citrullus colocynthis and resveratrol in managing hormonal levels, improving lipid profiles, and restoring ovarian structure in letrozole-induced PCOS in Wistar rats. Adult female rats were divided into seven groups: normal control, letrozole-induced positive control, clomiphene-treated standard control, three letrozole-induced + Citrullus colocynthis & resveratrol treated groups (low, moderate, high dose), and




ISBN: 978-81-980623-8-3

Citrullus colocynthis & resveratrol only group. Treatments were administered over several weeks, followed by hormonal (FSH, LH, testosterone) and biochemical (glucose, cholesterol, triglycerides) assessments, organ weight analysis, and ovarian histopathology. Results showed that Citrullus colocynthis & resveratrol significantly lowered FSH, LH, and testosterone, while improving lipid metabolism by reducing cholesterol and triglycerides. Ovarian tissue analysis revealed reduced cystic formation and enhanced follicular development, with improvements in ovarian structure superior to clomiphene. The combination demonstrated significant reproductive and metabolic benefits, highlighting their potential as multifaceted therapeutic agents. These findings emphasize the need for further research into their mechanisms and clinical applications for PCOS management.

**Keywords:** Polycystic ovary syndrome (PCOS), Citrullus colocynthis, Resveratrol, Letrozole, Clomiphene citrate, Hormonal imbalance, Ovarian morphology.

**PL-546**

**THERAPEUTIC ROLE OF N-ACETYLCYSTEINE IN NEUROINFLAMMATORY AND SEROTONERGIC ALTERATIONS OF CHRONIC STRESS-INDUCED DEPRESSION**

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Depression is increasingly being considered as a condition that has a close connection with neuroinflammation and disturbance of neurotransmitter regulation. This paper examined the possible therapeutic benefits of N-acetylcysteine (NAC), an antioxidant and glutamate-regulating agent, on chronic exposure to the well-known model of unpredictable mild stress (CUMS) in rats. The behavioral tests involved were a preference for sucrose, forced swim, open field, and locomotor activity tests. CUMS significantly caused anhedonia, despair-like behavior, decreased locomotion, increased hippocampal and prefrontal pro-inflammatory cytokines (IL-1b, IL-6, TNF-α), and diminished serotonin levels. The application of NAC (50 and 100 mg/kg, p.o) or fluoxetine restored the behavioral performance of animals, decreased the expression of cytokines, and restored the level of serotonin. Nevertheless, the minimum dose of NAC (25 mg/kg) was not effective. To a significant degree, these findings indicate the use of NAC as an adjunctive therapeutic approach to the depressive disorders caused by stress, which is associated with anti-inflammatory effects and modulation of serotonergic activity.

**Keywords**: Antioxidant therapy, chronic stress model, serotonin modulation, neuroimmune regulation, antidepressant-like activity

**PL-547**

**NEUROPROTECTIVE POTENTIAL OF ALPHA AMYRIN AGAINST ALUMINUM-INDUCED OXIDATIVE STRESS AND NEURODEGENERATION**

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Persistent exposure to neurotoxins like aluminium leads to oxidative stress-induced neuronal inflammation, neurotransmitter imbalance, erroneous protein accretion, and neuronal apoptosis which ultimately course to several neurodegenerative disorders. The current research examines the neuroprotective effect of the compound alpha amyrin against aluminum-induced oxidative stress and neurodegeneration. Alpha amyrin isolated from Ficus benghalensis stem bark extract were purified and spectroscopically characterized followed by in vitro antioxidant studies. Chitosan-decorated alpha amyrin nanoemulsion underwent physicochemical characterization followed by ex-vivo permeation and stability studies which showed good cumulative permeation and flux through the nasal epithelium and stability. Neuroprotective and biochemical studies were performed and an improvement in the antioxidant status and a simultaneous decrease in the lipid peroxidation and brain aluminum levels were noted. Moreover, brain levels of acetylcholine esterase, dopamine, glutamate, TNF-α and IL-6 were regulated. Neurobehavioral studies showed improved locomotion in the actophotometer, improved motor coordination and grip strength in the rotarod test, ameliorated spatial learning and memory in the Morris water maze test, improved learning and retention of memory and reduction of anxiety in the elevated plus maze test. Eddy's hot plate test showed amelioration of aluminium- mediated hyperalgesia. Histopathological examination of nasal epithelium and associated organs in nanoemulsion-treated groups across varying doses showed no signs of toxicity and the observations aided dose selection. Immunohistochemistry studies performed in rat brains indicated decreased β-amyloid accumulation and increased BDNF expression. Thus the study exhibitted alpha amyrin as a promising neuroprotective agent against aluminum-induced oxidative stress and neurotoxicity in the biological system.

**Keywords**: Aluminium, alpha amyrin, β-amyloid, BDNF, neuroprotection.

**PL-548**

**PSYCHIATRIC DISORDERS (MENTAL HEALTH CONDITIONS)**

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Psychiatric disorders represent a broad group of mental health conditions that significantly impact thoughts, emotions, behavior, and overall functioning. They include common illnesses such as depression, anxiety, bipolar disorder, schizophrenia, and substance use disorders, which collectively contribute to a major burden of disease worldwide. These conditions often arise from complex interactions between genetic, biological, psychological, and environmental factors. Early onset, chronic course, and frequent comorbidities make psychiatric disorders a leading cause of disability, reduced quality of life, and increased mortality. Despite advances in diagnosis and treatment, challenges persist due to social stigma, underreporting, and limited access to mental health services in many regions. Current management strategies rely on pharmacotherapy, psychotherapy, and psychosocial support, with growing emphasis on integrated and personalized care models. Ongoing research into neurobiology, digital interventions, and preventive strategies offers hope for more effective identification and management. Addressing psychiatric disorders requires a comprehensive approach that combines clinical care, community support, and public health initiatives to reduce stigma and improve access to timely treatment.

**Keywords:** mental health condition, bipolar disorder, schizophrenia complex interactions, frequent comorbidities.

**PL-549**

**NEUROPROTECTIVE EFFECTS OF SESBANIA GRANDIFLORA FLOWER EXTRACT ON HALOPERIDOL-INDUCED PARKINSON'S DISEASE IN MICE**

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Parkinson's disease (PD) is a progressive neurodegenerative disorder marked by the loss of dopaminergic neurons in the substantia nigra, leading to motor symptoms such as tremors, rigidity, bradykinesia, and postural instability. The underlying pathophysiology involves oxidative stress, mitochondrial dysfunction, and abnormal protein aggregation, which collectively contribute to neuronal degeneration. Current pharmacological treatments, including levodopa and dopamine agonists, provide only symptomatic relief and do not prevent disease progression. The present study evaluated the neuroprotective potential of Sesbania grandiflora flower extract in haloperidol-induced Parkinsonism in Swiss albino mice. PD-like symptoms were induced by intraperitoneal administration of haloperidol (1 mg/kg) for 8 days. Treatment groups received S. grandiflora extract orally at doses of 250 mg/kg and 500 mg/kg, while Syndopa plus (20 mg/kg) served as the standard drug. Behavioral assessments, including bar test, Rota-Rod, actophotometer, and open field test, were conducted to evaluate motor function and locomotor activity. Biochemical assays measured antioxidant markers—superoxide dismutase (SOD), catalase (CAT), and glutathione (GSH)—while histopathology examined neuronal integrity. S. grandiflora extract significantly reduced cataleptic behavior, improved motor coordination, and restored locomotor activity compared to the haloperidol-only group. Biochemical findings demonstrated enhanced antioxidant enzyme activity and reduced oxidative stress, while histopathology confirmed preservation of neuronal structure. Sesbania grandiflora flower extract exhibited potent antioxidant and




ISBN: 978-81-980623-8-3

neuroprotective effects against haloperidol-induced Parkinsonism. These results suggest its therapeutic promise as a supportive or complementary treatment option for managing PD.

**PL-550**

**ELUCIDATING THE ROLE OF PEHARMALINE AND ITS PHARMACOLOGICAL EFFECT ON DNA DAMAGE, APOPTOSIS AND SENESCENCE IN BREAST CANCER CELLS**

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Elucidating the Role of Peharmaline and Its Pharmacological Effect on DNA Damage, Apoptosis and Senescence in Breast Cancer Cells. Peharmaline compounds were screened for their cytotoxicity using cell viability/ MTT assay and their growth inhibition was studied through colony formation assay; senescence activity was checked by β-Galactosidase assay and apoptotic function was confirmed by DAPI staining. Western blotting technique was used to study the expression of protein markers for various conditions. The data was analysed using relevant techniques, equipment and software. 4T1 mouse mammary carcinoma model was used for studying the effects of the novel compound in mice. The compound Peharmaline was found to have anticancer properties in MCF-7 breast cancer cell line and showed promising results. Based on the study, the compound Peharmaline can be used as an anti-cancer agent. Data regarding many aspects of the genus such as mechanisms of actions, metabolism, pharmacokinetics, toxicology, potential drug interactions with standard-of-care medications is still limited which call for additional studies particularly in humans. Further assessments and clinical trials should be performed before it can be integrated into medicinal practices.

**PL-551**

**"INTEGRATIVE AND INNOVATIVE APPROACHES TO HYPOTHALAMIC AMENORRHEA: CURRENT EVIDENCE AND FUTURE DIRECTIONS"**

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Hypothalamic amenorrhea (HA) is a reversible form of secondary amenorrhea resulting from functional disruption of the hypothalamic–pituitary–ovarian (HPO) axis. It is primarily characterized by reduced or absent gonadotropin-releasing hormone (GnRH), PULSATILITY, leading to diminished luteinizing hormone (LH) and follicle-stimulating hormone (FSH) secretion, HYPOESTROGEN, and consequent menstrual irregularities. Traditionally, HA has been associated with stress, significant weight loss, eating disorders, or excessive physical exercise. However, emerging research highlights the novelty of considering HA not only as a reproductive disorder but also as a multisystem condition with broader implications. Novel insights suggest its links with metabolic dysregulation, decreased bone mineral density, altered cardiovascular health, and neuropsychological disturbances. Furthermore, recent advances in neuroendocrinology emphasize the role of KISSPEPTIN neurons, leptin signal, and other metabolic peptides in mediating hypothalamic suppression. Innovative diagnostic strategies, including advanced hormonal assays and neuroimaging, are improving the precision of HA detection and differentiation from other causes of amenorrhea. Therapeutic novelty lies in shifting from mere hormone replacement toward holistic interventions such as stress reduction, nutrition optimization, cognitive-behave therapy, and novel pharmacologic agents like KISSPEPTIN analogues, which show promise in restoring reproductive function. Recognizing HA as an adaptive physiological response rather than a mere pathology is also a novel conceptual advancement, reframing its management in a personalized and integrative context. Thus, hypothalamic amenorrhea represents not only a reproductive health challenge but also an opportunity for novel multidisciplinary research and therapeutic innovation that can significantly improve women's overall health outcomes.

**PL-552**

**DIURETICS EFFECT OF ETHANOLIC EXTRACT OF MUSA PARADISIACA IN WISTAR RATS**

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While a specific detailing the diuretic effect of an ethanolic extract of Musa paradisiaca (plantain) in Wistar rats is not available, a review of related studies provides a strong basis to construct a similar one. Musa paradisiaca (plantain) is a medicinal plant traditionally used for various ailments, including those affecting the urinary system. Diuretics are important for treating conditions like hypertension, congestive heart failure, and edema. The search for natural, effective diuretics with fewer side effects is ongoing. This study aims to investigate the diuretic potential of the ethanolic extract of a specific part of Musa paradisiaca in Wistar rats. The study would involve preparing an ethanolic extract of the plant part. Healthy Wistar rats would be divided into several groups, including a control group (receiving a vehicle like distilled water), a standard group (receiving a known diuretic drug like furosemide), and one or more test groups (receiving different doses of the Musa paradisiaca extract). The diuretic activity would be assessed by measuring parameters such as total urine volume, and the excretion of electrolytes like sodium (Na+), potassium (K+), and chloride (Cl−) over a specific time period (e.g., 5 or 24 hours). The Na+/K+ ratio would also be calculated. The results would likely show that the ethanolic extract of Musa paradisiaca caused a significant, dose-dependent increase in urine output compared to the control group. The extract would also lead to an increased excretion of urinary electrolytes, particularly sodium and potassium. The effect would be compared to the standard diuretic drug. A low Na+/K+ ratio might suggest a loop-diuretic-like activity. The findings would conclude that the ethanolic extract of Musa paradisiaca possesses significant diuretic activity, which supports its traditional use in managing conditions related to fluid retention and kidney health. The diuretic effect may be attributed to the presence of various phytochemicals, such as flavonoids, alkaloids, and saponins, which are known to have diuretic properties. Further studies would be recommended to isolate the specific active compounds and elucidate their precise mechanism of action.

**PL-553**

**METABOLIC MASTERY: SEMAGLUTIDE'S TRANSFORMATIVE IMPACT**

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Semaglutide is a glucagon-like peptide-1 (GLP-1) receptor agonist that has emerged as a transformative therapy for type 2 diabetes mellitus (T2DM) and obesity. Developed by Novo Nordisk, it mimics the action of endogenous GLP-1, enhancing insulin secretion, suppressing glucagon release, slowing gastric emptying, and promoting satiety. Clinical trials such as SUSTAIN and STEP have demonstrated semaglutide's efficacy in significantly reducing HbA1c levels and inducing substantial weight loss, often exceeding 15% of baseline body weight in patients with obesity. It is available in both injectable and oral formulations, offering flexibility in treatment options. Beyond glycemic control and weight reduction, semaglutide has shown cardiovascular benefits, making it a cornerstone in the management of metabolic syndrome. Ongoing studies are also exploring its potential in conditions such as non-alcoholic steatohepatitis (NASH), Alzheimer's disease, and polycystic ovary syndrome (PCOS).

**PL-554**

**REVIEW ON COVID-19 VACCINE AND IMMUNOTHERAPY**

Ruhab Dhansay and swapnil daunde

The COVID-19 pandemic due to the SARS-CoV-2 virus resulted in a global health crisis and necessitated urgent scientific response. Vaccination and immunotherapy have been essential in managing the disease spread and severity. This review provides an elaborate account of different COVID-19 vaccines including mRNA vaccines (Pfizer-BioNTech, Moderna), viral vector vaccines (Covishield, Sputnik V), inactivated vaccines (Covaxin), and protein subunit vaccines (Novavax), based on their mechanisms, efficacies, and safety profiles. In addition to vaccines, immunotherapy has been a valuable supportive care option, particularly in highly risky or seriously ill patients. Monoclonal antibodies, convalescent plasma, and immune modulators like interleukin inhibitors have also been explored for their capacity to decrease viral load and manage hyperinflammatory processes. The review also points to challenges including vaccine resistance, developing variants, restricted access in developing nations, and the need for boosters. This article highlights the synergistic importance of vaccines and immunotherapeutic strategies in mitigating COVID-19 morbidity and mortality, and also illuminates their potential future role in pandemic preparedness.




ISBN: 978-81-980623-8-3

**Keywords**: COVID-19, SARS-CoV-2, Vaccines, Immunotherapy, mRNA vaccine, Monoclonal antibodies, Covaxin, Covishield, Pandemic, Convalescent plasma, Immune response, Viral vector, Cytokine storm

**PL-555**

**UNDERSTANDING AUTOIMMUNE DISORDERS: MECHANISMS, IMPACT, AND THERAPEUTIC APPROACHES.**

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Autoimmune disorders cause the body to attack its own cells by mistake which produces persistent inflammation and tissue damage. The group of autoimmune disorders encompasses rheumatoid arthritis along with systemic lupus erythematosus and type 1 diabetes as well as multiple sclerosis and inflammatory bowel disease. The various conditions display individual characteristics yet they all stem from the same fundamental process of genetic susceptibility combined with environmental triggers and immune system abnormalities. The diagnostic challenges of these complex diseases lead to postponed identification which produces enduring medical consequences. The delivers comprehensive information about autoimmune disorders to second-year pharmacy students by covering their pathophysiology and classification together with their clinical presentation and present-day treatment methods. The pharmaceutical treatment options for autoimmune conditions consist of corticosteroids along with disease-modifying antirheumatic drugs (DMARDs) and biologics and newly developed targeted therapies that focus on immune system modulation. Pharmacy professionals serve as essential contributors to patient care by delivering medication counseling and ensuring prescription compliance while watching for drug reactions and enhancing patient wellness. The rising number of autoimmune diseases requires pharmacy students to understand these conditions because patients need ongoing pharmaceutical management. Future pharmacists will deliver effective patient care when they possess fundamental knowledge about autoimmune disease mechanisms and management strategies for both clinical and community healthcare settings.

**Keywords**: Autoimmune disorders, Immune response, Biologics, DMARDs, Pharmacist role

**PL-556**

**HOSPITAL, COMMUNITY AND CLINICAL PHARMACY IN PATIENT-CENTERED CARE**

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Pharmacy practice has evolved far beyond simply dispensing medicines. Today, hospital, community, and clinical pharmacists each play a unique and important role in improving patient health. Hospital pharmacists work closely with doctors and nurses to ensure patients receive the right medications safely and effectively during their hospital stay. Community pharmacists are often the most accessible healthcare professionals, providing advice, counseling, and support for everyday health concerns. Clinical pharmacists bring specialized knowledge to patient care, often working directly with healthcare teams to manage complex medication therapies. Together, these branches of pharmacy form a strong network that supports better treatment outcomes, reduces medication errors, and promotes responsible medicine use. As healthcare continues to focus more on the individual, collaboration between these pharmacy roles becomes even more essential. Their combined efforts help ensure that patients receive the care, education, and support they need at every step of their health journey.

**Keywords**: Hospital pharmacy, Community pharmacy, Clinical pharmacy, Patient care, Medication safety, Health support.

**PL-557**

**MECHANISM OF ACTION OF NSAIDS**

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Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) are among the most commonly used medications worldwide for the treatment of pain, inflammation, and fever. The primary mechanism of action of NSAIDs is the inhibition of cyclooxygenase (COX) enzymes, particularly COX-1 and COX-2, which are responsible for the conversion of arachidonic acid into prostaglandins. Prostaglandins are lipid compounds that mediate inflammation, pain, fever, and other physiological responses. NSAIDs reduce prostaglandin synthesis, thereby producing anti-inflammatory, analgesic, and antipyretic effects. While COX-1 is involved in maintaining gastric mucosa, renal function, and platelet aggregation, COX-2 is induced during inflammation. Non-selective NSAIDs inhibit both COX-1 and COX-2, which can lead to gastric irritation and ulceration due to decreased protective prostaglandins in the stomach. In contrast, COX-2 selective inhibitors (coxibs) aim to reduce inflammation with fewer gastrointestinal side effects. Understanding the mechanism of NSAIDs helps in the rational use of these drugs and guides the development of safer alternatives with reduced adverse effects.

**Keywords**: NSAIDs, Cyclooxygenase, COX-1, COX-2, Prostaglandins, Anti-inflammatory, Analgesic, Coxibs

**PL-558**

**IDENTIFYING AND PRIORITIZING THE CAUSES OF MEDICATION ERRORS IN THE PHARMACY**

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Medication errors in pharmacies represent a significant threat to patient safety and healthcare quality, often resulting in adverse drug events, increased hospitalization, and higher healthcare costs. This study aims to systematically identify and prioritise the root causes of medication errors within pharmacy settings, focusing on both community and hospital pharmacies. The research adopts a mixed-methods approach, incorporating qualitative interviews with pharmacists and pharmacy technicians, and quantitative analysis using error-reporting data. Key findings reveal that medication errors are predominantly caused by factors such as workload and time pressure, look-alike/sound-alike (LASA) drugs, illegible prescriptions, lack of proper communication between healthcare professionals, inadequate staffing, and insufficient use of technology. Using prioritisation tools like the Failure Mode and Effects Analysis (FMEA) and Pareto analysis, the study highlights the most critical contributors to errors. Among these, distractions during dispensing, misinterpretation of prescriptions, and incomplete patient information emerged as high-priority causes requiring immediate intervention. The study concludes with evidence-based recommendations, including enhanced automation and electronic prescribing systems, standardized labeling practices, continuing education for pharmacy staff, and improved interprofessional communication. Addressing these high-impact areas can significantly reduce the incidence of medication errors and enhance patient safety across pharmacy practice.

**Keywords:** medication error, patient safety, community pharmacy, AHP

**PL-559**

**ROLE OF ANTICHOLINERGIC DRUGS IN PARKINSON'S DISEASE**

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Parkinson's disease (PD) is a chronic neurodegenerative disorder primarily caused by the degeneration of dopaminergic neurons in the substantia nigra, leading to an imbalance between dopamine and acetylcholine in the basal ganglia. This imbalance contributes to classic motor symptoms such as tremors, rigidity, and bradykinesia. Anticholinergic drugs help restore this neurotransmitter balance by inhibiting muscarinic acetylcholine receptors, thereby reducing excessive cholinergic activity. These drugs are particularly effective in managing tremors and rigidity, especially in the early stages of Parkinson's disease. Commonly used anticholinergic agents include trihexyphenidyl, benztropine, and biperiden. However, their use is limited in elderly patients due to potential side effects like cognitive dysfunction, dry mouth, blurred vision, and urinary retention. While their role has diminished with the availability of dopaminergic therapies, anticholinergics still hold value in younger patients or those with predominant tremor symptoms. Ongoing research aims to develop more selective anticholinergic agents with fewer adverse effects.

**Keywords:** Parkinson's disease, Anticholinergic drugs, Acetylcholine, Trihexyphenidyl, Muscarinic receptor blockers, Tremors

**PL-560**




ISBN: 978-81-980623-8-3

**INVESTIGATING THE CARDIOVASCULAR SAFETY PROFILE OF NOVEL ANTIDIABETIC MEDICATIONS**

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Diabetes mellitus is a global health concern, affecting millions of people worldwide. The management of diabetes often involves the use of antidiabetic medications to regulate blood glucose levels. In recent years, several novel antidiabetic medications have been introduced, promising better glycemic control and potential cardiovascular benefits. This research article aims to investigate the cardiovascular safety profile of these novel antidiabetic medications, shedding light on their impact on cardiovascular outcomes and safety concerns. By synthesizing existing research, clinical trials, and real-world data, we can provide a comprehensive overview of the cardiovascular effects of these emerging therapies.

**Keywords:** Diabetes mellitus, cardiovascular safety, sodium-glucose cotransporter-2 inhibitors, glucagon-like peptide-1.

**PL-561**

**TRANSFORMING GENERAL PHYSICIAN PRACTICE THROUGH CYBERPRESCRIPTION: A PRACTICAL APPLICATION STUDY**

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This study examines how using cyber prescriptions can change the way general physicians prescribe medicines. Cyber prescriptions are digital versions of traditional paper prescriptions, designed to reduce errors and improve communication between doctors, patients, and pharmacists. The main goal is to find out if cyber prescriptions can make prescribing safer and easier in everyday medical practice. This study used a comparative observational approach to evaluate the impact of cyber prescriptions on general physician practice. Two groups of general physicians were selected: one using traditional paper prescriptions and the other using a cyber prescription application. Over a period of three months, prescription accuracy, patient understanding, and pharmacist feedback were recorded for both groups. Data were collected through prescription audits to identify errors, patient-surveys to assess clarity and adherence, and pharmacist interviews to report on prescription processing efficiency. Results showed that cyber prescriptions reduced medication errors by 37% and helped patients understand their medication better. Doctors and pharmacists found the system more convenient because it prevented mistakes caused by unclear handwriting and helped check for drug-interactions automatically. However, some challenges like the cost of setting up system and training older doctors were noted. The study concludes that cyber prescriptions can improve general physician practice by making prescriptions safer and more reliable. It encourages hospitals and clinics to adopt digital prescription systems to enhance patient care and reduce medication errors.

**Keywords**: Cyber prescriptions, general physician, errors, pharmacists, prescriptions audits.

**PL-562**

**ASSESSMENT OF DRUG-RELATED PROBLEMS IN GERIATRIC PATIENTS USING BEERS CRITERIA: A PROSPECTIVE OBSERVATIONAL STUDY**

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Geriatric patients are highly vulnerable to drug-related problems (DRPs) due to polypharmacy, comorbidities, and age-related changes in drug metabolism. The present study aimed to assess the incidence and distribution of potentially inappropriate medications (PIMs) in older adults using the American Geriatrics Society (AGS) Beers Criteria. A prospective observational study was conducted in a tertiary care hospital among patients aged ≥65 years. Data on demographics, comorbidities, and prescribed medications were collected. Beers' Criteria were applied to identify PIMs, and the frequency of DRPs was documented across clinical departments. Statistical analysis was performed using the chi-square test and t-test. Out of 320 geriatric patients screened, 184 DRPs were identified, with 56% involving at least one PIM. The highest prevalence was in the cardiology department (38%), followed by neurology (25%), while the lowest occurred in endocrine and urogenital departments (5–7%). The most common PIM classes were benzodiazepines (18%), anticholinergics (15%), NSAIDs (14%), and sulfonylureas (12%). Patients with ≥5 medications had a 2.1-fold higher risk of DRPs ($p<0.05$). Hospital stay was prolonged in patients with PIMs (mean 9.2 ± 2.4 days vs 6.1 ± 1.8 days). Application of the Beers Criteria effectively identified PIMs and highlighted polypharmacy and comorbidities as major risk factors. Regular pharmacist-led medication reviews can reduce DRPs, prevent complications, and improve clinical outcomes in geriatric care.

**Keywords**: GERIATRICS, DRP, BEERS CRITERIA

**PL-563**

**ASSESSMENT OF PREVALENCE AND RISK FACTORS OF ANEMIA AMONG PATIENTS AT TERTIARY CARE TEACHING HOSPITAL**

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The prevalence of anemia is a major clinical challenge. Due to poor Socio- economic, malnutrition, heredity diseases and mal-absorption of Iron also leads to Anemia. Menstrual periods with excessive bleeding also major concern in anemia. This study aimed to assess the Socio-demographic factors in relation to the problem of anemia in adult females. The randomized, cross sectional study was carried out with 120 patients for 6 months as per the study criteria. Patients were screened for biochemical tests. Out of 120 patients, 32% were male and 68% were female. The 17 to 30 years of age group were mostly affected. The educational status indicates 35% were illiterate. The severity was assessed based on Hb value and result that, 8% patient were severe, 8% were moderate and 84% were in mild anemia. The mean Hb value was found that 10.82 mg/dl. 42% of female patients not consuming red meat, fish and chicken. Serum ferritin value is only 5.8 ng/ml, MCV found that 72.30 fL and Hb is 10.82 g/dl. The patient counseling on healthy diet and awareness about risk factors of anemia may reduce the severity and complications of anemia. The Pharmaceutical care on anemic patients is essential to prevent the morbidity and mortality rate.

**Keywords**: Anemia, Adult female, Mal-nutrition, Iron.

**PL-564**

**NOMOPHOBIA SURVEY STUDY**

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Nomophobia, defined as the fear or anxiety of being without a mobile phone, has become a significant concern in today's highly connected digital world. With smartphones serving as primary tools for communication, social networking, information access, and online learning, students have become increasingly dependent on them. The COVID-19 pandemic and the shift to online education have further intensified this reliance, making nomophobia a highly relevant psychological issue. This study aimed to identify the key dimensions of nomophobia, develop a reliable measurement tool, and examine its relationship with self-esteem, loneliness, and happiness among university students in Turkey and Pakistan. The study employed a two-phase exploratory sequential mixed-methods design. In the first phase, nine undergraduate students from a Midwestern university in the United States were interviewed. The analysis identified four core dimensions of nomophobia: inability to communicate, loss of connectedness, limited access to information, and reduced convenience. These findings informed the development of the 20-item Nomophobia Questionnaire (NMP-Q). In the second phase, the NMP-Q was administered to 301 students, demonstrating strong reliability and validity as a tool to assess




ISBN: 978-81-980623-8-3

nomophobia.A larger cross-cultural study was then conducted with 729 students, comprising 368 from Turkey and 361 from Pakistan. Participants also completed surveys measuring loneliness, self-esteem, and happiness. Statistical analyses, including multiple regression and MANOVA, revealed significant gender differences in self-esteem and nomophobia, with male and female students showing different levels of vulnerability. The results suggest that nomophobia is a measurable, multidimensional condition with clear psychological consequences. The NMP-Q provides a practical tool for research and assessment, and the study highlights how modern smartphone dependence—especially in contexts like remote learning, social media, and online interactions—affects students' mental well-being. Cultural and gender differences underline the role of social and environmental factors in shaping how students experience smartphone-related stress. The findings call for increased awareness and targeted interventions to support student well-being in today's digitally dependent world.

**PL-565**

**TIRZEPATIDE MITIGATES COGNITIVE DECLINE IN ZEBRAFISH MODEL OF TYPE 2 DIABETES MELLITUS INDUCED BY HIGH-FAT DIET**

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In examining the enduring consequences of diabetes, recent research has focused on the anticipated outcomes of the condition. Specifically, cognitive impairment has been linked to diabetes mellitus dating back to the discovery of insulin. This study delves into the neuroprotective effects of TZP, i.e. tirzepatide a dual GIP and GLP-1 receptor agonist that works by mimicking these two gut hormones, against cognitive impairment associated with type 2 diabetes mellitus (T2DM). T2DM-like zebrafish model of varying age groups was created through a 6-week administration of a high-fat diet (HFD). Parameters such as body weight, body mass index, and blood glucose levels were monitored, and behavioural assessments (T-maze, novel tank diving test, and inhibitory avoidance test) were conducted at the conclusion of the protocol to assess learning and memory. Additionally, lipid profile biochemical parameters (MDA, AChEs, and GSH), molecular markers (IL-1β, IL-10, TNF-α, Bcl-2, Bax, GSK-3β, and AMPK), and histopathological examinations were performed. Treatment with the novel GLP-1 and GIP dual agonist TZP (10 nM/kg, i.p.) significantly ameliorated cognitive impairment, as evidenced by behavioural parameters, and restored antioxidant like GSH ($p < 0.05$) and catalase ($p < 0.05$) and anti-inflammatory marker levels, i.e. IL-10 ($p < 0.05$) compared to the HFD group. TZP also mitigated abnormal glucose ($73.2 \pm 5.889$) and lipid profiles (TG $0.159 \pm 0.0075$ and TC $0.100 \pm 0.0020$) in hyperglycaemic zebrafish. This study suggests that the positive effects of TZP on cognition and memory may stem from its neuroprotective capabilities, potentially attributed to its antioxidant, anti-inflammatory, and anti-apoptotic properties, as well as its ability to enhance AMPK levels as GLP-1 agonist has the potential to increase the level of AMPK.

**PL-566**

**TRANSFORMING TRADITIONAL BONE FRACTURE TREATMENT: A BREAKTHROUGH IN PERSONALIZED CARE**

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India experiences over 134 million reported incidents annually, with many more unreported accidents, where bone fractures are common. Currently, these fractures are treated using traditional methods like bamboo sticks or plaster of Paris (PoP) casts, which have limitations such as restricted movement, poor ventilation, and skin complications, causing discomfort to patients. The proposed solution aims to address these issues by using 3D-printed casts. These casts not only provide mechanical support but also incorporate sustained-release medication through their inner lining, offering a unique blend of traditional treatments with modern technological support.

**Keywords**: Bone fracture treatment, 3D-printed casts, personalized care

**PL-567**

**DECIPHERING THE MECHANISTIC INSIGHTS OF AEGLE MARMELOS LINN AGAINST ALZHEIMER'S DISEASE**

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The progressive neurodegenerative disease known as Alzheimer's disease (AD) is typified by memory loss, cognitive impairment, and compromised synapse function. The fact that current treatments simply relieve symptoms emphasizes how urgently new, multi-target strategies are needed. The traditional medicinal plant Aegle marmelos, also known as Bael, is abundant in bioactive phytochemicals that have been shown to have neuroprotective properties. To clarify the mechanistic insights of Aegle marmelos against AD, this study used a network pharmacology and molecular docking technique. From the databases that were available, important phytoconstituents were found, and their probable protein targets were anticipated. Strong connections with AD-related pathways, such as cholinergic neurotransmission, amyloid-beta processing, and oxidative stress modulation, were found using network pharmacology analysis. Significant participation in neuroinflammation, PI3K-Akt signaling, and apoptotic regulation was revealed by Gene Ontology (GO) and KEGG pathway enrichment. Compounds including marmeline, marmelosin, aegeline, and skimmianine also showed strong binding affinities for important AD targets like acetylcholinesterase (AChE), beta-secretase 1 (BACE1), and glycogen synthase kinase-3β (GSK-3β), according to molecular docking studies. According to these results, Aegle marmelos has the potential to be used therapeutically to slow the progression of AD by exerting a multi-target modulatory impact. The scientific foundation for additional in vitro and in vivo confirmation of Aegle marmelos as a viable option for Alzheimer's disease treatment is provided by this integrative in silico study.

**Keyword:** Aegle marmelos(L), acetylcholinesterase, beta-secretase 1 (BACE1), and glycogen synthase kinase-3β (GSK-3β), Alzheimer's, marmaline.

**PL-568**

**NEUROPROTECTIVE EFFECTS OF AVICULARIN AGAINST AMYLOID-BETA INDUCED MEMORY DEFICITS IN RATS**

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Alzheimer's disease is defined by toxic aggregates of amyloid-beta peptides that provoke degeneration of neurons and progressively damage memory and cognitive functions. Here we examined the protective potential of natural flavonoid avicularin against amyloid-beta-induced cognitive dysfunctions in a rat model. After intracerebroventricular injection of amyloid-beta Aβ1-42, rats were treated orally with graded doses of avicularin (30, 60, and 120 mg/kg) for 21 days, with cognition assessed by various behavioural parameters. Avicularin treatment, particularly at higher doses, enhanced performance in spatial recognition and memory tests, coinciding with reductions in acetylcholinesterase activity and restoration of antioxidant enzyme levels (catalase, SOD, GSH). Molecular analysis showed that avicularin inhibited the increase in pro-inflammatory cytokines (TNF-α, IL-6, IL-1β) and diminished amyloid-beta deposition in brain tissues, in contrast to upregulating brain-derived neurotrophic factor (BDNF) expression. These results emphasize antioxidant as well as anti-inflammatory actions, avicularin has multidimensional neuroprotective actions. The capability of altering amyloid-beta dynamics while restoring neurotrophic homeostasis is an indication of its promise as a Supportive Therapy for Alzheimer's-related memory loss.

**Keywords**: Avicularin, Alzheimer's disease, Amyloid-beta, Neuroprotection, Acetylcholinesterase, Behavioural tests, Rat model

**PL-569**

**ADVANCING POLYCYSTIC OVARY SYNDROME MANAGEMENT: CURRENT AND EMERGING BIOACTIVE PHYTOCHEMICAL WITH THERAPEUTIC POTENTIALS**

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Polycystic Ovary Syndrome (PCOS) is a multifactorial endocrine disorder affecting millions of women worldwide characterized by reproductive




ISBN: 978-81-980623-8-3

hormonal imbalance, metabolic disturbances, insulin resistance and chronic inflammation. Conventional treatments provide symptomatic relief; their efficacy remains limited and side effect profiles necessitate the exploration of complementary solutions. Recent advances in natural product research have identified bioactive phytochemicals including inositol, resveratrol, berberine, quercetin, flavonoids, polyphenols, alkaloids, and omega-3 fatty acids as key modulators in PCOS pathophysiology. Experimental and clinical studies have highlighted their potential for improving ovarian morphology, metabolic function, and reproductive outcomes with that various class of bioactives including flavonoids, polyphenols, alkaloids and isoflavones exhibit beneficial effects on PCOS by modulating hormonal imbalance, improving insulin resistance, reducing oxidative stress and reducing chronic inflammation. Among well studied compounds resveratrol, Berberine, Curcumin, Quercetin and soybean isoflavones (genistein, daidzein) show promising result in reducing hyperandrogenism, restoring ovarian function and ameliorate metabolic disturbances. These bioactives act through diverse molecular mechanisms such as inhibition of steroidogenic enzymes, activation of AMPK and SIRT1 pathways, antioxidant enzyme enhancement and modulation of inflammatory cytokines. Emerging research directions highlight novel bioactives with potential for future investigation. Future research should focus on clinical validation, bioavailability enhancement, genetic and epigenetic modulation and integrative approaches combining phytochemicals with conventional therapies. This integrative strategy holds a significant promise for personalized and effective management of PCOS.

**Keywords:** PCOS, bioactives, flavonoids, polyphenols, isoflavones, resveratrol

**PL-570**

**RECENT ADVANCES IN NANOTHERAPEUTICS AND TARGETED PATHWAYS FOR THE MANAGEMENT OF RHEUMATOID ARTHRITIS**

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Rheumatoid arthritis (RA) is a chronic autoimmune disorder characterized by joint inflammation and progressive cartilage destruction. Traditional therapies often exhibit systemic side effects and limited efficacy. Recent advances in nanotherapeutics have revolutionized RA management by enabling targeted drug delivery, improved bioavailability, and reduced toxicity. Various nanocarriers—such as liposomes, dendrimers, and polymeric nanoparticles—have been engineered to deliver anti-inflammatory agents and biologics directly to inflamed tissues. Additionally, insights into key molecular pathways, including TNF-α, IL-6, and JAK/STAT signaling, have facilitated the development of pathway-specific interventions. This review highlights the emerging nanotechnology-driven strategies and molecular targets offering promising avenues for more effective and personalized RA treatment.

**Keywords:** Rheumatoid arthritis (RA); nanotherapeutics, polymeric nanoparticles, molecular pathways. Joint inflammation.

**PL-571**

**BEYOND ANTIBIOTICS: TARGETING VIRULENCE, BIOFILMS, AND RESISTANCE IN PSEUDOMONAS AERUGINOSA**

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Pseudomonas aeruginosa is a gram-negative, rod-shaped, opportunistic pathogen and a major cause of hospital-acquired infections, particularly in immunocompromised patients and patients with comorbidities. It is accountable for numerous acute and chronic infections, resulting in mortality rates of up to 40 % and significant morbidity. Its remarkable ability to survive under hostile conditions stems from a combination of virulence factors, biofilm formation, and multidrug resistance (MDR) mechanisms. Conventional antibiotic therapies are often ineffective due to intrinsic barriers such as efflux pumps and low outer membrane permeability, as well as acquired resistance via β-lactamases, carbapenemases. Additionally, the antibiotic resistance mechanisms within biofilms make them challenging to treat, emphasizing the need for strategies to be develop. The novel therapeutic strategies to treat P. aeruginosa infections such as Phage Therapy which target Bacterial Virulence factors (toxins, enzymes, adhesins) and CRISPR-Cas9 can directly disable genes responsible for resistance or virulence, Antimicrobial Peptides target Membranes, Biofilms, and Virulence mechanisms, Immunomodulators boost the host immune response and reduce tissue damage, Drug repurposing, Biofilm Disruption Molecules, nanotechnology-based delivery systems, Quorum-Sensing Inhibitors. These approaches aim not to kill the bacterium directly, but to weaken its pathogenic potential, making infections more manageable and antibiotics more effective. This gives rise for the development of the newer therapies than antibiotics and reduces the usage and dosage of antibiotics which reduces the development of Resistance.

**Keywords:** Phage Therapy, CRISPR-Ca9, Immunomodulators, Biofilm Disruption Molecules, Quorum-Sensing Inhibitors.

**PL-572**

**CHROMOSOMES AND ITS ABNORMALITIES.**

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Genetic disorders traditionally fall into three main categories: single-gene defects, chromosomal abnormalities, and multifactorial conditions. A chromosomal abnormality, or chromosomal aberration, is a disorder characterizised by a morphological or numerical alteration in single or multiple chromosomes, affecting autocomes, etc. When most cells of an embroyo are analysed, this technique allows differentiation to be made between aneuploidy, mosaicism, haploidy, and polyploidy. Abnormal types of fertilization such as uniproculeated and triproculeated zygotes.

**Keywords:** Chromosome abnormality, chromosome, aneuploidy, monosomy, nullysomy, trisomy, tetrasomy, polyploidy etc.

**PL-573**

**DECITABINE PRESERVES TIGHT JUNCTION INTEGRITY AND ATTENUATES NEUROINFLAMMATION IN CEREBRAL ISCHEMIA-REPERFUSION INJURY**

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Background and Aim: Ischemic reperfusion myury in bran triggers neuroinflammation, disruption of blood brain barrier and downregulation of tight junction proteins. DNA Methylation is an epigenetic mechanism implicated in inflammatory gene regulation. Decitabine, a DNMT inhibitor and has shown neuroprotective effects in MCAO models. Present study is aimed to investigate the neuroprotection offered by decitabine on tight junction proteins and neuroinflammation. Methods: Adult Wistar rats (200-250g) were used for induction of ischemic reperfusion injury usng MCAO for 90 minutes followed by 24 hours of reperfusion. Rats were treated with the dose (0.125, 0.25, 0.50 mg kg) and time (0.3, 6, 12 hour) ofDecitabine after MCAO. Beamwalk test and neurological deficit score were evaluated followed by TTC staining, ELISAfor cytokines (TNF-a and TGF-B). Further, mRNA estimation using RT-PCR was performed to evaluate tight junction proteins (claudin and occludin) Result: Present investigation examined the dose (0.125, 0.25, 0.50 mg/kg) and time (0, 3, 6, 12 hour) dependent neuroprotection of Decitabine after MCAO reperfusion in rats. Decitabine 0.25 mgkg (i.p.) improved neurological deficit and beam walk score at 6 hours of reperfusion Additionally, decitabine reduced infarction volume, ameliorated the TNF-a expression and elevated TGF-B expression Furthermore, it alleviated the BBB disruption via restoration of tight junction proteins (claudin and occludin) Conclusion: This study elucidated the neuroprotective effect of decitabine on ischemic reperfusion injury by suppressing neuroinflammation and preserving BBB integrity via maintenance oftightjunction proteins.

**Keywords:** Decitabine, MCAO, Cytokines, Claudin, Occludin

**PL-574**

**GUGGULSTERONE AS A POTENTIAL ANTI- THROMBOSIS AGENT**

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ISBN: 978-81-980623-8-3

Thrombosis is a serious medical condition marked by a clot formation within the veins or arteries, which creates an obstruction to normal blood flow thus inducing cardiovascular disease including stroke, myocardial infarction, and deep vein thrombosis. Thrombosis is often a result of endothelial dysfunction, hypercoaguability, inflammatory response, dyslipidemia, and environmental/ lifestyle conditions such as obesity, smoking, and sedentary behavior. Current anti-thrombotic modalities have demonstrated efficacy, but possess serious limitations related to bleeding risk and/or side effects; thus, a need persists for natural, safer, therapeutically valuable options. Guggulsterone, a bioactive steroid compound, isolated from the resin of Commiphora mukul, has garnered interest due to its anti-inflammatory, hypolipidemic, and anti-platelet therapeutic effects. However, guggulsterone has poor aqueous solubility and oral bioavailability that limit its therapeutic application. Phytosome based delivery systems represents an alternative approach using phospholipid–phytoconstituent complexes to enhance absorption of phytoconstituents, membrane permeability, and biological activity. A phytosomal formulation containing guggulsterone may improve its pharmacokinetic profile and provide anti-thrombotic effect. In conclusion, phytosomes containing guggulsterone are a promising new natural therapeutic option in the prevention and treatment of thrombosis. Future pre-clinical and clinical research is warranted to demonstrate safety, refine dosing, and evaluate their potential as an effective alternative to existing anti-thrombosis treatment options.

**Keywords:** - Guggulsterone, Thrombosis, Anti-thrombotic activity, Phytosome, Bioavailability enhancement, Commiphora mukul.

**PL-575**

## PATIENTS' PERCEPTION AND ITS IMPACT ON ADHERENCE BEHAVIOR AND ANALYSIS OF POLYPHARMACY PRESCRIPTIONS IN MIDDLE-AGED POPULATION

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Polypharmacy, defined as the concurrent use of multiple medications, is increasingly common among middle-aged adults due to the growing prevalence of chronic diseases. Understanding polypharmacy is essential to identify potential risks such as drug interactions and adverse effects, and to enhance medication safety and treatment effectiveness. Patient perception significantly influences medication adherence, impacting overall health outcomes. This study aimed to assess how patients perceive polypharmacy and its effect on their adherence to prescribed medications. It also focused on determining the prevalence and patterns of polypharmacy, identifying key factors that influence adherence, and analyzing the most common diseases associated with polypharmacy in the middle-aged population. A prospective observational study was conducted over six months at Sri Aurobindo Institute of Medical Sciences, Indore. The study included 217 inpatients aged 50 to 65 years who were prescribed five or more medications. Data collection involved demographic profiling, prescription analysis, and evaluation of medication adherence using the 8-item Morisky Medication Adherence Scale (MMAS-8). Patient perceptions were collected through structured interviews, and statistical analysis was performed to identify correlations. Among the 217 patients, 70.97% were male and 29.03% female, with 92.63% from rural areas. Common diagnoses included hypertension (31.34%), diabetes (23.04%), and asthma (16.59%). According to MMAS-8, 16.6% demonstrated high adherence, 48.8% medium adherence, and 34.6% low adherence. A majority (75.6%) believed their medications improved their health, which was significantly associated with better adherence ($p = 0.042$). The leading barriers to adherence were medication costs (60.8%) and regimen complexity (24%).

**Keywords:** Polypharmacy, Medication Adherence, Patient Perception, Middle-Aged Adults, Chronic Diseases

**PL-576**

## A COMPARATIVE EFFECTIVENESS ANALYSIS OF TELMISARTAN AND CILNIDIPINE IN HYPERTENSIVE PATIENTS USING AMBULATORY BLOOD PRESSURE MONITORING

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Hypertension management is crucial for reducing the risk of cardiovascular events. Telmisartan, an angiotensin II receptor blocker (ARB), and Cilnidipine, a dual L/N-type calcium clunnel blocker (CCB), are widely used antihypertensive agents. Ambulatory Blood Pressure Monitoring (ABPM) provides a comprehensive assessment of blood pressure control over 24 hours, offering insights into the efficacy of antihypertensive treatments beyond clinic measurements. This study aims to compare the effectiveness of Telmisartan and Cilnidipine using ABPM. A systematic review and meta-analysis were conducted, focusing on randomized controlled trials (RCTs) and observational studies that employed ABPM to evaluate Telmisartan and Cilnidipine. The data were used in deriving new variables of interest by writing a customized script. Descriptive statistics like mean, SD, minimum and maximum were obtained using SPSS software for each variable at baseline and using individual measurements. The comparison of mean values between the two groups at base line was performed using a t-test for independent samples. After treatment, a gradual decline in SBP from 166.60±16.2 at baseline to 140.4±14.0 and DBP from 93.30±6.2 at baseline to 84.54±4.7 was noted in Telmisartan group. Gradual decline in SBP from 163.30 15.12 at baseline to 142.04±11.8 and DBP from 96.60±8.6 at baseline to 82.6±6.1 was noted with Cilnidipine group. Statistical analysis using independent t-test was obtained which is statistically non-significant, $P=0.447$. The efficacy assessment of Telmisartan 40 mg and Cilnidipine 10 mg using ABPM concluded that the both drugs equal efficacy in reducing blood pressure in hypertensive individuals.

**Keywords:** Telmisartan; Cilnidipine; hypertension, ABPM

**PL-577**

## NANOVESICULAR SYSTEM FOR SKIN CANCER TREATMENT THROUGH LIPOSOMAL DRUG DELIVERY OF 5-FLUROURACIL AND AVOBENZONE

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One of the common malignancies is skin cancer, which requires effective topical chemotherapy that has high skin penetration and low local side effects but, in many cases, its application is hampered by poor penetration to the skin. 5-Fluorouracil (5-FU) is a proven chemotherapeutic agent in the treatment of superficial skin cancer but its use is restricted by low penetration into the skin. To address this drawback, a dual-drug nanovesicular liposomal system of 5-FU and avobenzone, an extensive ultraviolet filter, has been designed and optimized to deliver therapeutic and protective effects on UV radiation. This study aimed at developing and testing a nanovesicular liposomal gel, which could be used in achieving better drug delivery and effective treatment of skin cancer. A 2 2 factorial design was used to optimize the nanovesicles to form spherical vesicles with an average diameter of about 150200nm, low polydispersity index and stable zeta potential (c. -30mV). FTTIR, UV spectral, HPLC characterization showed drug encapsulation and no drug-excipient interactions and encapsulation efficiency was more than 80. The optimized liposomal gel exhibited good viscosity, homogeneity and pH which was desirable in the application of dermals. The in vitro diffusion and skin permeation experiments have shown sustained release and greatly increased drug permeation characteristics in comparison to traditional gel preparations. Finally, the resulting dual-drug nanovesicular liposomal gel is a chemotherapeutic agent which incorporates the photoprotective effect of avobenzone with excellent stability, skin diffusion, and prolonged release of the drug. The innovative solution is very promising as a safe and effective topical treatment of skin cancer, and other dermatological diseases that would be treated and provided with UV protection simultaneously.

**Keywords**: 5-Fluorouracil, Avobenzone, Nanovesicular Liposomes, Skin Cancer

**PL-578**

## CELL LINES

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ISBN: 978-81-980623-8-3

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Cell lines are indispensable tools in modern biomedical and pharmaceutical sciences, providing reproducible and sustainable models for investigating cell biology, disease mechanisms, and therapeutic interventions. Since the establishment of the first immortalized human cell line, HeLa, in 1951, cell lines have facilitated groundbreaking discoveries in cancer biology, vaccine development, toxicology, and regenerative medicine. They are classified into finite and continuous cell lines, each serving distinct roles in research and industry. Human and animal cell lines alike have contributed to advancements in understanding cellular physiology, drug discovery, virology, and genetic engineering. Recent innovations, such as three-dimensional (3D) cultures, organoids, and CRISPR-Cas9 gene-editing technologies, are expanding the relevance and accuracy of cell-based models. This review explores the types of cell lines, their applications, established models, ethical challenges, and emerging trends, while highlighting their role in bridging laboratory science and translational medicine. Future perspectives emphasize the need for authentication, reduction of misidentification, development of physiologically relevant systems, and incorporation of personalized medicine approaches. Through continuous innovation and ethical stewardship, cell line research will remain a cornerstone of biomedical discovery and therapeutic advancement.

**Keywords:** 3 dimensional cultures, CRISPR, Cell Lines, ethics.

**PL-579**

## CDK4/6 INHIBITORS IN THE MANAGEMENT OF HR+/HER2- BREAST CANCER

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Hormone Receptor-Positive (HR+) and HER2-Negative breast cancer accounts for majority of breast cancer cases in women. The traditional treatment relies mostly on endocrine therapy (ET). However, major clinical challenge in ET includes inherent and acquired resistance. The introduction of CDK4/6 inhibitors represents a definitive paradigm shift, moving the standard of care from ET monotherapy to ET combination therapy. Accumulating evidences has revealed that G1-S phase cell cycle is driven by hyperactivated Cyclin-Dependent Kinase 4/6 (CDK4/6) pathway. Currently available CDK4/6 inhibitors include palbociclib, ribociclib, and abemaciclib has reshaped the therapeutic landscape by targeting a core mechanism of resistance. This has been proved by a consistent body of evidence from major Phase 3 clinical trials (PALOMA, MONALEESA, MONARCH families). In the metastatic setting, the combination significantly prolonged Progression-Free Survival (PFS) across all lines of therapy, with select agents also demonstrating a meaningful Overall Survival (OS) benefit, establishing them as the preferred first-line treatment. However, the therapeutic role has expanded into the high-risk early breast cancer (eBC) setting, notably with the monarchE (abemaciclib) and NATALEE (ribociclib) trials, which demonstrated a significant improvement in Invasive Disease-Free Survival (IDFS) when these agents are added to standard adjuvant ET. This expansion validates the role of CDK4/6 inhibition in interrupting the natural history of high-risk disease and preventing recurrence. CDK4/6 inhibitors are now indispensable in the management of HR+/HER2- breast cancer. While significant progress has been made, ongoing research is focused on optimizing treatment sequencing post-CDK4/6 inhibitor failure and identifying predictive biomarkers to guide personalized therapy. Their integration represents one of the most significant clinical advancements in solid tumor oncology in the last decade.

**Keywords:** CDK4/6 Inhibitors, Hormone Receptor-Positive Breast Cancer, Metastatic Breast Cancer, Endocrine Therapy

**PL-580**

## OPIOID-SPARING PAIN MANAGEMENT FOR BETTER POST-SURGERY RECOVERY

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Acute post-surgical pain (PSP) is traditionally managed with opioid analgesics, a practice contributing to the global opioid crisis and associated with significant risks, including opioid-related adverse events (ORADEs) and potential for persistent use. This necessitates the adoption of safer, more effective strategies. This evaluates the comparative effectiveness of opioid-based regimens versus multimodal analgesia (MMA) strategies emphasising non-opioid medications in managing acute PSP.A review focused on comparative outcomes: pain intensity (VAS), 24-hour opioid consumption (MME), ORADE incidence, and length of hospital stay (LOS). The evidence demonstrates that opioid-sparing, multimodal non-opioid regimens provide comparable or superior pain control across various surgeries. The combination of non-opioid analgesics (NOAs) like acetaminophen, NSAIDs (e.g., ketorolac), and adjuncts (e.g., gabapentinoids, regional blocks) leads to a significant reduction in 24-hour opioid consumption. Critically, MMA is consistently associated with a lower incidence of ORADEs (e.g., PONV), which improves early recovery and correlates with a shorter LOS.Current evidence strongly supports the implementation of multimodal, opioid-sparing analgesic protocols as the standard of care for acute postoperative pain. These strategies offer effective pain management while successfully mitigating the risks inherent in opioid-centric treatment.

**Keywords**: Opioid-Sparing Pain Management, Acute post-surgical pain (PSP), Opioid-related adverse events (ORADEs), Multimodal analgesia (MMA), Effective pain management

**PL-581**

## AMYLOID BETA AND THE IMMUNE SYSTEM: HARNESSING NEURODEGENERATIVE PATHWAYS FOR CANCER IMMUNOTHERAPY

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Amyloid beta (Aβ), traditionally recognized as a neurotoxic peptide central to Alzheimer's disease pathology, is now gaining acknowledgment for its unexpected immunomodulatory and antitumor properties. Emerging evidence indicates that Aβ, beyond its harmful buildup in the brain, can play a crucial role in activating immune pathways that inhibit tumor growth. This dual functionality highlights a significant biological link between neurodegeneration and cancer, conditions often observed to have an inverse epidemiological relationship. Aβ has been shown to enhance tumor antigen presentation, stimulate microglial activation, and promote the release of pro-inflammatory cytokines such as TNF-α, IL-6, and IFN-γ, collectively boosting innate and adaptive antitumor responses. Furthermore, Aβ's impact on immune checkpoints and T-cell activation parallels the principles of modern immunotherapies, suggesting that carefully regulating Aβ signaling could be used to strengthen antitumor immunity. Harnessing these neurodegenerative mechanisms may allow for reprogramming the tumor microenvironment into a more immunogenic and cancer-resistant state. By integrating insights from neurology and oncology, current research aims to develop precision immunotherapies using Aβ or its derivatives to enhance immune defense while protecting neurons. Therefore, Amyloid beta is not only a hallmark of Alzheimer's disease but also a promising molecular link between Neuroinflammation and cancer immunity, offering a transformative approach for future cancer immunotherapy development.

**Keywords:** Amyloid beta, Microglial Activation, cytokine production, Precision oncology, Peptide modulation

**PL-582**

## NEUROMODULATION REVOLUTION: HOW EMERGING SPINAL CORD STIMULATION DEVICES ARE TRANSFORMING PAIN AND NEUROLOGICAL CARE

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ISBN: 978-81-980623-8-3

The field of neuromodulation has entered a period of remarkable innovation and transformation, particularly through cutting-edge developments in spinal cord stimulation (SCS) technology. Between 2024 and 2025, significant strides in stimulation waveform engineering, closed-loop feedback mechanisms, and artificial intelligence integration have reshaped the therapeutic landscape. Once regarded primarily as a palliative intervention, SCS is now evolving into a dynamic and personalized form of therapy at the core of chronic pain and neurological disorder management. This review provides a comprehensive overview of the recent technological breakthroughs that have advanced the precision and adaptability of SCS devices. It explores the clinical efficacy evidence supporting these new systems, highlighting improvements in patient outcomes, device responsiveness, and long-term safety profiles. Furthermore, key challenges—such as variability in patient response, the need for improved biocompatibility, and ethical considerations surrounding AI-guided modulation—are critically examined. Finally, this paper discusses future directions for SCS research and development, envisioning a future where neuromodulation systems function as intelligent, self-optimizing therapeutic platforms capable of continuous adaptation to an individual's neural and physiological state. Through these innovations, spinal cord stimulation stands poised to redefine the boundaries of neurotherapeutic care and establish a new standard for precision medicine in pain and neurological management.

**Keywords:** Neuromodulation,Spinal Cord Stimulation,Pain Management

**PL-583**

## OSTEOPROTECTIVE EFFECT OF HYDROALCOHOLIC EXTRACT OF TERMINALIA ARJUNA BARK ON DEXAMETHASONE INDUCED OSTEOPOROSIS IN RAT MODEL

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This study aimed to scientifically evaluate its osteoprotective efficacy in a rat model of glucocorticoid induced osteoporosis. This study specifically employed a dexamethasone-induced osteoporosis rat model to investigate the efficacy of the hydroalcoholic extract of Terminalia arjuna bark in mitigating glucocorticoid-induced bone deterioration. The model was selected because dexamethasone administration is a well-established method to induce bone resorption and simulate osteoporosis-like conditions. In this context, the objective of the present study was to comprehensively evaluate the osteoprotective potential of T. arjuna by assessing its effects on biochemical parameters, bone biomechanical indices, motor coordination, pain threshold, and histopathological architecture of the femur bone. Phytochemical analysis of T. arjuna was performed to identify its active constituents. Thirty rats were divided into five groups (n = 6). Group I served as the normal control; Group II received dexamethasone (7 mg/kg, i.m 3x/week for 2 weeks) and served as the negative control; Group III received dexamethasone followed by the standard drug alendronate (0.2 mg/kg, p.o. daily for 3 weeks). Groups IV and V received dexamethasone followed by T. arjuna bark extract at 100 mg/kg and 500 mg/kg, respectively, orally for 3 weeks. Body weight was monitored weekly. Osteoporosis induction and treatment efficacy were assessed using biochemical markers, behavioural tests, biomechanical assessments and histopathological analysis. Data were analysed using one-way ANOVA, with $p < 0.05$ considered significant. Dexamethasone administration resulted in significant decreases in body weight, serum calcium, and phosphorus levels, along with elevated alkaline phosphatase (ALP) activity, confirming the induction of osteoporosis. These changes were accompanied by behavioural alterations, including reduced fall latency on the rotarod test and increased pain sensitivity in the hotplate test, indicating functional bone weakness and impaired neuromuscular coordination. Treatment with T. arjuna extract markedly reversed these changes in a dose-dependent manner. The high-dose extract (500 mg/kg) restored biochemical parameters, improved bone weight and length, and enhanced performance in rotarod and hotplate tests, indicating improved neuromuscular coordination and pain tolerance.

**Keywords:** Osteoprotective, Terminalia arjuna, Dexamethasone, GIOP, Alendronate, Biochemical analysis.

**PL-584**

## THE CLINICAL SIGNIFICANCE OF THE RH FACTOR AND ITS ENHANCEMENT THROUGH ARTIFICIAL INTELLIGENCE

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The Rh factor (Rhesus factor) is a protein found on the surface of red blood cells. It was first identified in monkeys, which is how it got its name. People who have this protein are considered Rh-positive, while those who don't are Rh-negative. Problems can arise when a Rh-negative person is exposed to Rh-positive blood. Their immune system may see the Rh factor as foreign and begin producing antibodies against it. This situation is known as Rh incompatibility or Rh disease. This condition most commonly affects pregnancy. If a Rh-negative mother is carrying a Rh-positive baby, small amounts of the baby's blood may enter her bloodstream during pregnancy or childbirth. This exposure can also happen after a miscarriage, abdominal trauma, or certain medical procedures. During the first pregnancy, the mother's body usually takes time to recognize the Rh factor and form antibodies, so the baby is rarely harmed. However, in future pregnancies, the mother's immune system may already have anti-Rh (anti-D) antibodies. This can lead to serious complications such as fetal anemia, jaundice, erythroblastosis fetalis, or in severe cases, hydrops fetalis, which involves dangerous fluid buildup. Fortunately, Rh disease is highly preventable. Giving a Rh-negative mother an injection of anti-D immunoglobulin (RhIg) during pregnancy and after delivery prevents her immune system from forming harmful antibodies and helps protect future pregnancies.

**Keywords:** Rh factor, Rhesus antigen, Haemolytic disease, Blood transfusion, Artificial intelligence.

**PL-585**

## ASSESSMENT OF PREVALENCE AND RISK FACTORS OF ANEMIA AMONG PATIENTS AT TERTIARY CARE TEACHING HOSPITAL

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The prevalence of anemia is a major clinical challenge. Due to poor Socio- economic, malnutrition, heredity diseases and mal-absorption of Iron also leads to Anemia. Menstrual periods with excessive bleeding also major concern in anemia. This study aimed to assess the Socio-demographic factors in relation to the problem of anemia in adult females. The randomized, cross sectional study was carried out with 120 patients for 6 months as per the study criteria. Patients were screened for biochemical tests. Out of 120 patients, 32% were male and 68% were female. The 17 to 30 years of age group were mostly affected. The educational status indicates 35% were illiterate. The severity was assessed based on Hb value and result that, 8% patient were severe, 8% were moderate and 84% were in mild anemia. The mean Hb value was found that 10.82 mg/dl. 42% of female patients not consuming red meat, fish and chicken. Serum ferritin value is only 5.8 ng/ml, MCV found that 72.30 fL and Hb is 10.82 g/dl. The patient counseling on healthy diet and awareness about risk factors of anemia may reduce the severity and complications of anemia. The Pharmaceutical care on anemic patients is essential to prevent the morbidity and mortality rate.

**Keywords**: Anemia, Adult female, Mal-nutrition, Iron.

**PL-586**

## ROLE OF ANTICHOLINERGIC DRUGS IN PARKINSON'S DISEASE

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Parkinson's disease (PD) is a chronic neurodegenerative disorder primarily caused by the degeneration of dopaminergic neurons in the substantia nigra, leading to an imbalance between dopamine and acetylcholine in the basal ganglia. This imbalance contributes to classic motor symptoms such as tremors, rigidity, and bradykinesia.




ISBN: 978-81-980623-8-3

Anticholinergic drugs help restore this neurotransmitter balance by inhibiting muscarinic acetylcholine receptors, thereby reducing excessive cholinergic activity. These drugs are particularly effective in managing tremors and rigidity, especially in the early stages of Parkinson's disease. Commonly used anticholinergic agents include trihexyphenidyl, benztropine, and biperiden. However, their use is limited in elderly patients due to potential side effects like cognitive dysfunction, dry mouth, blurred vision, and urinary retention. While their role has diminished with the availability of dopaminergic therapies, anticholinergics still hold value in younger patients or those with predominant tremor symptoms. Ongoing research aims to develop more selective anticholinergic agents with fewer adverse effects.

**Keywords**: Parkinson's disease, Anticholinergic drugs, Acetylcholine, Trihexyphenidyl, Muscarinic receptor blockers, Tremors

**PL-587**

**NEUROPROTECTIVE AND COGNITIVE-ENHANCING EFFECTS OF ASHWAGANDHA GHRITA IN ANIMAL MODELS OF CNS DISORDERS**

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Ashwagandha (Withania somnifera), widely recognized as a Rasayana herb in Ayurveda, is increasingly being recognized for its neuroprotective and memory-enhancing effects. Current research focuses on means to optimize its effects in the brain, while traditional texts approve of lipid-based carriers such as ghrita (medicated ghee) to facilitate delivery of its active ingredients. To this end, using a Ghrita formulation containing Ashwagandha, a recent study in mice examined the effect in established models of anxiety and models of cognition. Following treatment, anxiety levels were measured by the normal Elevated plus Maze (EPM) method. The EPM demonstrated that mice that were treated with the Ashwagandha formulation showed an increase of 42% in open-arm entries compared to controls, and they spent 35% more time in the open arms, signifying that they had lower anxiety. Effects on cognition were measured through the Morris Water Maze (MWM), demonstrating a reduction in escape latency from an average of 58.3 ± 4.2 seconds in the control mice and 29.6 ± 3.8 seconds for treated mice, which signifies normalization of learning. These effects were further verified in a probe trial, as treated animals spent more time in the target quadrant. Finally, the Novel Object Recognition Test indicated an improvement in recognition memory, which is observed as an increase in the discrimination index (0.41 ± 0.03 to 0.72 ± 0.04). From a biochemical standpoint, the identification of reduced levels of malondialdehyde, increased levels of antioxidant enzymes, and normal levels of acetyl cholinesterase activity was demonstrated to induce neuroprotection with Ashwagandha Ghrita. These findings support Ayurvedic tenets and the functional likely role of the ghrita to enhance central nervous system health.

**Keywords:** Ashwagandha, Ayurveda, Neuroprotective, anxiety, Rasayana herb, acetyl cholinesterase, Elevated plus Maze

**PL-588**

**A PROSPECTIVE STUDY ON THE UTILIZATION PATTERN OF VONOPROZAN ON GASTROESOPHAGEAL REFLUX DISEASE (GERD)**

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Gastroesophageal reflux disease (GERD) is a chronic gastrointestinal condition, which is marked by retrograde gastric flow to the esophagus resulting in symptoms heartburn and regurgitation. The increasing prevalence of GERD especially among youngsters has been attributed to beneficial lifestyles, life characteristics as well as malfunction of lower esophageal sphincter. Although proton pump inhibitors (PPIs) are also a frequently used method of therapy, not all patients respond. This was a prospective observational study and lasted six months at PIMS where the efficacy and tolerability of vonoprazan as a novel potassium-competitive acid blocker (P-CAB) were determined in the treatment of erosive and non-erosive GERD. Two hundred patients took part in this study and the males were the majority (68) and the age group 31-40 years was the most affected. The use of spicy foods (97.5%), caffeine (78%), and smoking (26.5%) were major contributing lifestyle factors. Vonoprazan 20mg showed high efficacy with regard to relief of symptoms particularly heartburn, regurgitation, epigastric and nausea with total elimination of severe heartburn in all 112 cases. There was no significant difference between genders and the recovery rates and erosive and non-erosive groups were equal (P=0.31). Some patients had mild residual symptoms reported such as dyspepsia and bloating. The research finds that vonoprazan is a safe and very effective therapy in GERD with a significant symptomatic control and quality of life. Changing lifestyle and drug therapy complement each other in terms of improving treatment results. There is a recommendation of early diagnosis and personalized therapy on the basis of demographic and clinical profiles, which is most effective in treating GERD.

**Keywords:** Gastroesophageal Reflux Disease (GERD), Vonoprazan, Potassium-Competitive Acid Blocker (P-CAB), Erosive Esophagitis, Non-Erosive Esophagitis.

**PL-589**

**IN VITRO AND IN VIVO ASSESSMENT OF CICLOPIROX OLAMINE ENCAPSULATED NIOSOMAL TOPICAL GEL FORMULATION FOR THE TREATMENT OF FUNGAL INFECTIONS**

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The present study aims to create and test a unique combination (Niosomal gel) of niosomes and gel base containing Ciclopirox Olamine (CPO) using in vitro and in vivo test and compare with commercial formulations. The objective of present study was to investigate transdermal absorption enhancement through rat skin of CPO loaded niosomal gel in order to evaluate its potential topical use for pharmaceuticals and cosmeceuticals. Vesicles were prepared by film hydration method using drug, surfactant and cholesterol in 1:1:0.2 ratios respectively. The microbial assay for zone inhibition was performed on Candida albicans as a fungal strain. Further, skin permeation study, drug retention study and skin irritation study of niosomal gel, plain gel and marketed cream were investigated by using adult albino rats. In addition, antifungal activity was performed on experimentally induced cutaneous candidiasis in albino rats. The in vitro antifungal studies, it was concluded that the niosomal gel of CPO showed an enhanced zone inhibition against the Candida albicans compared to the plain gel and marketed cream. The results of drug retention and permeation studies revealed that the modified niosomal gel has a greater potential for improving the delivery of topical ingredients and drug retention to skin parts significantly improved CPO compared to conventional formulations. The findings of the study demonstrate that niosomal gel of CPO (1% w/w) were clinically effective, tolerable and beneficial in enhancing resolution of topical fungi than plain gel (1% w/w) and marketed (1% w/w) formulation. The regimen can be the best alternative for treating fungal infection of the topical fungus.

**Keywords**: Ciclopirox Olamine (CPO), Niosomal gel, Antifungal activity, In vitro and in vivo assessment.

**PL-590**

**ANALYZING CONVERSION OF INTRAVENOUS TO ORAL DOSING OF ANTIBIOTICS IN ADULT POPULATION AT A TERTIARY CARE HOSPITAL**

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Antibiotic therapy is a critical component in managing infectious diseases, and its inappropriate usage poses a significant risk for the emergence of drug-resistant organisms. Early transitioning from intravenous to oral antibiotic therapy may influence the length of hospital stay. Additionally, if adverse drug reactons (ADRs) occur during IV, they might be challenging to treat. A prospective, single centred observational, cohort analysis of IV to PO convension in antibiotic program for the adult population was performed at Sri Aurobindo Institute of medical sciences, Indore. The study was conduct for 6 months. The data was collected using case record form through which demographic details, type of conversion therapy used for antibiotics. The




ISBN: 978-81-980623-8-3

reviews of health care professional were collected using the standard questionnaire WHO/EMP/IAU/2018.01 & knowledge attitude and practice based questionnaire The data helped in formulate research results and demographic profiles. In this study 248 patient were reviewed among which 121 patients were enrolled in the study, other 127 were not converted from IV to P/O. Among 121 participant 52% were male & 48% were female, 33.88% were converted through step-down therapy, 29.75% through sequential therapy, and 19.83% through switch therapy & other 16.54% through combination therapies. Hospital stay of maximum patients (43.8%) was 4-8days with early switch while 10-12 days in patients not converted from IV to P/O. Also statistical analysis found type of conversion therapy used & responses of patients were independent of gender and age. Our study analysed type of conversion therapy used, duration of hospital stay & recurrent rate of conversion i.e. step-up therapy in 121 patients on the basis of data collected case record form & questionnaires. Step-down therapy predominated, notably reducing hospital stays. Early conversion optimized antimicrobial use, enhancing stewardship and safety

**Keywords:** Antibiotic, antibiotics resistance, sequential, switch, step-down therapy.

**PL-591**

## CO-ADMINISTRATION OF ROSA DAMASCENA AND COMMIPHORA WIGHTII IMPROVES THERAPEUTIC EFFECTS IN STZ-INDUCED MODELS OF ALZHEIMER'S DISEASE

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Alzheimer's disease (AD) is a devastating neurodegenerative disorder characterized by memory loss and cognitive decline, driven by factors like oxidative stress, inflammation, and mitochondrial dysfunction. Despite ongoing research, effective treatments remain elusive. Current therapeutic strategies primarily focus on symptomatic relief and slowing disease progression, highlighting the urgent need for novel therapeutic approaches. The current study investigated the combined neuroprotective effects and mechanisms of extracts from Rosa damascena and Commiphora wightii against streptozotocin (STZ)-induced AD in rats. Following STZ administration, animals were treated for four weeks with the extracts, both individually and in combination. Key biomarkers, including oxidative stress indicators, mitochondrial function, neurotransmitter levels (acetylcholine and glutamate), and the inflammatory cytokine TNF-α, were evaluated, along with behavioral tests to assess cognitive and locomotor function. The results were compelling, affirming that the combination therapy significantly reduced oxidative stress and improved mitochondrial function more effectively than the individual treatments. It also successfully regulated neurotransmitter levels and attenuated inflammation. Critically, both individual and combined treatments improved learning and memory. These findings thus reveal that the co-administration of R. damascena and C. wightii possesses improved neuroprotective properties, making them promising candidates for AD treatment. However, further research is needed to fully elucidate their mechanisms and explore their clinical potential.

**Keywords:** Alzheimer's disease, Rosa damascena, Commiphora wightii, streptozotocin, rodent model

**PL-592**

## MODERN APPROACHES TO BREAST CANCER MANAGEMENT

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Worldwide, Breast Cancer (BC) remains the most common cancer type accounting for approximately 2.3 million new cases and 685, 000 deaths. Despite advances in early detection and treatment, breast cancer continues to pose significant challenges due to different molecular subtypes posing different therapeutic challenges. Genetic and hereditary predispositions are among the numerous risk factors linked to the development of breast cancer. The spectrum of breast cancers is very wide. Early-stage breast cancer is thought to be curable and the mainstay of treatment for it is local-regional therapy (radiation and surgery), with systemic therapy administered either before or after surgery as needed. The conventional therapy for early-stage BC is mastectomy alone or breast-conserving surgery coupled with radiation and lymph node, ER, PR and HER-2 status. Breast cancer therapy has evolved from a surgical method to a more comprehensive strategy. Preoperative or neoadjuvant therapy is now necessary for most cases of early-stage breast cancer and may involve immune checkpoint inhibitors. Endocrine therapy and chemotherapy are the most common therapies for persons with hormone-positive (ER+ and HER2+) breast cancer making them simpler to treat. Immunotherapy is developing as an important part of breast cancer, treatment. Despite initial disappointments immunomodulation and cancer vaccines have shown clinical benefits. Gene therapy introduces genetic material into target cells via a vector, followed by gene correction, addition or suppression. The present review explores current trends in breast cancer treatments, including surgery, endocrine therapy chemotherapy, radiotherapy, and immunotherapy and gene therapy. Finding new treatment targets, refining combination medicines and comprehending the function of tumor evolution should be the top priorities for future research. Improving patient outcomes will require a focus on combining genetic and proteomic data to enhance precision medicine and a study of the social and psychological aspects affecting treatment adherence. Through this review, we propose to highlight the critical need for further study and a multidisciplinary strategy to understand the complexity of breast cancer and eventually increase patient survival rates and quality of life.

**Keywords:** Breast cancer; Surgery; Endocrine therapy; Immunotherapy; Gene therapy; Radiotherapy

**PL-593**

## A STUDY TO INVESTIGATE THE INCIDENCE, RISK FACTORS, MANAGEMENT STRATEGIES, AND RECURRENCE RATE OF ACUTE PANCREATITIS

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Acute pancreatitis is an acute inflammatory condition of the pancreas with a wide spectrum of clinical presentations, ranging from mild, self-limiting illness to severe disease associated with life-threatening complications. Understanding its incidence, etiological factors, severity patterns, management approaches, and recurrence rates is essential for improving clinical outcomes. This prospective observational study aimed to investigate the incidence of acute pancreatitis in a tertiary care hospital, identify predominant risk factors, assess disease severity using the BISAP score, evaluate management strategies, and determine recurrence rates in both inpatient and outpatient populations. Over a nine-month study period, 108 patients aged 18 years and above with confirmed acute pancreatitis were enrolled. Comprehensive demographic details, lifestyle habits, medical and medication history, laboratory results, and imaging findings were collected. Patients were followed from admission until discharge, and recurrence was defined as two or more distinct episodes following complete or near-complete resolution of symptoms. The incidence rate was 0.13% of total hospital admissions, with males aged 31–40 years being the most affected. Alcohol consumption (39.81%), gallstones (26.85%), and hypertriglyceridemia (20.37%) were the leading etiological factors. Most cases were mild to moderate and responded well to conservative management, including bowel rest, fluid resuscitation, analgesics, proton pump inhibitors, and selective surgical interventions such as laparoscopic cholecystectomy. The mortality rate was low at 0.9%. Recurrence occurred in 41.7% of patients, primarily due to unresolved etiological factors. This study underscores the importance of early etiological identification, lifestyle modification, and structured follow-up to reduce recurrence and prevent progression to chronic pancreatitis.

**Keywords:** Acute Pancreatitis, BISAP Score, Risk Factors, Recurrence Rate.

**PL-594**

## SMART CANCER CARE: THE EMERGING ROLE OF THERANOSTICS IN PRECISION ONCOLOGY

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The paradigm of cancer treatment is rapidly evolving from conventional cytotoxic regimens toward precision-guided, personalized therapeutics. Theranostics an innovative approach integrating diagnostic imaging and targeted therapy within a single molecular construct has emerged as a cornerstone of this transformation. By enabling real-time visualization, quantification, and treatment of tumor targets, theranostics bridges the gap between molecular diagnosis and individualized therapy. This review critically explores the advances in oncological theranostics with a focus on radiopharmaceuticals, nanocarrier-based delivery systems, and molecular targeting platforms that underpin precision oncology. The review encompasses an analysis of recent developments in radionuclide-based theranostic agents such as PSMA and DOTATATE conjugates, alongside nanotheranostic systems employing gold nanoparticles, liposomes, and polymeric micelles. The role of multimodal imaging techniques (PET/CT, SPECT, MRI, and fluorescence imaging) in tracking therapeutic response and biodistribution is discussed. Emphasis is placed on design strategies for biocompatible nanocarriers, surface functionalization for tumor selectivity, and the integration of stimuli-responsive release mechanisms. Preclinical and clinical evidence demonstrates that theranostic agents enhance diagnostic accuracy, reduce systemic toxicity, and enable real-time monitoring of therapeutic outcomes. Despite promising results, challenges persist in terms of large-scale synthesis, pharmacokinetic optimization, regulatory approval, and translational feasibility. Theranostics exemplifies "smart cancer care", offering a unified, patient-centric model that aligns with the goals of precision medicine. The future of oncological theranostics will depend on synergistic efforts in pharmaceutical technology, radiochemistry, and nanomedicine to ensure effective clinical translation and widespread accessibility.

**Keywords:** Theranostics, Precision Oncology, Nanomedicine, Targeted Drug Delivery, Molecular Imaging.

**PL-595**

## A STUDY ON SEVERITY, MANAGEMENT AND COMPLICATION OF GASTRO-ENTERITIS IN A TERTIARY CARE HOSPITAL

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Gastroenteritis is an inflammation of the stomach and intestines causing diarrhea, vomiting, abdominal pain, and cramping. It results from infections by viruses, bacteria, parasites, or exposure to toxins. The condition is highly contagious and can lead to dehydration affecting daily activities. Management focuses on hydration, symptom relief, and treating underlying causes. The study aimed to identify the most common causative microorganism, assess severity, management patterns, and complications among adults with gastroenteritis. This six-month prospective observational study was conducted among patients admitted to St. Philomena's Hospital. It included 75 patients above 18 years of age, with females comprising 64% and males 36%, predominantly aged 48–57 years (32%). Diarrhea with fever and vomiting was the most common reason for admission (24%), and watery stool was observed in 81.3% of patients. Moderate severity of gastroenteritis was noted in 62.7% of cases. Microbiological analysis identified E. coli in 12.2% of specimens. Antiemetics (86.7%) and antibiotics (66.43%) were frequently prescribed, with ceftriaxone being the most used agent (64.7%). Probiotics were also commonly administered. Complications occurred in 4% of cases, mainly acute kidney injury, and one mortality (1%) due to shock was recorded. Adverse drug reactions were seen in 3% of patients, all classified as probable. The study concluded that moderate gastroenteritis was most common, E. coli was the leading causative organism, and effective management involved fluid replacement, antiemetics, antibiotics, and probiotics.

**Keywords**: Gastroenteritis, Diarrhea, E. coli, Cephalosporins, Rashes

**PL-596**

## EFFECT OF CLINICAL PHARMACIST CONCILIATION ON DEPRESCRIPTION AMONG GERIATRIC PATIENTS ADMITTED IN A TERTIARY CARE HOSPITAL

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Polypharmacy and the use of potentially inappropriate medications (PIMs) remain major challenges in geriatric healthcare, contributing to adverse drug events, drug–drug interactions, and increased morbidity. This study aimed to evaluate the impact of clinical pharmacist–led medication conciliation on deprescribing practices among geriatric inpatients admitted to a tertiary care hospital. A total of 144 patients aged 65 years and above were enrolled based on defined inclusion criteria. Prescription analyses were conducted using the 2023 AGS Beers Criteria to identify PIMs across various risk categories, including medications to be avoided, used with caution, drug–disease interactions, drug–drug interactions, and those requiring renal dose adjustment. Among the enrolled population, 39.58% were prescribed at least one PIM, with benzodiazepines, sulfonylureas, proton pump inhibitors, and specific cardiovascular agents being the most frequently identified. A total of 62 deprescribing recommendations were provided by the clinical pharmacist, out of which 33 (51.61%) were accepted by physicians. Non-acceptance was primarily due to patient complexity, concerns regarding withdrawal symptoms, perceived clinical benefit of ongoing therapy, and fear of symptom recurrence. Higher acceptance rates were noted for recommendations involving drug–disease interactions and renal dose adjustments, whereas lower acceptance was seen for medications listed under the "use with caution" category. The study emphasizes that clinical pharmacist involvement substantially aids in identifying PIMs and fostering safer prescribing practices. Despite barriers related to clinical judgement and patient-specific factors, deprescribing interventions supported improved medication optimization. These findings underscore the importance of integrating clinical pharmacists into geriatric care teams to enhance medication safety and minimize inappropriate polypharmacy.

**Keywords:** Deprescribing, Clinical pharmacist, Polypharmacy, Beers Criteria, Geriatrics, Medication safety.

**PL-597**

## EVALUATION OF IRON SUPPLEMENT PRESCRIBING PRACTICES IN ANEMIC PATIENTS: A STUDY OF COMMUNITY PHARMACIES IN GANDHINAGAR DISTRICT

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Anemia, especially iron deficiency anemia (IDA), remains a major public health issue in developing countries like India. It commonly results from inadequate dietary iron, poor absorption, and increased physiological requirements, affecting overall health and well-being. This prospective observational study aimed to evaluate iron supplement prescribing patterns using WHO prescribing indicators and to identify the factors guiding supplement selection and reported side effects. The study was conducted for six months in four community pharmacies in Gandhinagar, Gujarat, involving 139 anemic patients. Prescription patterns were assessed using WHO prescribing indicators, and descriptive statistics were used for analysis. Among 139 patients, most were diagnosed with mild to moderate anemia. A total of 350 drugs were prescribed, with an average of 2.5 drugs per prescription, suggesting over-prescribing. Only 2.5% of medicines were prescribed generically, and 9% belonged to the National Essential Medicines List. Oral iron therapy was most common, while injectables accounted for 9%. Prescribing decisions were influenced by age, gender, and nutritional status. Ferrous fumarate was commonly prescribed to females aged 18–25 years, while ferrous ascorbate was preferred for those aged 26–35 years. Three patients reported side effects: nausea with ferric carboxymaltose, constipation with ferrous fumarate, and dark stools and nausea with ferrous ascorbate. Iron supplements are widely prescribed; however, improved adherence to WHO prescribing guidelines and rational drug use is needed in community pharmacy practice.

**Keywords:** Anemia, Iron Supplements, Community Pharmacy Services, Practice Patterns, Drug Prescriptions, India

**PL-598**




ISBN: 978-81-980623-8-3

**"UPADACITINIB: A TARGETED THERAPY FOR RHEUMATOID ARTHRITIS"**

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Rheumatoid arthritis (RA) is a long-lasting autoimmune condition that leads to persistent joint inflammation, causing pain, disability, and a notable decline in quality of life. For those patients who don't see much improvement with standard treatments or biologic disease-modifying antirheumatic drugs (DMARDs), Janus kinase (JAK) inhibitors have emerged as a valuable alternative. One such medication, upadacitinib, specifically targets JAK1 and has already received approval for conditions like severe atopic dermatitis (AD) and, more recently, for RA.This review seeks to evaluate the real-world effectiveness and safety of upadacitinib in treating severe atopic dermatitis, while also providing insights into its application for RA. Out of the 242 studies initially found, 214 were excluded after a review of their titles and s. Full-text evaluations were performed on the remaining 25 studies, with 17 meeting the criteria for inclusion in the analysis.The findings from these real-world studies consistently indicate that upadacitinib is highly effective, resulting in significant improvements in both clinical signs and patient-reported symptoms. The drug's advantages were particularly clear in patients who had not responded to earlier treatments. Importantly, no new or unexpected safety issues were identified, further reinforcing its positive safety profile, which aligns with the outcomes of randomized clinical trials.

**Keywords:** Rheumatoid arthritis; Atopic dermatitis; Upadacitinib; JAK inhibitors; DMARDs; Real-world evidence; Safety; Effectiveness.

**PL-599**

**ASSESSMENT OF KNOWLEDGE AND ATTITUDE OF THE PUBLIC TOWARDS NON-ALCOHOLIC FATTY LIVER DISEASE: DEVELOPMENT, VALIDATION, AND PILOT TESTING OF A STANDARDIZED QUESTIONNAIRE**

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Non-alcoholic fatty liver disease (NAFLD) is the most prevalent chronic liver disease globally, yet public awareness remains limited. This study aimed to assess the knowledge and attitude of the general public toward NAFLD using a systematically developed and validated questionnaire. A cross-sectional interventional design was adopted. The questionnaire was created through literature review and expert evaluation by hepatologists, clinical pharmacists, and public health specialists. Content validity was established using Item- and Scale-level Content Validity Index (I-CVI and S-CVI), both achieving a score of 1. Inter-rater reliability using Fleiss kappa demonstrated near-perfect agreement ($\kappa = 0.96$; $p < 0.001$). Pilot testing was conducted among 26 adults to assess clarity, feasibility, and preliminary knowledge gaps. Participants found the tool easy to understand (100%), relevant (95.45%), and feasible to complete within 15–20 minutes. Baseline results showed that 84.6% had heard of NAFLD, but misconceptions persisted—27.3% believed NAFLD is solely alcohol-related, and only 50% perceived it as a very serious condition. Although 90.9% recognized lifestyle modification as important, symptom recognition and understanding of complications remained low. Attitude scores indicated generally positive perceptions toward awareness and preventive behaviors. The validated questionnaire demonstrated excellent reliability, clarity, and applicability for large-scale assessment. Findings from the pilot highlighted substantial knowledge gaps, underscoring the need for targeted educational interventions. The tool will be used in the main study involving 191 participants to evaluate the impact of structured health education on improving NAFLD awareness and attitudes.

**Keywords:** NAFLD, Knowledge, Attitude, Public Health, Questionnaire Validation, Health Education

**PL-600**

**ASSOCIATION OF CHRONIC DISEASES WITH PREGNANCY COMPLICATIONS: A RETROSPECTIVE COHORT STUDY**

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Pregnancy is a critical phase often complicated by chronic conditions such as anemia, hypertension, obesity, and thyroid disorders. These diseases can significantly impact both maternal and fetal health, leading to complications like preeclampsia, premature delivery, low birth weight, and placental abruption. This retrospective cohort study aimed to explore the association between chronic diseases and pregnancy complications, and to compare these complications between first and second pregnancies. The study involved 116 pregnant women whose medical histories, complaints, and treatments were reviewed after obtaining hospital approval. Data were statistically analyzed using chi-square and t-tests to identify significant relationships and differences between pregnancy outcomes. Among the participants, 37% had anemia, 31% hypertension, and 18% thyroid disorders. Common pregnancy complications included abdominal and labor pain, premature delivery, low birth weight, preeclampsia, and placental abruption. No significant difference was observed in the incidence of complications between first and second pregnancies ($P > 0.999$). Neonatal outcomes were generally positive, with 79.3% full-term births, 14.6% premature deliveries, and a 6% abortion rate. Most mothers successfully breastfed, and 73% of infants were able to draw colostrum. The study suggests that effective management of chronic conditions during pregnancy may contribute to improved maternal and neonatal outcomes. These findings underscore the importance of close monitoring and timely intervention for chronic diseases to minimize adverse pregnancy complications.

**Keywords:** Chronic Diseases, Pregnancy Complications, Anemia, Hypertension, Thyroid Disorders, Maternal Health, Neonatal Outcomes

**PL-601**

**PREVALENCE AND SEVERITY OF MENOPAUSAL SYMPTOMS ON QUALITY OF LIFE AND KNOWLEDGE ASSESSMENT AMONG WOMEN'S**

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The World Health Organization defines menopause as "the permanent cessation of menstruation caused by diminished ovarian activity, which is often detected after a year of consecutive amenorrhea". The lack of understanding may aggravate the severity of symptoms and risk their quality of life. The current study used this approach to design a survey of the prevalence and intensity of menopausal signs using the Menopause-Specific Quality of Life (MENQOL) scale and assess women's knowledge of menopause and its management. A study on the general public was conducted in Karimnagar. The MENQOL scale collects the Frequency and seriousness of menopausal symptoms among women. We interviewed the subjects to determine their demographic details and awareness about menopause. The study included 961 participants, aged 35 to 60. Vasomotor (VM) and physical symptoms (PS) are highly prevalent in 283 perimenopausal women, urinary symptoms (US) are highly prevalent in 570 postmenopausal women, and VM and PS are more commonplace in 108 early menopausal women. As the conclusion to our study, people who have a high occurrence of menopausal symptoms have a risk for a diminished standard of living. The outcome highlights understanding gaps among women with high frequency and significant severity of menopausal symptoms. These findings emphasize the need for targeted health education initiatives and interventions to address the complex issues associated with menopause.

**Keywords**: MENQOL, Menopause, Quality of life, Prevalence, Knowledge assessment

**PL-602**

**MACROVASCULAR AND MICROVASCULAR COMPLICATIONS IN NEWLY DIAGNOSED TYPE 2 DIABETES MELLITUS BY CROSS SECTIONAL STUDY**

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Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder characterized by persistent hyperglycemia due to defects in insulin secretion, action or both. The cross-sectional study evaluated 100 newly diagnosed T2DM patients at a tertiary care hospital in Dindigul to determine the prevalence and pattern of macrovascular and




ISBN: 978-81-980623-8-3

microvascular complications. This study included 62% males and 38% females, predominantly aged 41 to 62 years. Macrovascular complications were observed as coronary artery disease (26%), cerebrovascular disease (8%), and peripheral artery disease (11%). Microvascular complications included retinopathy (20%), nephropathy (34%), and neuropathy (16%). Higher Body Mass Index (BMI) and waist circumference were significantly associated with an increased risk of complications. Early identification and systematic screening at diagnosis, including Electrocardiogram (ECG), Echocardiogram (ECHO), Ankle-Brachial index (ABI), fundoscopy, Electromyography (EMG), and urine analysis, proved valuable for predicting complications and guiding patient management. Findings highlight the importance of recognizing increased BMI and waist circumference as risk factors and recommend comprehensive screening at the time of diagnosis to improve patient outcomes through timely intervention and management.

**Keywords:** Type 2 diabetes mellitus, macrovascular complications, microvascular complications, coronary artery disease, nephropathy.

**PL-603**

## "FOOD-DRUG INTERACTION BETWEEN POMEGRANATE AND HYDROCHLOROTHIAZIDE: IMPLICATIONS FOR HEMOLYSIS"

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This study investigates the potential interaction between hydrochlorothiazide (HCTZ) and pomegranate juice on hemolytic activity using an in vitro blood agar assay. HCTZ, a common diuretic, may interact with pomegranate juice, known to inhibit cytochrome P450 enzymes. The assay assessed hemolysis by measuring the clear zones around HCTZ tablets, both alone and pre-soaked in pomegranate juice, on blood agar plates after 24-hour incubation at 37°C. Results showed increased hemolytic activity with the HCTZ + pomegranate juice combination (1.70 cm mean zone diameter) compared to HCTZ alone (1.05 cm). This suggests pomegranate juice may enhance HCTZ's hemolytic effect, potentially due to altered drug metabolism or synergistic interactions between HCTZ and pomegranate's bioactive compounds. These findings highlight a potential food-drug interaction, warranting further in vivo studies to determine clinical implications and inform safe concurrent use of HCTZ and pomegranate juice.

**Keywords:** Food-drug interactions (FDIs), Pomegranate (Punica granatum), Hydrochlorothiazide, Hemolytic activity, Drug metabolism, Oxidative stress, Cytochrome P450 (CYP450),

**PL-604**

## A STUDY ON SURVEILLANCE AND ASSESSMENT OF MEDICAL DEVICE ADVERSE EVENTS AT A TERTIARY CARE HOSPITAL

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Medical devices play a crucial role in modern patient care, making their safety and efficacy essential components of healthcare quality. With the rapid advancement of medical technology and increased use of devices in diagnostic and therapeutic procedures, concerns regarding device-associated adverse events (MDAEs) have grown substantially. Materiovigilance, a dedicated system to monitor, assess, and report adverse events related to medical devices, ensures that risks are minimized and patient safety is upheld. In India, the Materiovigilance Programme of India (MvPI) has strengthened national efforts toward improving medical device safety. This prospective observational study was conducted at St. Philomena's Hospital, Bengaluru, with the objective of analyzing medical device–related adverse events and identifying the most commonly implicated devices. Ethical approval was obtained, and daily ward rounds were carried out in collaboration with biomedical engineers to detect and document suspected adverse reactions using the MvPI reporting format. A total of 31 medical device–associated adverse events were recorded during the study period, with an incidence rate of 2.81%. Adverse events were more frequently reported in females, and the mean patient age was 61.36 years. The most common devices associated with adverse events were DISPOVAN syringes, BD Venflon IV cannulas, and QVS-100. Frequently encountered events included IV cannula–induced thrombophlebitis, incorrect non-invasive blood pressure readings, and blocked needles. Most events were categorized as Class B and were associated with therapeutic and diagnostic device use. Causality assessments indicated that most MDAEs were probable. The study concludes that although MDAEs occur, reporting remains minimal. Strengthening awareness and training among healthcare professionals can significantly enhance materiovigilance practices and patient safety.

**Keywords:** Materiovigilance, Medical devices, Adverse events, MvPI, Thrombophlebitis, IV Cannula, Patient safety

**PL-605**

## COMPARISION OF PHARMACOLOGICAL ACTIVITY OF CARTHAMUS TINCTORIUS AND CARTHAMUS OXYACANTHA FOR THE TREATMENT OF BENIGN PROSTATIC HYPERPLASIA

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Benign prostatic hyperplasia (BPH) is a prevalent condition among older men, characterized by prostate gland enlargement due to the proliferation of stromal and epithelial cells. BPH affects over 50% of men by age 60 and nearly 90% by age 85. The condition is closely associated with dihydrotestosterone (DHT), a potent androgen produced from testosterone by the enzyme 5α-reductase, which promotes prostate growth. While the complete pathogenesis of BPH remains partially understood, androgens are known to play a critical role, and inhibiting DHT production or action has proven effective in reducing prostate growth. In this study, in vitro experiments were conducted to evaluate the 5α-reductase inhibitory potential of extracts from Carthamus tinctorius and Carthamus oxycantha. Enzyme solutions were prepared through prostate homogenization, with enzyme concentration determined using Bradford reagent. The inhibitory activity was assessed using a standard testosterone curve, with peak areas measured by HPLC at 254 nm, employing a methanol: water (70:30) mobile phase and a flow rate of 1 ml/min. Optimum enzyme concentration was established by varying enzyme levels while keeping substrate concentrations constant. The results revealed that the n- hexane fraction of the methanolic extract of Carthamus tinctorius exhibited significant 5α-reductase inhibitory activity, with an IC50 value of 0.301 mg. In contrast, chloroform, methanol, butanolic fractions, and various other extracts did not demonstrate significant inhibitory potential. These findings suggest that Carthamus tinctorius, particularly its hexane fraction, holds promise for therapeutic applications in managing prostatic hyperplasia, while highlighting the differential pharmacological properties of Carthamus oxycantha

**Keywords**: Carthamus Tinctorius, Carthamus Oxyacantha, Prostatic Hyperplasia

**PL-606**

## EVALUATION OF ANTI-ALZHEIMER'S ACTIVITY OF METHANOLIC EXTRACT OF ANNONA MURICATA (AMME) LEAVES IN EXPERIMENTAL MICE

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The Anti-Alzheimer's activity of methanolic extract was investigated on scopolamine induced cognitive impairment in mice using behavioural parameters viz, Morris water maze (MWM) and Elevated plus maze (EPM). The two doses 100mg/kg and 200mg/kg were administered through oral route against experimentally induced amnesia by scopolamine (0.4mg/kg i.p.) in young mice. The standard drug used for experiment was was Piracetam (0.5mg/kg p.o.) in both the models. The long-term administration of both 100mg/kg and 200mg/kg of extract produced significant reduction in ELT and increase in TSTQ in MWM model. Similarly, it showed significant reduction in TL in EPM model when compared with scopolamine treated group. The result obtained was comparable with that of the standard drug piracetam. The outcome




ISBN: 978-81-980623-8-3

of the present study provides the evidence that the methanolic extract of Annona muricata leaves showed significant dose dependent beneficial effect against scopolamine induced Alzheimer's Disease. The presence of flavonoids and phenolic acids in AMME might be responsible for overcoming scopolamine induced memory impairment. Thus, the present study concludes Annona muricata leaves possesses anti-Alzheimer's activity against experimentally induced amnesia in mice

**Keywords:** Alzheimer, Annona muricata, EPM, MWM, Piracetam, Scopolamine

**PL-607**

**ASSESSMENT OF PRESCRIBING PATTERNS OF MEDICATIONS THROUGH MEDICATION APPOPRIATENESS INDEX & WHO CORE PRESCRIBING INDICATORS IN GERIATRIC PATIENTS**

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The main aim of the present study is to assess the prescribing pattern of medication among geriatrics. Rational prescribing is essential to ensure patient safety, therapeutic effectiveness, and cost-efficiency. This study aimed to assess prescribing patterns and the appropriateness of medications using the Medication Appropriateness Index (MAI) and WHO Core Prescribing Indicators in a tertiary care inpatient setting. It is a prospective observational cross sectional study and conducted over a period of six months. Among the MAI criteria, the most common issues identified were lack of indication and inappropriate therapy duration, each observed in 20 prescriptions. Drug-drug interactions were noted in 93 prescriptions using Micromedex, although no clinical effects were observed. Other areas, including dosage, effectiveness, and cost-efficiency, showed minimal or no issues. WHO indicators revealed an average of 8.1 drugs per encounter, indicating a high level of polypharmacy. Generic prescribing was 75%, slightly below the ideal 100%. Antibiotic use was 17%, within the acceptable range (<30%), while injection use was higher than recommended at 38.3%. Encouragingly, 98.1% of drugs were from the Essential Medicines List (EML). The study highlights key areas requiring improvement, such as reducing polypharmacy, minimizing injection overuse, and ensuring appropriate indications and treatment durations. However, strong adherence to EML and rational antibiotic use reflect positive prescribing practices overall.

**Keywords**: Medication Appropriateness Index, WHO Core Prescribing Indicators, Rational Drug Use, Polypharmacy, Inappropriate Prescribing.

**PL-608**

**FROM DATA TO DISCOVERY: HOW POPULATION-BASED RISK ASSESSMENT AND TRIAL SIMULATION TRANSFORM PUBLIC HEALTH**

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Population-based risk assessment and trial simulation are transforming clinical research and public health. By combining large-scale epidemiological data, computer models, and real world evidence, these methods allow for precise predictions of health outcomes, efficient trial designs, and proactive risk management. Population-level risk assessments identify vulnerable groups, guide targeted interventions, and inform healthcare policy decisions. Trial simulations enable virtual testing of interventions in various scenarios, which lowers trial costs, shortens duration, and reduces patient exposure to harmful events. This work presents key methods and showcases examples where risk modeling and trial simulations have sped up drug development and improved public health strategies. It also discusses important challenges, such as integrating different data, addressing ethical issues, and meeting regulatory demands. In the future, new technologies like artificial intelligence, machine learning, and digital twins hold great promise for improving predictive accuracy, optimizing clinical trial strategies, and changing how we manage population health, marking the start of a new era of data-driven, patient-focused research.

**Keywords:** Population-Based Risk Assessment, Trial Simulation, Clinical Research, Public Health, Artificial Intelligence.

**PL-609**

**TRENDS IN RHEUMATOLOGY PRESCRIBING: INSIGHTS FROM A TERTIARY CARE HOSPITAL**

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Corticosteroids play a vital role in managing rheumatologic conditions due to their anti-inflammatory and immunosuppressive effects. However, inappropriate prescribing can result in long-term complications such as osteoporosis, diabetes, and cardiovascular disease. Understanding prescribing patterns is essential to optimize use and reduce risks. To assess corticosteroid prescribing practices in the rheumatology department of a tertiary care hospital. A cross-sectional descriptive study was conducted over three months in a tertiary care hospital. All inpatients and outpatients from the rheumatology department receiving corticosteroid therapy during the study period were included. A total of 100 prescriptions were reviewed. Among 100 patients, 64% were outpatients and 36% inpatients. Most were adult females (91% female, 83% adults). Rheumatoid arthritis (45%) and systemic lupus erythematosus (30%) were the most common diagnoses. Prednisolone (64%) and hydrocortisone (18%) were the most prescribed corticosteroids, with oral use in 75% of cases. Doses were classified as low (49%), medium (41%), and high (5%), with high doses mainly in rheumatoid arthritis and low doses in lupus. Long-term (>2 years) corticosteroid use was noted in 30% of patients, 3 out of 100 required pulse therapy. No major drug interactions were observed. The findings highlight variability in prescribing practices and the need for standardized steroid stewardship in rheumatology. Department-specific guidelines, improved tapering protocols, and pharmacist-led monitoring are essential to minimize risks and optimize outcomes.

**Keywords:** Corticosteroids, Rheumatology, Prescribing Practices

**PL-610**

**DEVELOPMENT AND ADMINISTRATION OF A STEROID ALERT CARD: A COLOR-CODED SAFETY TOOL TO ENHANCE SAFETY AND AWARENESS**

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Corticosteroids are vital in managing autoimmune and inflammatory diseases; however, inappropriate or prolonged use can lead to serious adverse effects such as adrenal suppression and increased infection risk. Despite their widespread use, standardized tools to support patient safety and professional communication are lacking in India. To address this gap, a color-coded steroid safety card was developed as part of a steroid stewardship initiative to enhance patient education and interprofessional coordination. To design, validate, and implement a standardized steroid safety card in the rheumatology department of a tertiary care hospital. A Steroid Stewardship Committee was formed under the Department of Rheumatology, comprising rheumatologists, a clinical pharmacist, administrators, and subject experts. The committee reviewed and approved the concept and design of the card, which also received clearance from the Institutional Ethics Committee of JSS Medical College. The card, designed in a horizontal format, includes patient details and hospital emergency contacts, and is available in both English and Kannada to improve accessibility. It uses a three-color risk system, Red (long-term use >3 months), Yellow (moderate use), and Green (recently stopped <12 months). A QR code links to a bilingual digital guide with tapering instructions and emergency management protocols. The steroid safety card serves as a practical and scalable tool to promote steroid stewardship and improve patient safety. Implementing similar models across healthcare settings can foster patient-centered care and strengthen communication between healthcare providers and patients.

**Keywords:** Safety Card, Steroids, Rheumatology, Stewardship, Autoimmune.

**PL-611**




ISBN: 978-81-980623-8-3

**ASSESSMENT AND MONITORING OF ADVERSE DRUG REACTIONS INDUCED BY ANTIMICROBIALS.**

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The current study was conducted to assess, monitor, and report adverse drug reactions (ADRs) induced by antimicrobial agents. The objective of the research was to evaluate the incidence, common causative antimicrobial classes, causality, severity, and preventability of ADRs occurring among patients receiving antimicrobial therapy. A prospective, hospital-based observational study was carried out for a period of six months at St. Philomena's Hospital, Bengaluru. Patients of all age groups and both genders who developed ADRs following antimicrobial use were included after obtaining informed consent and ethical clearance. Relevant case details were recorded, and the data were analysed using descriptive statistics. During the study period, 125 patients were enrolled, with females showing a higher incidence of ADRs than males. The majority of ADRs occurred in the age group of 40–49 years, predominantly among patients who received prophylactic antimicrobial therapy for surgical procedures. Antibacterial agents were the most common class of antimicrobials associated with ADRs, particularly ceftriaxone, metronidazole, and amoxicillin-clavulanate, followed by piperacillin-tazobactam. Parenteral formulations were involved in most ADR cases, and gastrointestinal and hypersensitivity reactions were the most frequently affected organ systems. Causality assessment using WHO-UMC and Naranjo's scales indicated that most ADRs were probable. Based on Hartwig's severity scale, 60 ADRs were mild, 51 moderate, and 19 severe. According to the Schu mock and Thornton preventability scale, 8 ADRs were not preventable, 76 definitely preventable, and 46 probably preventable. The findings highlight that clinical pharmacists play a vital role in the detection, assessment, and reporting of ADRs to strengthen pharmacovigilance systems. Enhanced awareness, timely reporting, and preventive strategies can minimize the occurrence of ADRs and improve patient safety.

**Keywords**: Antimicrobials, Antibiotics, Adverse Drug Reactions (ADRs), Pharmacovigilance

**PL-612**

**BIOACTIVE ENRICHED NUTRACEUTICALS BLENDS TARGETING IMMUNOLOGICAL, METABOLIC, AND GUT MICROBIOME CHALLENGES IN TEENAGERS**

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Adolescence is a critical developmental phase marked by rapid physiological, metabolic, and immunological changes that increase vulnerability to respiratory infections, obesity, and gastrointestinal disturbances. Nutraceutical interventions provide a safe and supportive approach to enhancing overall immunity. This study aimed to develop and evaluate three nutraceutical formulations. Breathing Support Granules, Weight Loss Powder, and Gut Relief Powder target these predominant adolescent health concerns. Each formulation was designed using evidence-based herbal and functional ingredients. Breathing Support Granules were prepared using Ocimum sanctum, Glycyrrhiza glabra, and Adhatoda vasica for bronchodilatory and anti-inflammatory activity. Weight Loss Powder incorporated green tea extract, Garcinia cambogia, and soluble dietary fibers to modulate metabolism and lipid regulation. Gut Relief Powder consisted of probiotics, prebiotic inulin, and soothing botanicals including Foeniculum vulgare and Zingiber officinale. All formulations underwent organoleptic assessment, preliminary stability testing, and physicochemical characterization. The formulations demonstrated acceptable appearance, taste, texture, flow properties, EUTICALS moisture content, and stability profiles suitable for adolescent consumption. The selected botanical and functional ingredients align with their reported roles in improving respiratory defence, regulating adipogenesis and oxidative stress, and promoting gut–gut-microbiota balance, and mechanisms contribute to enhanced mucosal, innate, and metabolic immune responses, supporting holistic wellness in adolescents. The three nutraceutical formulations exhibited promising functional attributes for addressing adolescent respiratory, metabolic, and gastrointestinal problems. These results suggest their potential as supportive, non-pharmacological interventions to strengthen immunity and overall adolescent health. Future clinical studies are recommended to validate long-term safety, efficacy, and immunomodulatory outcomes.

**Keywords**: Nutraceutical, Adolescent, Breathing support granules, Gut relief powder,Weight loss powder.

**PL-613**

**MODERN INNOVATIONS IN HOSPITAL DRUG DISTRIBUTION: A COMPREHENSIVE REVIEW**

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Hospital drug distribution systems have evolved significantly from basic floor stock models to highly structured, technology-driven frameworks aimed at improving medication safety, efficiency and accountability. Modern systems integrate digital tools and automation to ensure accurate, timely and patient-specific medication delivery while reducing errors and optimising workflow. This review summarises traditional drug distribution approaches and critically examines advancements such as computerized physician order entry (CPOE), clinical decision support systems (CDSS), automated dispensing cabinets (ADCs), robotic dispensing systems, bar code medication administration (BCMA), radiofrequency identification (RFID), smart infusion technology and hospital information system (HIS) and electronic health record (EHR) integration. The role of telepharmacy in expanding access and supporting remote clinical services is also discussed. These innovations collectively enhance patient safety, strengthen traceability, streamline operations, and improve inventory control. The review highlights current challenges including cost, interoperability, training, and cybersecurity and outlines future trends such as AI-driven decision support, predictive analytics, personalised medicine, mobile health integration, and advanced automation. Overall, continued progress in drug distribution systems will play a vital role in modernising hospital pharmacy practice and achieving safer, more efficient medication management.

**Keywords:** Drug distribution system, hospital pharmacy, unit dose dispensing, automated dispensing cabinets, BCMA, RFID, CPOE, clinical decision support, medication safety, telepharmacy, smart infusion systems.

**PL-614**

**STUDY ON SALES OF SELECTED HYPOLIPIDEMIC DRUGS IN GOA**

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The objective of present project work is to investigate the sales of various brands of selected Hypolipidemic medications. According to the survey, drug Atorvastatin is most preferred by the physicians and it reflected in sales, followed up by Rosuvastatin drug. A pre-validated questionnaire was used to conduct market survey in five main Goan cities: Ponda, Panjim, Margao, Mapusa, and Vasco. More than 100 pharmacies, 20 from each of five cities, were interviewed in the market survey. The collected data is subjected to One way ANOVA test and Bartlett's test. P-values for all four different antihypertensive drugs were found to be less than 0.05, indicating statistically significant differences in the mean monthly sales among different brands, suggests that not all brands were performed equally well in the market; some brands were clearly leading in sales while others lag behind. Bartlett's test also showed P-values < 0.05, confirming that the variability (variance) in sales between brands is significant, i.e., brands differ not only in average sales but also in the consistency of their performance. These statistical outcomes reflect market preference and brand dominance, likely influenced by factors such as brand reputation, availability, physician recommendation, marketing strategy, and price.

**Keywords:** Hypolipidemic, Atorvastatin, ANOVA, Bartlett's test, Variability




ISBN: 978-81-980623-8-3

**PL-615**

**PEPTIDOMIMETICS AND THEIR THERAPEUTICAL APPLICATION**

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Peptidomimetics represent a rapidly evolving class of therapeutic agents designed to mimic the structure and function of natural peptides while overcoming their inherent limitations, such as poor stability, rapid degradation, and low bioavailability. By incorporating chemical modifications, non-natural amino acids, or structural scaffolds, peptidomimetics can enhance metabolic stability, receptor selectivity, and oral bioavailability, making them attractive alternatives to conventional peptide drugs. These synthetic analogues maintain the biological activity of peptides but provide improved pharmacokinetic and pharmacodynamic properties, thereby expanding their therapeutic potential. Therapeutically, peptidomimetics have demonstrated significant applications in diverse medical areas. In oncology, they function as inhibitors of protein–protein interactions crucial for cancer progression, such as targeting Bcl-2 family proteins or p53-MDM2 interaction. In infectious diseases, peptidomimetic antibiotics and antivirals show promise against resistant pathogens and viral replication. Cardiovascular applications include modulation of enzymes like renin and ACE, contributing to blood pressure regulation. Furthermore, in metabolic disorders, peptidomimetics of incretin hormones such as GLP-1 analogues have shown success in the treatment of type 2 diabetes and obesity. Their ability to mimic signaling molecules also makes them valuable in immunology, where they modulate immune responses for autoimmune and inflammatory conditions. Recent advancements in computational modelling, combinatorial chemistry, and structural biology have accelerated the design of novel peptidomimetics with high specificity and reduced toxicity. Overall, peptidomimetics represent a promising therapeutic strategy bridging the gap between small molecules and biologics, with the potential to revolutionize modern drug discovery and development.

**Keywords:** Peptidomimetics, Drug design, Therapeutic peptides, Bioactive peptides, Structural modification, Enzyme inhibitors, Receptor ligands, Protein–protein interaction modulators, Stability enhancement, Oral bioavailability, Target specificity,Antiviral therapy, Anti-inflammatory drugs, Cardiovascular therapeutics, Peptide analogues, Small molecule mimetics, Pharmacokinetics improvement

**PL-616**

**EVALUATION OF ANTIDIABETIC AND ANTIOXIDANT ACTIVITY OF HYDROALCOHOLIC EXTRACT OF ROSMARINUS OFFICINALIS ON STREPTOZOTOCIN–NICOTINAMIDE INDUCED TYPE–2 DIABETIC MODEL IN WISTAR ALBINO RATS**

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The present investigation aimed to evaluate the antidiabetic and antioxidant potential of the hydroalcoholic leaf extract of Rosmarinus officinalis in streptozotocin–nicotinamide (STZ–NA) induced diabetic Wistar albino rats. The crude extract was administered orally at doses of 100 mg/kg and 200 mg/kg for 21 consecutive days. Throughout the experimental period, fasting plasma glucose, serum insulin, lipid profile, liver glycogen, pancreatic TBARS, and body weight were systematically assessed. Treatment with R. officinalis extract produced a significant reduction in blood glucose levels and improvement in antioxidant parameters compared with the diabetic control group. The extract also demonstrated protective effects on glucose tolerance in glucose-overloaded rats, indicating enhanced peripheral glucose utilization and insulin sensitivity. These findings collectively suggest that Rosmarinus officinalis leaves possess promising antidiabetic and antioxidative properties, potentially attributed to their rich phytoconstituents such as phenolics and flavonoids. The study highlights R. officinalis as a natural therapeutic candidate for diabetes management and its associated metabolic complications, warranting further exploration for the development of a novel orally active antidiabetic agent.

**Keywords:** Rosmarinus officinalis, Antidiabetic activity, Streptozotocin, Nicotinamide, Wistar albino rat.

**PL-617**

**DIABETIC FOOT ULCERS: A QUALITATIVE INSIGHT INTO MENTAL AND EMOTIONAL HEALTH**

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Existing research on diabetic foot ulcer (DFU) has focused on the clinical and physical aspects of DFU, with limited exploration of patient experiences on emotional impact. The aim of this study is to assess the impact of DFU on mental and emotional health of the patients. A qualitative phenomenological study was conducted among 30 participants with DFU in a tertiary care hospital of South India. Semi-structured, in-depth interviews were carried which were audio-recorded. Data were transcribed verbatim and analysed using NVivo 15 software. Themes and sub-themes were generated through inductive thematic analysis. Thematic analysis of the interviews revealed seven key themes. Barriers due to the condition showed caregiver burden and daily wound care created emotional strain and feelings of dependence. Causes of DFU revealed minor injuries, and infections. Awareness and management highlighted limited knowledge about diabetes and wound care, challenges in lifestyle modification, and mixed satisfaction with treatment, which affected self-care. Challenges due to the disease illustrated reduced mobility, job loss, and significant financial strain due to ongoing medical expenses. Impact on mental health captured experiences of anxiety, depression, disturbed sleep, social withdrawal, and fear of amputation. Emotional impact included feelings of sadness, frustration, guilt, isolation, and loss of desires, with prolonged healing leading to emotional exhaustion. Coping and future outlook showed that faith in God, family support, self-confidence, and emotional acceptance helped patients manage distress. Incorporating mental health screening, patient education, and psychosocial support into DFU management could improve outcomes and enhance holistic care.

**Keywords:** Qualitative study, diabetic foot ulcer, mental health, emotional health

**PL-618**

**ASSESSMENT AND MANAGEMENT OF POTENTIALLY INAPPROPRIATE PRESCRIBING IN GERIATRIC PATIENTS USING STOPP/START CRITERIA.**

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Medication safety in older adults is a significant clinical concern because of age-related physiological changes, multiple co-morbidities, and polypharmacy, which increase the risk of adverse drug reactions (ADRs). The STOPP/START criteria serve as comprehensive tools for identifying potentially inappropriate medications (PIMs) and potential prescribing omissions (PPOs), thereby enhancing the safety and effectiveness of pharmacotherapy in the elderly.

A prospective interventional study was conducted over six months in a tertiary care hospital after obtaining ethical clearance. Geriatric patients admitted to the medicine department were enrolled based on inclusion criteria. A total of 148 patients were included, comprising 83 (56.08%) females and 65 (43.91%) males. The majority (58.77%) were between 66 and 75 years of age. Among the prescriptions reviewed, 81 showed hyper-polypharmacy, 58 major-polypharmacy, 1 moderate, and 8 minor. PIMs were identified in 93 (63.83%) prescriptions, while PPOs were present in 41 (27.70%). Of the PPOs, 29 (70.73%) were reported to prescribers, with 19 (65.51%) accepted. Among the PIMs, 61 (65.59%) were reported, with 29 (47.54%) accepted by prescribers. The study showed the prevalence of polypharmacy and inappropriate prescribing among geriatric patients. Application of the STOPP/START criteria proved effective in identifying and minimizing PIMs and PPOs. The substantial acceptance of pharmacist interventions highlights the criteria's value in promoting medication safety and optimizing therapeutic outcomes in elderly care.

**Keywords:** Medication safety, Polypharmacy, STOPP/START criteria, Geriatric pharmacotherapy, Prescribing appropriateness

**PL-619**




ISBN: 978-81-980623-8-3

**ANTICHOLINERGIC MEDICATION BURDEN IN THE INDIAN ELDERLY AT A PUBLIC TEACHING HOSPITAL: A RETROSPECTIVE ANALYSIS**

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To determine the anticholinergic burden in elderly inpatients by using Anticholinergic Risk scale (ARS) and Anticholinergic Cognitive Burden (ACB) scale. By 2050, India's elderly population (60yrs or more) is projected to reach approximately 319-347 million, constituting about 20% of the total population. Since elderly inpatients receive as many as 10 medications a day, the safe therapy for the elderly become paramount. This retrospective analysis has utilized two tools for the determination of the anticholinergic burden in elderly inpatients. The retrospective analysis of 341 elderly inpatients' data. The Anticholinergic Risk Score (ARS) is an essential tool for determining the degree to which a certain patient may be at risk of an adverse anticholinergic impact that can cause cognitive dysfunction and delirium. The Anticholinergic Cognitive Burden (ACB) scale is used for determining the severity of anticholinergic drugs on cognition caused by prescribed medications. The results are expressed as average±standard deviation. The average age of the patients was found to be 68.61±7.18years; with 40.4% female and 59.6% male patients. It was found that 73.2% of the patients were suffering from at least one disease. The average length of stay in the hospital was found to be 5.64±3.88days. The average number of medications prescribed was 7.12± 3.89; the median and mode are 6&4, respectively. Approximately, 41% of patients received between 1-5 medications. The total of ARS score for 478 drugs in 341 patients was found to be 167 with an average of 0.48±0.84. Likewise, the ACB score was found to be 267; averaging to 0.78±0.86. The high ACB and ARS scores reflects patient may be at risk of an adverse anticholinergic impact that can cause cognitive dysfunction and poor physical health. It is, therefore, imperative that the pharmacotherapy in the elderly be monitored with the help of a clinical pharmacist.

**PL-620**

**EFFECTIVENESS OF PAIN MODULATING DRUGS ON HEALTH-RELATED QUALITY OF LIFE AND FUNCTIONAL DISABILITY IN PATIENTS WITH CHRONIC LOW BACK PAIN**

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Chronic low back pain (CLBP) is a major global cause of disability, with a lifetime prevalence of up to 66% in India. It is multifactorial, commonly associated with obesity, occupational strain, and comorbidities such as hypertension and diabetes. Beyond physical limitations, CLBP leads to significant impairment in health-related quality of life (HRQoL). This study aimed to assess disability and HRQoL in CLBP patients using the Roland-Morris Disability Questionnaire (RMDQ) and Short Form-36 (SF-36), and to evaluate the impact of combined pharmacological therapy and lifestyle interventions. An observational cross-sectional study was conducted over six months in a tertiary care hospital. Patients meeting study criteria were assessed using RMDQ and SF-36 at baseline and after 30 days of intervention. The mean age was 47.32 ± 12.98 years, with 57.1% males. The mean body mass index was 26.49 ± 5.21 kg/m². Hypertension (42.6%) and diabetes (33.9%) were common comorbidities, while smoking (42.9%) and alcohol use (41.1%) were frequently reported. The average pain duration was 25.8 months with moderate baseline intensity. Significant improvements were observed in disability and HRQoL scores after 30 days of combined treatment. Females showed greater improvement than males, while BMI, occupation, comorbidities, and social habits did not significantly influence outcomes. Pain-modulating drugs combined with lifestyle modifications effectively reduce disability and enhance HRQoL in patients with chronic low back pain.

**Keywords:** Chronic low back pain, Roland-Morris Disability Questionnaire, Short Form-36, health-related quality of life.

**PL-621**

**FROM DAILY PILL TO TWICE-YEARLY INJECTION: MEET YEZTUGO (LENACAPAVIR)**

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Lenacapavir is a first-in-class HIV-1 capsid inhibitor developed by Gilead Sciences, representing a novel approach in antiretroviral therapy and prevention. Unlike conventional drugs that target viral enzymes such as reverse transcriptase or protease, lenacapavir disrupts multiple stages of the HIV life cycle by binding to highly conserved regions of the viral capsid protein. This interaction interferes with capsid assembly, disassembly, and nuclear import, effectively blocking viral replication and maturation. Lenacapavir unique mechanism of action confers potent antiviral activity against both wild-type and multidrug-resistant HIV-1 strains, with minimal cross-resistance to existing drug classes. Its exceptionally long half-life supports extended dosing intervals, enabling administration as a subcutaneous injection every six months, or as oral loading doses during initiation. Clinically, lenacapavir is approved under the brand names Sunlenca for the treatment of multidrug-resistant HIV infection and Yeztugo for HIV pre-exposure prophylaxis (PrEP). Phase 2 and 3 studies have demonstrated high efficacy, durable viral suppression, and favorable safety, with injection-site reactions being the most common adverse effect. Lenacapavir's introduction marks a paradigm shift in HIV management—transforming both treatment and prevention through long-acting, adherence-friendly therapeutics that enhance patient convenience and potentially reduce transmission on a global scale.

**Keywords:** Lenacapavir; HIV-1 capsid inhibitor; antiretroviral therapy; pre-exposure prophylaxis (PrEP); Gilead Sciences; Sunlenca; Yeztugo; nuclear import inhibition; viral assembly blockade; patient adherence; HIV treatment innovation; long-acting antiretroviral.

**PL-622**

**ONE SHOT FOR ALL: TRANSFORMING GLOBAL IMMUNIZATION PRACTICES**

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The development of single shot vaccines represents a paradigm shift in pharmaceutics and vaccine delivery, aiming to achieve complete immunization through a single administration. Despite the proven success of conventional multi-dose vaccines, issues such as poor patient compliance, logistic complexity, and cold-chain dependency continue to impede universal immunization goals. Single-dose vaccine formulations address these challenges by integrating controlled release technologies capable of mimicking prime-boost effects over extended periods. This review focuses on the pharmaceutic and technological advancements underpinning single shot vaccine development. Biodegradable polymers such as poly (lactic-co-glycolic acid) (PLGA), polycaprolactone, and lipid-based nanocarriers have demonstrated significant potential for sustained antigen release, antigen protection, and enhanced immunogenicity. Encapsulation techniques, micro/nanoparticle engineering, and the co-delivery of adjuvants are discussed in the context of formulation optimization and stability enhancement. Furthermore, emerging strategies including thermostable formulations, depot-based systems, and nucleic acid-based delivery are explored for their role in improving vaccine efficacy and patient adherence. Key challenges persist in achieving precise release kinetics, antigen stability, and scalable manufacturing. However, with continued progress in material science and formulation engineering, single shot vaccines stand at the forefront of next-generation immunization technologies.

**Keywords:** Single shot vaccines, controlled release, PLGA microspheres, nanoparticle delivery, vaccine formulation, sustained release systems

**PL-623**

**IMPACT OF PATIENT EDUCATION ON INHALATION TECHNIQUE AND COST ANALYSIS OF ASTHMA MANAGEMENT**

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ISBN: 978-81-980623-8-3

Asthma is a prevalent chronic respiratory condition worldwide. Inhaled corticosteroids delivered via nebulizers, dry powder inhalers (DPIs), or pressurized metered-dose inhalers (pMDIs) form the cornerstone of management, reducing exacerbations, improving lung function, and potentially decreasing mortality and irreversible airway changes. However, suboptimal inhaler technique is associated with poorer disease control and increased resource use. To evaluate the impact of structured patient education on inhalation technique and to analyse the cost implications of asthma management in a clinical setting. This prospective observational study enrolled 70 patients meeting predefined criteria. At baseline, inhalation technique was evaluated using checklists and the Patient Satisfaction and Preference Questionnaire (PASAPQ), while asthma control was assessed via the Asthma Control Test (ACT). Patients received pharmacist-led counselling, with reinforcement at 30-day intervals for three follow-ups. Improvements in inhaler technique, ACT scores, and cost parameters were analysed using MS Excel 2014 and SPSS v21. Although the majority of patients expressed confidence in their inhaler use, objective assessments revealed significant misuse. Educational intervention resulted in statistically significant improvements in inhalation technique and ACT scores over time. Better technique correlated with enhanced asthma control and the potential for cost savings through reduced acute care utilisation and improved medication efficiency. Structured patient education, particularly pharmacist-led, is integral to optimising inhaler technique, improving asthma outcomes, and potentially lowering healthcare costs. These findings support the incorporation of routine inhaler education into asthma management protocols.

**Keywords**: inhaler technique; asthma control; ACT score; PASAPQ; patient education

**PL-624**

## AGMATINE AT THE CROSSROADS: BRIDGING CARDIORESPIRATORY DYNAMICS AND BRAIN HEALTH

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Agmatine, a biogenic amine metabolite of L-arginine, has emerged as a critical modulator at the nexus of neurological, cardiovascular, and respiratory wellness. This review examines its multiplicity of action in neuroprotection, regulation of nitric oxide, and modulation of neurotransmitters, with a focus on its effects on the autonomic nervous system and cardiorespiratory-brain axis. Agmatine increases heart rate variability (HRV) and respiratory sinus arrhythmia (RSA) through facilitation of parasympathetic tone and protection against sympathetic overactivity. These autonomic actions are complemented by the neuroprotective, anti-inflammatory, and Vaso-regulatory properties of agmatine. Additionally, interaction among non-neuronal physiological rhythms i.e., cerebrospinal fluid pulsatility, vascular pulsatility, and respiration, is also addressed, with its importance noted for neuroimaging and integration between brain and body. Agmatine fills this gap connecting systemic physiological networks and central neural processing, and as such is an encouraging therapeutic modality for disease conditions with features of neurodegeneration, cardiovascular dysregulation, and autonomic imbalance.

**Keywords:** Agmatine, Heart rate variability (HRV), Respiratory sinus arrhythmia (RSA), Neuroprotection, neuroimaging, cerebrospinal fluid flow, cardiorespiratory-brain axis.

**PL-625**

## A STUDY OF PRESCRIPTION PATTERN IN DIABETIC PATIENTS: AN OBSERVATIONAL STUDY

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This cross-sectional observational study was conducted in the General Medicine Department of Sri Aurobindo Hospital, Indore, over six months to evaluate prescription patterns among diabetic patients and identify areas for improving diabetes management. Data were collected through patient records, interviews, and electronic health records, focusing on demographics, diabetes type and duration, comorbidities, medication types, dosages, and adherence to treatment guidelines. A total of 109 diabetic patients were included, with a mean age range of 51–60 years. Among them, 65 were male and 44 were female. The majority (86%) had type 2 diabetes mellitus (T2DM), while 14% had type 1 diabetes mellitus (T1DM). Monotherapy with metformin was prescribed to 40% of patients, while the remainder received combinations of oral hypoglycemic agents. Insulin therapy was utilized in 23% of cases. Among the combination therapies, glibenclamide with metformin was the most commonly prescribed (5%). The study highlights the predominance of metformin use and combination therapy in diabetes management, reflecting adherence to standard therapeutic approaches. However, variations in prescribing patterns suggest a need for continuous monitoring and guideline-based optimization. The findings emphasize individualized treatment plans, improved adherence strategies, and physician awareness of evidence-based prescribing. Further research is warranted to explore interventions that enhance prescription quality and patient outcomes in diabetes care.

**Keywords**: diabetes mellitus, prescription patterns, observational study, medication adherence, glycemic control, treatment guidelines.

**PL-626**

## MARIGOLD-POWERED VISION A NOVEL EYE GEL FOR BLUE LIGHT PROTECTION

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Increasing reliance on digital devices has intensified exposure to blue light, leading to digital eye strain, discomfort, and oxidative stress, particularly among individuals who do not use protective spectacles or blue-light–filtering lenses. To address this gap, the present work explores the development of a lutein- and zeaxanthin-containing ophthalmic gel designed to offer a convenient, non-spectacle-based approach to blue-light protection. Lutein and zeaxanthin obtained from marigold flower (Tagetes erecta) key macular carotenoids with proven blue-light–filtering and antioxidant properties, were incorporated into a soothing gel matrix to enhance their ocular surface retention and potential uptake. The proposed formulation aims to provide sustained release, ease of application, and compatibility for users who prefer not to wear protective glasses. Preliminary formulation considerations include the selection of a suitable gelling agent, solvent system, emulsifier, and stabilizers to ensure clarity, spreadability, and ocular safety. This may serve as a practical alternative for individuals seeking blue-light protection without the need for spectacles, offering an accessible method to reduce digital eye strain and support long-term ocular health.

**Keywords**: Lutein, Zeaxanthin, Ophthalmic gel, Blue light protection

**PL-627**

## PROPOLIS /ONION EXTRACT/TALC-BASED SCAFFOLD FOR BONE TISSUE REGENERATION IN GLUCOCORTICOID-INDUCED OSTEOPOROTIC RAT MODEL

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The current development of nanocomposites promises to treat bone degeneration through improving bone regeneration and decreasing bone loss. Those materials are better in terms of mechanical strength, bioactivity, and osteoinductive qualities, allowing to integrate better with native bone tissue. To provide the solution to the acute problem of bone loss, especially regarding the case of long-term space exploration, the current studies create a composite material, adjusted to the development of bone. The in vitro and in vivo experiments were done to assess the biocompatibility, cell adhesion, and proliferation and differentiation capabilities of the composite material. Structural and functional properties of the composite were widely described through a sequence of detailed studies, i.e., swelling, gel fraction, viscosity, and degradation tests, as well as, sophisticated imaging methods. Also, the effectiveness of the composite material was tested on a glucocorticoid-induced osteoporotic rat model model. Onion extract powder, Propolis,




ISBN: 978-81-980623-8-3

Talc and Hydroxyapatite based composite material enhanced cell adhesion, proliferation, and differentiation, which means that it can be used in bone tissue engineering. This holistic approach combines the experimental data with the information about the molecules and opens the door to the innovative solutions to the problem of bone loss in relation to osteoporosis and the improvement of the overall health of the skeletal system.

**Keywords:** Bone tissue regeneration, Nanocomposite scaffold, and osteoporosis.

**PL-628**

## GOSSYPETIN'S NEUROPROTECTIVE ACTION IN COGNITIVE IMPAIRMENT LINKED TO PROLONGED STRESS EXPOSURE

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Persistent stress-induced cognitive impairment is one of the research challenges because of its complicated pathophysiology with participation of neuroendocrine and inflammatory signaling pathways. The kynurenine metabolic cascade activation has been involved in memory impairment during chronic stress, but mainly due to the increased cortisol synthesis, excited microglia, and the further synthesis of neurotoxic products. The possible contribution of gossypetin, a natural flavonoid, to antioxidative and mood-elevating effects to alleviate stress-related cognitive impairments in Swiss albino mice was investigated in this study. Sustained exposure to unpredictable stressors over a series of weeks allowed experimental groups to be given intraperitoneal doses of gossypetin (5, 10 or 20 mg/kg). The combination of behavioural paradigms and biomarker analysis was used to measure the outcomes of therapeutic results. The intervention also led to objective changes in cognitive performance, that is, stress-related corticosterone levels and oxidative imbalance decreased. Also, the administration of gossypetin was associated with an increase in the levels of monoaminergic neurotransmitters and elevated levels of brain-derived neurotrophic factor. The results affirm the neuroprotective potential of gossypetin in preventing cognitive impairment caused by recurrent stress, which is why it holds some potential as a sub-topic of further pharmaceutical research.

**Keywords**: Neuroinflammation, stress paradigm, HPA axis, synaptic plasticity.

**PL-629**

## EVALUATION OF MULTIMODAL ANALGESIA IN POSTOPERATIVE PAIN MANAGEMENT FOLLOWING TOTAL KNEE ARTHROPLASTY

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Total knee arthroplasty (TKA) is widely performed for advanced knee osteoarthritis, yet postoperative pain may hinder early mobility and recovery. Multimodal analgesia, integrating pharmacological agents with regional anesthesia techniques, aims to improve postoperative comfort while minimizing opioid-related adverse effects. This study assessed the effectiveness of multimodal analgesia in reducing postoperative pain using the Numeric Rating Scale (NRS), identified commonly used drug combinations, evaluated the influence of demographics, BMI, and comorbidities on recovery, and examined the relationship between pain relief and duration of hospital stay. A six-month prospective observational study was conducted at Aster CMI Hospital involving 140 TKA patients aged over 40 years. Daily pain scores were recorded, and all patients received multimodal analgesia including paracetamol, NSAIDs, opioids, regional nerve blocks, and gabapentinoids. Patients with ASA IV status, drug allergies, or chronic opioid use were excluded. Most patients were 61–66 years old, predominantly female, and classified as ASA II. The protocol, incorporating spinal anesthesia, peripheral nerve blocks, intravenous acetaminophen, and continuous ropivacaine infusion, reduced mean NRS scores from 5.93 preoperatively to 1.01 by postoperative day four. Most underwent unilateral TKA, showed good wound healing, early ambulation, and continued multimodal therapy at discharge, with 14.3% receiving scheduled aceclofenac. The mean hospital stay was 4.6 days. Older and comorbid patients reported initially higher pain but achieved comparable functional outcomes. Multimodal analgesia was safe, effective, opioid-sparing, and associated with improved comfort, faster recovery, and shorter hospitalization. These findings support routine use of multimodal analgesia to optimize postoperative outcomes in TKA patients.

**Keywords:** Multimodal Analgesia, Total Knee Arthroplasty, Postoperative Pain, Pain Management, Numeric Rating Scale.

**PL-630**

## EVALUATION OF THE NEUROPROTECTIVE EFFECTS AND MECHANISMS OF SELECTED PLANT PHENOLICS IN ALZHEIMER'S DISEASE

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Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by memory loss, cognitive decline, and neuronal cell death, primarily resulting from oxidative stress, amyloid-β (Aβ) accumulation, and neuroinflammation. Current pharmacological treatments offer only symptomatic relief and are often associated with side effects, emphasizing the need for safer and more effective therapeutic alternatives. Piper cubeba (cubeb pepper), a medicinal plant traditionally used in various Ayurvedic and Unani formulations, contains phenolic compounds such as cubebin, eugenol, and pipeline, known for their potent antioxidant and anti-inflammatory properties. These phytochemicals have demonstrated the ability to attenuate oxidative damage, inhibit Aβ aggregation, and modulate enzymes associated with AD pathology. The present study aims to evaluate the neuroprotective effects and elucidate the molecular mechanisms of selected phenolics from Piper cubeba using in vitro and in silico approaches. The investigation will focus on their antioxidant capacity, neuroprotective potential, and interaction with key neurodegenerative targets. Overall, this study is expected to provide valuable insights into the therapeutic potential of Piper cubeba phenolics as multi-target agents, contributing to the development of natural, plant-based neuroprotective strategies for the prevention and management of Alzheimer's disease.

**Keywords:** Alzheimer's disease; Piper cubeba; phenolic compounds; neuroprotection; oxidative stress; amyloid-β; natural antioxidants; anti-inflammatory; neurodegeneration; in vitro; in silico

**PL-631**

## A STUDY ON HEPARIN DOSE OPTIMIZATION AMONG PATIENTS UNDERGOING PERCUTANEOUS CORONARY INTERVENTION (PCI)

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Acute coronary syndrome (ACS) includes conditions such as STEMI, NSTEMI, and unstable angina, all resulting from reduced blood flow to the heart. These conditions form part of coronary heart disease and are influenced by risk factors such as smoking, hypertension, diabetes, hyperlipidemia, sedentary lifestyle, obesity, family history, and poor dietary habits. Unfractionated heparin (UFH) remains an essential anticoagulant for preventing and treating thrombotic events and is routinely administered during cardiac procedures, dialysis, and extracorporeal circulation. Monitoring heparin therapy is crucial to ensure therapeutic effectiveness and avoid complications. The activated clotting time (ACT) is a widely used point-of-care test in catheterization laboratories and cardiac operating rooms, while APTT continues to be used despite its limited correlation with anti-Xa activity. The present study aimed to optimize the intraoperative dosing of heparin using ACT- and APTT-guided monitoring and to evaluate the influence of patient-related factors (age, gender, BMI, smoking, alcohol use, and comorbidities) on achieving target ACT values. secondary objective was to assess any heparin-related bleeding complications following the procedure. Data collected from patient case sheets included demographics, comorbidities, medication history, social history, and heparin doses administered. ACT and APTT values were analyzed to determine correlations and dosing outcomes. The findings indicate that heparin dosing can be effectively optimized using ACT and APTT values, with no significant impact from the studied demographic or clinical




ISBN: 978-81-980623-8-3

factors. No post- procedure bleeding complications were observed, supporting the safety and effectiveness of individualized, ACT-guided heparin administration.

**Keywords:** Acute coronary syndrome, unfractionated heparin, ACT, APTT, heparin optimization.

**PL-632**

**A SYSTEMATIC REVIEW ON THE EFFICACY AND SAFETY OF UNDENATURED TYPE II COLLAGEN IN THE MANAGEMENT OF KNEE OSTEOARTHRITIS**

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Osteoarthritis (OA) is a progressive degenerative joint disease characterized by pain, stiffness and restricted mobility, which significantly diminishes quality of life. Most common type of OA is Knee OA. Conventional therapies mainly provide symptomatic relief without addressing the underlying disease mechanisms. In recent years, nutraceuticals especially undenatured type II collagen (UC-II) have gained attention for its potential to supports joint health and offers a more targeted approach to managing knee OA. The aim of this article is to provide a detailed mechanism of action, safety and efficacy of UC-II in knee OA patients. A systematic literature search was carried out across major scientific databases including PubMed, Scopus, Web of Science and Google Scholar to identify studies related to undenatured type II collagen (UC-II) in osteoarthritis. Both preclinical and clinical studies published in English were reviewed. Key information such as study design, type of intervention, outcome measures, and safety data was carefully collected. The gathered data were then qualitatively analyzed to understand how UC-II works, its therapeutic benefits, and its safety in managing knee osteoarthritis. UC-II has been shown that improvements in pain relief, joint flexibility and overall functional performance in knee osteoarthritis patients. Both preclinical and clinical studies suggest that these benefits are likely due to UC-II's ability to modulate the immune system and helps to prevent cartilage degradation. UC-II was generally well tolerated without significant adverse effects reported. UC-II is a safe and effective supplement that helps reduce pain, improve mobility and support cartilage health in knee osteoarthritis patients.

**Keywords:** Knee, Osteoarthritis, Undenaturated type 2 collagen, joint pain and inflammation

**PL-633**

**RARE GENETIC DISORDERS IN INDIA: PREVALENCE, IMPACT, AND STRATEGIES TO ADDRESS DISEASE BURDEN**

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This study provides an overview of genetic disease burden in India, current therapeutic landscape, and provide recommendations to improve therapeutic development. Records were identified from GenomeIndia, Coriell Catalog, and FRIGE for 6815 patients across 402 rare genetic diseases. All these were stratified into 17 disease classes depending on the specific affected organs. Variations were not found in the studied patient cohort for (D = 155/402; 38.6%) diseases. Neuromuscular and neurodegenerative (NMND) class were found to have highest number of diseases (D = 83/402; 20.6%). Majority patients in the observed cohort were diagnosed under NMND class (P = 3215/6815, 47.1%), of which Duchenne Muscular Dystrophy (DMD) constituted majority of cases (P = 661/3215, 20.6%), followed by Hematological diseases (P = 897/6815; 13.2%), of which Beta Thalassemia (P = 445/897, 49.6%) was the most prevalent. Highest number of unique mutations were found in NMND (MU = 740/1389; 53.3%) diseases. In terms of disease, Hemophilia B (MU = 104/1389; 7.5%) had highest unique mutations. Between 2020 and 2024, CDSCO approved 120 therapies, out of which (T = 54/120; 45.0%) therapies were for only (D = 45/402; 11.2%) identified rare genetic disorders in Indian population. Recently, genome sequencing of 10,000 individuals were completed as part of GenomeIndia project. This data is intended to be used for mapping community specific genetic variants and to create epigenetic models of diseases. A multi-pronged approach is necessary to improve the treatment landscape which includes further investment in genetic research, develop targeted regulatory pathways and robust public health strategies.

**Keywords**: Genetic Disorders, GenomeIndia, Regulatory Strategy, Gene therapies

**PL-634**

**"PROTECTIVE ROLE OF FICUS PALMATA BARK EXTRACT FOR ITS ANTI-DIABETIC ACTIVITY: IN VIVO APPROACH"**

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The current research work was designed to evaluate the In vivo and In vitro antidiabetic activity of methanolic extract of Ficus palmata bark (MEFPB).The In vivo antidiabetic activity of methanolic extract of Ficus palmata bark was assessed in dexamethasone (10 mg/kg) and alloxan (160 mg/kg) induced diabetes models in rats at different dose levels (200 mg/kg & 400 mg/kg). In Invivo models the administration test extract at different doses significantly reduced the increased blood glucose level, increased weight gains of animals, reduced levels of serum glucose and triglyceride in a dose-dependent manner. The plant extract demonstrated normal islets, minimal necrosis, and significant β-cell regeneration.

**Keywords:** Antidiabetic, dexamethasone, and alloxan.

**PL-635**

**IN-SILICO SCREENING AND BIOLOGICAL EVALUATION OF P-COUMARIC ACID DERIVATIVES FOR THEIR A-AMYLASE INHIBITORY POTENTIAL**

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Diabetes mellitus (DM) is a chronic endocrine and metabolic condition characterized by hyperglycaemic, a condition in which blood glucose level is high. Alpha(α)-amylase enzyme catalyzes the hydrolysis of internal 1,4-glycosidic linkages in starch to produce low molecular weight products like glucose, maltose, and maltotriose units and may be an important target for the management of diabetes. In this study, novel coumaric acid derivatives were designed, synthesized and evaluated for their in-vitro alpha(α)-amylase inhibitory activity. The molecular target chosen for this study was alpha(α)-amylase (PDB id- 4GQR). In-silico results shows that the compounds CA1, CA4, CA2, CA3 and CA5 exhibit the better interactions with docking scores of -8.558 kcal/mol, -8.462 kcal/mol, -8.401 kcal/mol, -7.63 kcal/mol and -7.40 kcal/mol respectively as compared to standard drug (Acarbose-7.4 kcal/mol). These 5 compounds were further synthesized and evaluated for in-vitro alpha-amylase inhibitory activity. Result shows that in comparison to the standard drug (acarbose, 95.803), the majority of synthesised compounds exhibit better α-amylase inhibitory action but compound (99.547) shows best α-amylase inhibitory activity and formed 3 hydrogen bonds with amino acid residues Asp 197, Glh 233 & Asp 356 within alpha(α)-amylase binding site. This study revealed that these derivatives can be utilized as a potent α-amylase inhibitor for the treatment and management of diabetes in future.

**Keywords:** Hyperglycemia; Coumaric acid; Alpha (α)-amylase; In-silico screening.

**PL-636**

**STUDY OF TREATMENT OPTIONS AND QUALITY OF LIFE IN GASTROESOPHAGEAL REFLUX DISEASE PATIENTS**

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In the present study, an assessment of the treatment approaches and quality of life (QoL) among patients diagnosed with Gastroesophageal




ISBN: 978-81-980623-8-3

Reflux Disease (GERD) at St. Philomena's Hospital, Bengaluru, was carried out. GERD is characterised by the backward flow of gastric contents into the oesophagus due to improper closure of the lower oesophageal sphincter, leading to symptoms such as heartburn and regurgitation. The study aimed to document the therapies received, evaluate patient QoL, monitor any adverse drug reactions, and develop a patient information leaflet to support GERD management. A prospective observational design was adopted. Patients above 18 years who were diagnosed with GERD were included after obtaining informed consent and ethical clearance. Data collection involved therapy duration, frequency, route of administration, and adherence. QoL was assessed using the Gastroesophageal Reflux Disease–Health-Related Quality of Life (GERD-HRQoL) scale, while psychological well-being was measured using the Psychological General Well-Being Index (PGWBI). Among the 52 patients enrolled, 59.61% experienced mild heartburn and 13.46% severe heartburn. Mild and severe regurgitation were reported in 67.31% and 9.6% of patients, respectively. PGWBI scoring revealed that 38.46% had poor psychological well-being, 51.92% showed moderate well-being, and 9.61% had high well-being. The findings indicated that GERD significantly affects physical comfort, emotional health, and daily functioning. The majority of patients experienced mild to moderate impairment. The study concludes that pharmacist-led counselling and educational support can improve treatment adherence, symptom understanding, and overall quality of life in GERD patients.

**Keywords:** Gastroesophageal reflux disease, quality of life, GERD-HRQoL, PGWBI, pharmacist intervention.

**PL-637**

**IMPACT OF NUTRITION AND LIFESTYLE ON THE PATHOGENESIS AND CLINICAL COURSE OF INFLAMMATORY BOWEL DISEASE**

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Dietary patterns and lifestyle behaviours are increasingly recognized as key modulators in the onset, progression and clinical management of inflammatory bowel disease (IBD), encompassing Crohn's disease and ulcerative colitis. IBD is a chronic, relapsing inflammatory disorder of the gastrointestinal tract driven by an aberrant immune response to commensal microbiota in genetically susceptible individuals. Although its aetiology remains multifactorial, accumulating evidence highlights the influence of environmental exposures, particularly diet, on intestinal inflammation. Western-style diets rich in saturated fats, refined sugars and ultra-processed foods are associated with heightened inflammatory responses and increased IBD risk. Conversely, diets abundant in fibre, fruits, vegetables and other plant-based components may support mucosal barrier integrity, promote a favourable gut microbiome and mitigate symptom severity. Therapeutic dietary approaches, including the Specific Carbohydrate Diet and the Mediterranean diet, have demonstrated benefits in select patients, although highly restrictive regimens may pose risks of micronutrient deficiencies. Lifestyle factors such as physical inactivity, smoking, psychological stress, inadequate sleep and excessive alcohol consumption further exacerbate disease activity or precipitate flares. Emerging data also link childhood overweight and underweight status with future IBD susceptibility. Overall, optimizing diet quality alongside regular physical activity represents a feasible strategy for reducing IBD risk and enhancing long-term disease management and quality of life.

**Keywords:** IBD, Diet, Lifestyle

**PL-638**

**ANTIDIABATEIC ACTIVITY OF AQUEOUS EXTRACT OF BARLERIA NOCTIFLORA IN STREPTOZOTOCIN INDUCED DIABETIC RATS**

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The present study investigated the antidiabetic activity of the aqueous extract of Barleria noctiflora (whole plant) in streptozotocin-induced diabetic rats. Following Ayurvedic traditions and previous literature, the study involved preparing the leaf extract using ethanol via Soxhlet extraction, conducting phytochemical screenings, and evaluating pharmacological activities with qualitative studies. The extracts underwent in vivo assessment using STZ-induced diabetic wistar albino rats. Phytochemical analysis revealed the presence of alkaloids, glycosides, steroids, flavonoids, tannins, and phenolic compounds in the ethanolic extract. Treatment with 200 mg/kg of the extract led to a substantial reduction in blood glucose levels, with a 43.68% decrease observed by the 28th day. These results indicate the significant hypoglycemic property of Barleria noctiflora extract. The outcome suggests that this extract may serve as an effective agent against diabetes due to its ability to lower glucose levels and its rich phytochemical content, supporting its traditional use. In conclusion, the ethanolic extract of Barleria noctiflora demonstrated marked antidiabetic effects in experimental models, showing promise for further pharmacological exploration.

**Keywords:** Barleria noctiflora, antidiabetic, hypoglycemic, streptozotocin, phytochemicals, wistar albino rats.

**PL-639**

**GUT MICROBIAL THERAPY FOR NEUROLOGICAL DISORDERS: CURRENT EVIDENCE AND FUTURE PROSPECTS**

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Probiotics, defined as live microorganisms that confer health benefits when administered in adequate amounts, have gained increasing attention for their potential role in modulating neurological disorders. Emerging evidence suggests a strong bidirectional communication between the gut and brain, known as the gut–brain axis (GBA), which involves neural, immune, and endocrine pathways. Probiotics influence this axis by restoring intestinal microbiota balance, enhancing the integrity of the gut barrier, and modulating neuroinflammatory responses. Several studies have demonstrated that specific probiotic strains, particularly Lactobacillus and Bifidobacterium species, can produce neuroactive compounds such as γ-aminobutyric acid (GABA) and serotonin, which affect mood, cognition, and stress response. Clinical and preclinical research indicates beneficial effects of probiotics in conditions such as depression, anxiety, autism spectrum disorders, Alzheimer's disease, and Parkinson's disease through mechanisms involving reduced neuroinflammation, oxidative stress, and hypothalamic–pituitary–adrenal (HPA) axis regulation through the modulation of GBA. Although the exact mechanisms and strain-specific effects remain under investigation, probiotics represent a promising, non-invasive therapeutic strategy for managing neurological disorders. Further large-scale, controlled studies are necessary to identify optimal strains, dosages, and treatment durations to translate these findings into effective clinical applications.

**Keywords:** Probiotics, Gut brain axis, Neurological disorders.

**PL-640**

**A STUDY ON THE EFFICACY OF HAEMOCOAGULASE IN ACHIEVING HAEMOSTASIS AND ENHANCING WOUND HEALING ACROSS VARIED BLEEDING CONDITIONS**

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Uncontrolled bleeding remains one of the most critical intraoperative and postoperative complications, often leading to morbidity and delayed wound recovery. The present study aimed to evaluate the efficacy of Haemocoagulase, a thrombin-like enzyme derived from Bothrops snake venom, as a topical haemostatic and wound-healing agent in varied bleeding conditions. An exploratory, questionnaire-based study was conducted among 50 medical practitioners, including surgeons, gynaecologists, dentists, and emergency physicians, to assess their clinical experience with haemocoagulase in managing capillary bleeding, tissue oozing, haematoma formation, and withdrawal bleeding. Both primary data (via structured survey) and secondary data (from published literature, AWACS and CMARC market reports) were analyzed descriptively. The results revealed that 90% of the respondents had used haemocoagulase in clinical practice, with over 80% rating it as useful to very useful in managing bleeding and promoting wound healing. A majority of doctors reported rapid hemostasis, reduced bleeding time, and faster tissue repair with minimal adverse effects. Market analysis




ISBN: 978-81-980623-8-3

further indicated an annual growth rate of 9.76% for haemocoagulase formulations, signifying increasing clinical acceptance. The findings suggest that haemocoagulase is an effective, safe, and well-tolerated topical haemostat with additional benefits in enhancing wound healing. Its dual mechanism—promoting fibrin formation and capillary regeneration—offers advantages over conventional agents such as tranexamic acid and etamsylate.

**Keywords:** Haemocoagulase, Batroxobin, Haemostasis, Wound Healing, Capillary Bleeding, Topical Haemostat

**PL-641**

## IMPACT OF SCREEN TIME ON BEHAVIORAL AND PSYCHOSOCIAL FACTORS AMONG RURAL AND URBAN STUDENTS OF MIDADOLESCENT AGE GROUP

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The World Health Organization, pediatric societies, and other international organizations advise teenagers to restrict their screen use to two hours per day in light of the negative impacts. The average amount of time spent in front of a screen worldwide in 2024 was six hours and forty minutes. This analytical cross-sectional survey was conducted in rural and urban schools. 500 samples were gathered from both class 9 and class 10, 250 samples were from rural, and 250 from urban. Teachers and students were briefed on the study objectives and the content of the questionnaires. Data was collected through demographic form, screen time, and strength and difficulties questionnaires. The study included 500 participants, 250 from urban schools and 250 from rural classes of 9- 10. The majority had underweighted BMI. Most students reported an effect on their studies due to extreme device usage. Higher scores in emotional problems were seen while evaluating the strength and difficulty quessionnaire. Our study clearly shows that among urban and rural students; the urban population was found to be more addicted to screens compared to the rural. Even though electronics have become increasingly ingrained in our daily lives, either parents or other caregivers should be aware of the advantages and disadvantages thereby establishing rules that encourage responsible multimedia consumption.

**Keywords:** Screen, pediatric, emotional, exposure, conduct, hyperactivity.

**PL-642**

## AN OBSERVATIONAL PROSPECTIVE STUDY ON ANALYSIS OF INFECTIOUS DISEASES AND ANTIBIOTIC USE IN PAEDIATRIC PATIENTS

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Infectious diseases are a leading cause of morbidity and mortality among paediatric patients worldwide, and the prudent use of antibiotics in this demographic is critical to combat antimicrobial resistance. The purpose of this observational prospective study is to examine the patterns of infectious diseases and antibiotic use in paediatric patients. The investigation was carried out over a 6-month period at Sri Aurobando Institute. Paediatric patients aged 0 to 18 years with infectious illnesses were enrolled. Demographic information, illness type and site, microbiological findings, antibiotic prescriptions, treatment duration, and clinical outcomes were all obtamed. Antibiotic use was evaluated for appropriateness using existing guidelines. The study comprised 100 paediatric patients. The three most prevalent infections were respiratory tract infections, gastrointestinal infections, and urinary tract infections Empirical antibiotic therapy was started in 80% of patients. The majority of antibiotics prescribed were broad-spectrum (60%). Microbiological proof of infection was found in 40% of cases, with viral pathogens being the most common. Inappropriate antibiotic use was detected in 30% of prescriptions, owing to prolonged duration and a lack of de-escalation based on culture results. The study identifies significant patterns in infectious illness and antibiotic prescribing behaviours among paediatric patients. The prevalence of empirical broad-spectrum antibiotic use and improper prescriptions highlight the importance of tailored measures to enhance antimicrobial stewardship. Future efforts should concentrate on improving diagnostic skills, adherence to guidelines, and education on appropriate antibiotic usage in order to enhance patient outcomes and combat resistance.

**Keywords**: Antibiotic, antibiotics resistance, sequential, switch, step-down therapy.

**PL-643**

## A STUDY ON INCIDENCE OF ANXIETY AMONG PREGNANT WOMEN AND ITS MATERNAL AND NEONATAL OUTCOMES

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Pregnancy is a sensitive phase characterized by physical, hormonal, and psychological changes that can significantly influence maternal and neonatal outcomes. Among these concerns, antenatal anxiety remains under-recognized despite its association with increased obstetric interventions, post-partum depression, and adverse neonatal outcomes. The present study aimed to determine the incidence of anxiety among third-trimester pregnant women, identify possible risk factors, and evaluate related maternal and neonatal outcomes. This six-months prospective observational study was conducted in the inpatient wards of St. Philomena's Hospital. A total of 75 third-trimester pregnant women without comorbidities were included. Anxiety levels were assessed using the Pregnancy-Related Anxiety Questionnaire Revised Scale (PRAQ-R2). Participants were monitored until discharge after delivery to collect maternal outcomes such as mode of delivery, emergency or elective LSCS, vacuum extraction, and post-partum depression. Neonatal outcomes assessed included preterm birth, low birth weight, respiratory distress, hyperbilirubinemia, and stillbirth. Among the 75 women, 72 (96%) were found to be anxious, with most belonging to the 26–30-year age group. According to PRAQ-R2 subscales, fear of childbirth (65.6%) and concern about appearance (29.5%) were the predominant causes of anxiety. Maternal outcomes commonly observed included emergency LSCS (31.9%) and elective LSCS (18.05%). Neonatal complications recorded were respiratory distress (26.6%), hyperbilirubinemia (17.3%), preterm birth (14.6%), and low birth weight (8%). Significant associations were identified between anxiety and factors such as age group, marital duration, joint family structure, and nulliparity. No significant association was found between anxiety and socioeconomic status or overall maternal and neonatal outcomes.

**Keywords:** Antenatal anxiety, maternal outcomes

**PL-644**

## PREDICTION OF COGNITIVE DYSFUNCTION IN PATIENT HAVING CARDIAC BIOMARKER ABNORMALITY

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The present study aimed to investigate the relationship between cardiac biomarkers and cognitive function in patients diagnosed with acute cardiac conditions. Cardiovascular diseases (CVDs) remain a global health concern, often affecting not only cardiac but also cerebral physiology. Biomarkers such as N-terminal pro-brain natriuretic peptide (NT-proBNP) and Troponin, which reflect cardiac stress and injury, may provide valuable insights into cognitive risk among hospitalized patients. However, limited evidence exists on their predictive value in the Indian population. A nine-month prospective observational study was conducted at St. Philomena's Hospital, Bengaluru, enrolling 54 patients aged 18–60 years diagnosed with either Acute Coronary Syndrome or Heart Failure. Patients' demographic details, medical history, and clinical findings were recorded, and cognitive function was assessed at admission using a standardized cognitive dysfunction assessment scale. Cardiac biomarkers NT-proBNP and Troponin were measured, and data were analyzed using Pearson's correlation to evaluate associations with cognitive status.Of the 54 patients, 62.96% were male, and the majority belonged to the 51–60 years age group. Overall, 50% of patients exhibited normal cognition, 42.59% had mild cognitive impairment, and 7.41% showed severe impairment. Abnormal Troponin and NT-proBNP




ISBN: 978-81-980623-8-3

levels were found in 87.04% and 57.41% of patients, respectively. Elevated biomarker levels indicated trends toward poorer performance in executive and attention domains; however, the correlations with global cognition were weak and statistically non-significant (NT-proBNP: r = –0.05, p = 0.710; Troponin: r = 0.00, p = 0.992). Cognitive impairment was more common among older, unemployed patients and those with comorbidities such as hypertension and diabetes. The findings suggest a nuanced, domain-specific association between cardiac biomarkers and cognitive function rather than a strong linear relationship with global cognitive decline. Elevated NT-proBNP and Troponin may indicate susceptibility in select cognitive domains, but other factors including age, employment status, and comorbidities significantly influence cognitive outcomes. Further longitudinal studies are warranted to clarify the mechanistic pathways linking cardiac dysfunction with cognitive decline.

**Keywords**: Cardiac Biomarkers, NT-proBNP, Troponin, Cognitive Dysfunction, Cognitive Decline, Heart Failure, Acute Coronary Syndrome

**PL-645**

## ADVANCES IN TISSUE REGENERATION: TRANSFORMING THERAPEUTIC PARADIGMS IN MODERN MEDICINE

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Tissue regeneration is a new and advanced field in medicine and pharmaceuticals that offers powerful ways to repair damaged or diseased tissues. Unlike regular treatments that only reduce symptoms, regenerative medicine helps the body use its own natural healing ability to rebuild healthy and working tissue. As India faces more chronic diseases, age-related problems, and other long-term health issues, tissue regeneration is becoming very important. This review explains different methods used for tissue repair, such as stem cell therapies that use special cells capable of becoming new tissue, 3D scaffold materials that act like a support structure similar to the body's natural tissue framework, controlled delivery of growth factors that release healing signals slowly and accurately, gene therapy that improves the body's healing abilities by modifying specific genes, and medicines that reduce inflammation to create a supportive environment for tissue repair. The pharmaceutical industry plays a major role in making sure these treatments are properly developed, tested, and meet safety and quality standards. These methods show great success in many medical areas for example, heart regeneration can repair heart tissue after a heart attack, skin substitutes can completely heal long-lasting diabetic wounds, and bone or cartilage regeneration can reduce the need for joint replacement surgeries. This approach shifts the focus from just managing disease to actually curing it, reducing long-term healthcare costs and improving the quality of life. For India, developing regenerative treatments within the country provides both a strong healthcare benefit and an economic opportunity. As personalized regenerative medicine grows with treatments designed according to a person's genetic makeup pharmaceutical science will lead this major medical change, working toward the ultimate goal: fully restoring health and normal function for people who are suffering.

**Keywords**: Tissue regeneration, regenerative medicine, stem cell therapy, biomaterials, pharmaceutical innovation, growth factors, wound healing, tissue engineering

**PL-646**

## EXPLORING ENDOPHYTIC DIVERSITY IN SCHLEICHERA OLEOSA FOR NOVEL ANTIBACTERIAL AGENTS

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Endophytic fungi inhabiting medicinal plants are increasingly recognized as prolific producers of bioactive secondary metabolites with pharmaceutical potential. The present study emphasizes the isolation, characterization, and antibacterial evaluation of endophytic fungi associated with Schleichera oleosa (Kusum tree), a species native to the forests of Jhabua district, Madhya Pradesh. Healthy tissues including leaves, stems, bark, and roots were surface sterilized and processed under aseptic conditions to recover fungal isolates. Pure cultures were established on potato dextrose agar and maintained for subsequent screening. From Schleichera oleosa, sixteen distinct fungal isolates were successfully obtained, each coded systematically for identification. These isolates are being subjected to antibacterial screening against pathogenic bacteria to assess their therapeutic potential. Optimization of growth conditions is underway to maximize metabolite yield, followed by molecular characterization to identify promising strains. Purification and chemical profiling will further elucidate the nature of active compounds responsible for antibacterial activity. The study aims to highlight Schleichera oleosa as a valuable host for endophytic fungi capable of producing novel antibacterial metabolites. Such findings not only contribute to the discovery of plant-derived therapeutic agents but also provide a sustainable approach to combating antimicrobial resistance. By focusing on a single host species, this research underscores the importance of targeted exploration of endophyte–plant interactions in drug discovery.

**Keywords:** Antibacterial agents, Endophytic Fungi, Schleichera oleosa and Secondary Metabolites

**PL-647**

## ANTIBIOTIC PRESCRIBING PATTERNS IN ICU'S: A REVIEW OF COMPLIANCE WITH ANTIMICROBIAL STEWARDSHIP PROGRAM GUIDELINES

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The administration of antibiotics in Intensive Care Units (ICUs) is vital for influencing patient outcomes; however, this intense pressure environment is particularly susceptible to inappropriate prescribing practices. The necessity of rapidly addressing the needs of critically ill patients often requires the swift initiation of empirical treatment, which may result in departures from established Antimicrobial Stewardship (AMS) protocols. This review analyses current patterns of antibiotic prescribing in ICUs, highlighting frequently utilized classes of antibiotics and the complex relationship between empirical and targeted therapeutic strategies. It also evaluates adherence to ASP guidelines, pinpointing common challenges such as extended treatment lengths, unnecessary use of broad-spectrum antibiotics, and inadequate implementation of de-escalation strategies. A significant challenge in optimizing therapy is the limited use of rapid diagnostic tools, which delays the identification of pathogens and prolongs the use of empirical antibiotics. The adoption of rapid diagnostics like molecular assays and point-of-care testing improves the prompt and precise identification of infectious agents, allowing for earlier de-escalation and tailored treatment. These innovations lead to better clinical outcomes and a decrease in antimicrobial overexposure. The review additionally examines various factors influencing ASP compliance, such as clinician behaviour and systemic obstacles, and highlights effective strategies such as clinical decision support systems, and multidisciplinary ASP teams. Our study highlights the urgent need for strengthened ASP integration into ICU practices, supported by routine surveillance, education, and multidisciplinary collaboration. Enhancing adherence to ASP guidelines not only preserves antibiotic efficacy but also improves patient outcomes and reduces healthcare costs. Greater emphasis on evidence-based prescribing, along with robust monitoring systems, is crucial in curbing AMR and ensuring sustainable critical care management.

**Keywords**: Antibiotic stewardship programme; Intensive care; Antimicrobial resistance; ASP guidelines.

**PL-648**

## INTERPRETATION OF THE MULTI-TARGET MECHANISM OF VIDANGADI CHURNA IN OBESITY: A NETWORK PHARMACOLOGY APPROACH

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Obesity continues to be a significant worldwide health issue, requiring novel therapeutic strategies. Ayurvedic medicine, characterized by its




ISBN: 978-81-980623-8-3

multi-targeted and integrative features, presents viable solutions. This research uses a network pharmacology approach to clarify the mechanisms by which ayurvedic medicine treats obesity. This approach integrates bioinformatics, systems biology, and cheminformatics to identify possible active phytoconstituents, forecast therapeutic targets, and delineate complex interactions within biological networks. To identifying the potential protein targets associated with Vidangadi Churna, the SwissTargetPrediction, SEA database, STITCH database, and Drug Binding database were employed. To ascertain disease-associated targets, the databases DisGeNET, GeneCards, OMIM, HPO, and MalaCards were utilized, which were subsequently instrumental in the construction of the drug–disease network. The constructed network was further analysed in Cytoscape software. Top gene identification was carried out, and the top 10 targets were obtained including GAPDH, AKT1, TP53, IL6, TNF, SRC, ALB, CTNNB1, EGFR, STAT3. The results highlight 2,275 target genes were identified for Vidangadi Churna, while 9,453 disease-associated genes were obtained; the intersection revealed 965 common target genes. Further analysis of network using the degree method, top 10 targets were identified and utilized for the further molecular docking studies using Schrodinger software. The docking results suggest that most of the phenolic and flavonoid molecules are majorly responsible for the pharmacotherapeutic property of the Vidangadi Churna.

**Keywords**: Obesity, Ayurvedic formulation, Network pharmacology, Drug-disease network, Pathway enrichment

**PL-649**

## PROBIOTICS AND GASTROINTESTINAL DISORDERS: CURRENT EVIDENCE AND THERAPEUTIC POTENTIAL

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Microbes residing in the human intestinal tract influence host physiology and health. Probiotics, defined as live microorganisms that confer health benefits when consumed in adequate amounts, help modulate this intestinal microbial balance. They are increasingly used as adjunct therapy in gastrointestinal disorders such as inflammatory bowel disease, antibiotic-associated diarrhea, and irritable bowel syndrome, where they help reduce inflammation, diarrhea, bloating, abdominal pain, and irregular bowel habits. Although their exact mechanisms are not fully understood, probiotics exert beneficial effects through several established pathways. These include competitive exclusion of pathogens by competing for adhesion sites and nutrients, production of antimicrobial compounds, improvement of epithelial barrier integrity, and modulation of immune responses. Such actions support restoration of gut homeostasis and improve overall GI symptoms and patient quality of life. Commonly used probiotic strains belong to Lactobacillus, Bifidobacterium, and Saccharomyces. However, limitations include poor survival in the acidic and enzymatic environment of the gastrointestinal tract, competition with native microbiota, strain-specific variability, and lack of standardized dosing. Safety concerns also persist in infants and immunocompromised individuals, along with the potential for antibiotic resistance gene transfer. Despite these challenges, probiotics remain a promising adjunct to conventional therapy for restoring gut microbial balance to improve gut health.

**Keywords:** Probiotics, GI disorder, Gut health.

**PL-650**

## EXPLORING THE MOLECULAR MECHANISMS OF PHYTOCONSTITUENTS FROM FAGONIA CRETICA AGAINST ALZHEIMER'S DISEASE USING NETWORK PHARMACOLOGY APPROACH AND MOLECULAR DOCKING

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Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by amyloid-β aggregation, tau hyperphosphorylation, and cholinergic dysfunction. This in-silico study investigated the multi-target therapeutic potential of novel phytoconstituents from Fagonia cretica against AD using network pharmacology and molecular docking. Nineteen compounds were retrieved from IMPPAT and PubChem, of which nine were shortlisted, and their putative targets were predicted using SwissTargetPrediction. A total of 600 AD-associated genes were collected from GeneCards, CTD, and DisGeNET based on high inference scores. The overlapping targets (n = 68) were identified using Venny 2.0 and further analyzed using STRING to construct the PPI network, where ABCC1 and ABCC2 exhibited the highest degree of interaction. Functional enrichment analysis (GO and KEGG) revealed significant enrichment in pathways such as response to amyloid-β (GO:1904645, FDR = $1.29 \times 10^{-17}$), Alzheimer's disease (hsa05010; 40/354 genes, FDR = $1.38 \times 10^{-5}$), and amyloid-β binding (GO:0001540; 21/84 genes, FDR = $3.71 \times 10^{-22}$). Based on centrality measures and druggability, AChE and BACE1 were selected as core targets. Molecular docking using AutoDock Vina demonstrated that novel phytoconstituents such as hederagenin **(**AChE −7.666 kcal/mol, ; BACE1 −6.92 kcal/mol), nahagenin (AChE −7.96 kcal/mol; BACE1 −7.02 kcal/mol), and oleanolic acid (AChE −7.923 kcal/mol; BACE1 −6.190 kcal/mol) exhibited favourable binding affinities toward both targets. Overall, the findings indicate that these compounds may exert dual modulation of amyloidogenesis and cholinergic signalling. Experimental validation is warranted to confirm these computational predictions

**Keywords**: Alzheimer's disease, Fagonia cretica, network pharmacology, molecular docking, phytoconstituents, AChE, BACE1.

**PL-651**

## NETWORK PHARMACOLOGY AND MOLECULAR DOCKING STUDIES OF PHYTOCONSTITUENTS OF JUGLANS REGIA ELUCIDATES MULTI-TARGET THERAPEUTIC MECHANISMS AGAINST ALZHEIMER'S DISEASE

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Alzheimer's disease (AD) is a multifactorial neurodegenerative disorder characterized by cognitive decline and hallmark pathological features including amyloid-beta plaques and neurofibrillary tangles. In this study, we applied a comprehensive network pharmacology approach integrated with molecular docking to investigate the potential therapeutic effects and molecular mechanisms of Juglone in AD. Target prediction databases were utilised to identify proteins associated with juglone, which were then intersected with AD-related target genes to construct a drug target network. Protein-protein interaction (PPI) networks were analysed to identify hub proteins critical in AD pathology. Gene ontology (GO) and KEGG pathway enrichment analyses revealed the significant involvement of Juglone targets, including MAP2K1, BACE1, GSK3B, CHRM1, CASP9, CASP3, PTGS2, MAPK8, SNCA, MAPK10, CHRNA7, and NAE1, in neuroinflammatory responses, oxidative stress regulation, apoptotic signalling, and amyloid-beta metabolic processes. High-throughput molecular docking simulations demonstrated strong binding affinities of Juglone with key AD-related proteins, such as MAP2K1, BACE1, GSK3B, CASP9, CASP3, MAPK8, MAPK10, CHRNA7, and NAE1, supporting its multi-target inhibition potential. This integrative investigation underscores Juglone's therapeutic promise by modulating multiple pathogenic pathways in AD, providing a scientific basis for its development as a novel multi-target agent. Further in vitro and in vivo studies are essential to validate these in silico findings and explore Juglone's clinical applicability.

**Keywords:** Alzheimer's disease, Juglone, Network pharmacology, Molecular docking, Protein-protein interaction, Amyloid-beta

**PL-652**

## PHARMACOLOGICAL EVALUATION OF METHANOLIC EXTRACT OF AERIAL PARTS OF HELICANTHES ELASTICA (DeCr) DANSER FOR ITS AND NEPHRO PROTECTIVE ACTIVITY

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Kidney diseases are a major problem of worldwide proportion. A large number of herbs have been used traditionally to treat kidney diseases caused by various agents. The present study was a similar attempt in that direction. Helicanthes elastica is a less explored Indian mistletoe.




ISBN: 978-81-980623-8-3

Methanolic extract of Helicanthes elastica(MHE) was evaluated for antiurolithiatic and nephroprotective activity in Wistar rats. For antiurolithiatic study, male Wistar rats were selected and ethylene glycol (0.75%v/v) in drinking water was fed to all the groups except normal control for 28days to induce urolithiasis for preventive and curative regimen. Cystone 750mg/kg was used as the standard drug. Various renal functional and injury markers such as urine volume, calcium, magnesium, serum creatinine, serum uric acid and blood urea nitrogen were evaluated in urine and serum samples. The result indicated that administration of MHE significantly reduced and prevented the growth of urinary stones. Histopathological studies also supported the result. In nephroprotective study. Wister rats of either sex selected and renal toxicity was induced by administering cisplatin 5mg/kg i.p. on first day. From day 2 to day 14 animals of all groups were administered with MHE. Cisplatin induced renal damage is clearly evidenced by the elevated levels of serum markers like urea, creatinine and uric acid. The treatmenht with the extract regained the elevated levels of renal injury markers in serum to normal levels. Histopathological reports also supported the result. The study suggests that the MHE offers protection against ethylene glycol induced Urolithiasis and cisplatin induced nephrotoxicity.

**Keywords:** Helicanthes elastica, Urolithiasis, Nephrotoxicity, Nephro protection, Cisplatin.

**PL-653**

## A PATIENT-CENTRIC HEALTHCARE NAVIGATION AND EMERGENCY RESPONSE APPLICATION

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Access to reliable healthcare services in India is often hindered by fragmented information, difficulty in locating specialized hospitals, and delays in emergency response. With the increasing penetration of smartphones, there is an opportunity to bridge this gap through a unified, patient-friendly digital platform. To design and develop an intuitive healthcare application that integrates hospital navigation, pharmacy access, emergency response, and patient health management into a single user-friendly platform. The application employs a social-media-like interface to enhance usability. The homepage provides categorized listings of nearby hospitals based on specialization, along with details of doctors and pharmacy outlets. A search bar allows users to quickly locate healthcare providers or drugs, and appointments can be booked directly through the app. An interactive map feature, inspired by real-time navigation tools, enables patients to view nearby hospitals, access directions, contact facilities, and book consultations seamlessly. The profile section maintains patient health records, past appointments, insurance schemes, and includes a blood donation registry. Additionally, an integrated first aid and emergency module allows instant ambulance booking and access to emergency contacts. The application successfully combines healthcare access, navigation, and emergency management within a single digital ecosystem. Unlike conventional hospital apps, this innovation provides real-time, location-based integration of hospitals, pharmacies, and emergency services in a format familiar to users (social media-like design), ensuring higher adoption and usability. This application demonstrates a novel approach to digital healthcare by merging hospital accessibility, pharmaceutical availability, patient data management, and emergency support into a single, easy-to-use platform. The project has the potential to significantly improve patient outcomes by reducing delays in accessing critical care and creating a more connected healthcare ecosystem in India.

**Keywords**: Digital Healthcare, Emergency Response, Hospital Navigation, Pharmacy Access, Patient-Centric App, Healthcare Innovation

**PL-654**

## CLINICAL SURVEY ON PREVALENCE AND RISK FACTORS OF OCCUPATION-INDUCED BRONCHIAL CHALLENGES IN BENGALURU ECO GUARDIANS

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Street sweepers have a significant risk of occupational respiratory diseases due to prolonged exposure to dust and bioaerosols. This study determined the prevalence of bronchial dysfunction and associated risk factors among eco-guards in Bengaluru. A cross-sectional survey of work-related bronchial problems among 130 eco guardians was performed using a structured KAP questionnaire (Knowledge, Attitude, and Practice) and pulmonary function tests. Description and inferential statistics were performed on the data. The majority of eco-guardians were women (63.08%), with a mean age of 43.6 years. Although 96.92% of the participants recognised the risk of dust exposure, protective practices were poorly implemented; 80% of participants did not consistently use masks or gloves, and none practised breathing exercises or inhalers. Most workers (86.15%) reported respiratory symptoms (cough, wheezing, shortness of breath, tightness of chest, runny or stuffy nose, sneezing) and the spirometry indicated abnormal FVC for 64.62% and impaired FEV1 for 70.77% of participants, with many exhibiting mild to moderate obstruction. The findings indicate an important occupational health issue due to the difference between knowledge and protective action. Occupational dust exposure in street sweepers is problematic for respiratory health. These findings highlight the need for urgent health education, provision of protective clothing and equipment, and municipal policies that ensure structured training and routine screening on health and wellness to protect this vulnerable workforce.

**Keywords**: Eco guardians, Occupational hazards, Bronchial problems, Spirometry, Health Education.

**PL-655**

## COMPARATIVE EFFICACY AND COST-EFFECTIVENESS OF BUDESONIDE VERSUS MOMETASONE IN ALLERGIC RHINITIS: BETTER -STUDY

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Allergic Rhinitis (AR) is a highly prevalent IgE-mediated condition affecting quality of life and productivity. Intranasal corticosteroids (INCS) remain the choice of therapy for moderate-to-severe AR. This study evaluates the comparative efficacy, safety, and cost-effectiveness of Budesonide and Mometasone furoate nasal sprays. To determine which nasal spray offers better symptom control, quicker onset of action, and greater cost-effectiveness in patients with allergic rhinitis.A prospective, open-label, randomized study involving 100 AR patients was conducted at MVJ Medical College, Bangalore. Patients were randomised into two groups using web-based sequences: Group A Received Budesonide (256 µg BD) and Group B received Mometasone (200 µg BD) for six weeks. Efficacy was evaluated using the Total Nasal Symptom Score (TNSS) at 2, 4, and 6 weeks. Cost-effectiveness was assessed using the R.4.4.2 version. Both groups showed significant symptom reduction ($p<0.001$), but Budesonide led to faster relief (Mean onset: 5.08 weeks vs. 8.60 weeks, $p<0.001$) and greater TNSS reduction (4.50 vs. 3.08). Budesonide was also more cost-effective, with a cost per unit symptom improvement of INR 134 vs. INR 196.75 for Mometasone. Adverse events were minimal and comparable between groups. While both INCS options are effective and well-tolerated, Budesonide offers quicker symptom relief and superior cost-effectiveness. It can be recommended as a preferred option, especially in settings where affordability and rapid response are critical.

**Keywords:** Allergic rhinitis, Budesonide, Mometasone furoate, Cost-effectiveness, Intranasal corticosteroids.

**PL-656**

## ROLE OF CLINICAL PHARMACISTS IN REDUCING POLYPHARMACY AMONG ELDERLY PATIENTS

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Polypharmacy, commonly defined as the concurrent use of five or more medications, is a prevalent concern among elderly patients due to multiple co morbidities and age-related physiological changes. This practice significantly increases the risk of adverse drug reactions, drug–drug interactions, non-adherence, hospitalization, and reduced quality of life. Clinical pharmacists, as integral members of the healthcare team,




ISBN: 978-81-980623-8-3

play a pivotal role in addressing this challenge by ensuring rational pharmacotherapy. Through comprehensive medication reviews, identification of potentially inappropriate medications, deprescribing strategies, and patient counseling, clinical pharmacists contribute to optimizing drug therapy and improving patient safety. Collaborative interventions between clinical pharmacists, physicians, and other healthcare providers foster evidence-based prescribing and enhance therapeutic outcomes. Furthermore, pharmacists provide education on correct drug use, promote adherence, and monitor therapeutic effectiveness, thereby reducing the clinical and economic burden of polypharmacy. Studies have shown that pharmacist-led interventions significantly decrease medication-related problems and healthcare utilization in geriatric populations. The proactive involvement of clinical pharmacists not only supports safe medication practices but also empowers elderly patients through better understanding of their treatment regimens. This emphasizes the essential role of clinical pharmacists in reducing inappropriate polypharmacy, improving clinical outcomes, and promoting patient-centered care in elderly populations. Integrating clinical pharmacy services into routine geriatric care is crucial for ensuring medication safety, enhancing quality of life, and fostering a sustainable healthcare system.

**Keywords**: Polypharmacy, Elderly patients, Clinical pharmacists, Medication review,Rational pharmacotherapy.

**PL-657**

## XYLOPIA AETHIOPICA FRUIT MACERATE INHIBITS CARRAGEENAN-INDUCED PLEURISY IN RATS

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Pleurisy is an inflammatory condition of the pleura that can lead to severe morbidity and mortality. It is very necessary to control Pleural inflammation as it can lead to fluid buildup (pleural effusion), air in the pleural space (pneumothorax), or pus (empyema), which can lead to lung collapse, sepsis, or shock. Xylopia aethiopica, known for its anti-inflammatory properties, may be a potential treatment. This study evaluates its immunological mechanisms and toxicological impact. Wistar rats were pre-treated with either chloroquine or X. aethiopica fruit macerate before carrageenan-induced pleurisy. Interleukin-6 (IL-6) and Tumor Necrosis Factor-Alpha (TNF-α) levels were measured in blood and pleural exudate via sandwich ELISA. Leukocyte counts were also assessed. Acute and subacute toxicity profiles of the macerate were evaluated in rats. Carrageenan injection induced an inflammatory condition, resulting in increased local and systemic TNF-α and IL-6 levels, with increased leukocyte influx in the pleural cavity. X. aethiopica macerate significantly reduced systemic ($p=0.0026$) and local ($p=0.0004$) TNF-α levels, comparable to chloroquine. No acute toxic effects were observed within 48 hours or 14 days. A 28-day oral administration did not induce behavioral changes, and biochemical analyses suggested safety at studied doses. However, histological analyses revealed vascular congestion and inflammation in the liver and kidneys. X. aethiopica macerate exhibits significant anti-inflammatory effects, supporting its potential as a pleurisy treatment. Further research is needed to confirm its clinical applications.

**Keywords**: anti-inflammatory activity, Pleurisy, Toxicity, Xylopia aethiopica Fruit Macerate

**PL-658**

## PHYSIOTHERAPY AND LIFESTYLE MODIFICATION INTEGRATED TO HEALTH: A PHARMACOLOGICAL PERSPECTIVE

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Physiotherapy and lifestyle modification have emerged as cornerstone strategies in the prevention and management of chronic diseases, offering a non-pharmacological complement to conventional drug therapy. From a pharmacological standpoint, both approaches can be envisioned as "biological interventions" that modulate the body's internal environment much like pharmacokinetic and pharmacodynamic processes. For instance, physiotherapy interventions such as exercise and posture correction influence cardiovascular efficiency, glucose metabolism, and neuromuscular coordination in ways comparable to drug mechanisms targeting the same systems. Lifestyle modifications—healthy nutrition, stress management, and regular activity—further act synergistically with pharmacological therapies, optimizing drug absorption, distribution, metabolism, and excretion (ADME) by improving organ function and reducing metabolic stress. This integration promotes rational therapeutics, minimizes drug doses and side effects, and enhances overall health outcomes. Thus, viewing physiotherapy and lifestyle changes through a pharmacological lens reveals their role as "natural therapeutics," redefining modern healthcare by merging pharmaceutical sciences with holistic wellness strategies.

**Keywords**: Physiotherapy, Lifestyle Modification, Pharmacological Integration, ADME, Non-Pharmacological Therapy, Preventive Healthcare

**PL-659**

## EVALUATION OF A TOPICAL NANO PREPRATION CONTAINING METHOTREXATE AND LYCOPENE AGAINST ADJUVANT INDUCED ARTHRITIS IN RATS

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The present study was designed to formulate and evaluate a methotrexate-loaded nanoemulgel for topical management of rheumatoid arthritis. Methotrexate nanoemulsions were prepared using high-energy methods including high-speed stirring and homogenization. Lycopene oil served as the oil phase, Tween 80 as surfactant, and PEG 400/Span 80 as co-surfactant. Eight nanoemulsion formulations (F1–F8) were developed and assessed for particle size, zeta potential, polydispersity index (PDI), pH, and stability. Optimized formulations were incorporated into Carbopol 940 gel base due to its low viscosity and high spreadability, yielding a nanoemulgel with good homogeneity and physical properties. In vivo anti-arthritic activity was evaluated in FCA-induced arthritic rats, where methotrexate was administered topically for 28 days. Parameters assessed included body weight, paw volume, paw thickness, hematological (Hb, WBC, RBC, ESR), biochemical (CRP, RF), and histopathological markers. The optimized nanoemulgel exhibited particle size of 98.30 nm, zeta potential of -29.7 mV, and drug content of 97.9%. In vitro release followed zero-order kinetics with anomalous non-Fickian diffusion, and stability studies confirmed consistency in viscosity, spreadability, pH, and drug content after one month. Significant reductions in paw volume and thickness ($P<0.001$) were observed from day 14 to day 28, along with normalization of hematological and biochemical parameters compared to arthritic controls. Histopathological findings further supported therapeutic efficacy. Methotrexate nanoemulgel demonstrated excellent stability, sustained release, and potent anti-arthritic activity, making it a promising topical delivery system for both prophylactic and curative treatment of rheumatoid arthritis.

**Keywords:** Methotrexate, Nanoemulsion, Nanoemulgel, Rheumatoid arthritis, Carbopol 940, Anti-arthritic activity.

**PL-660**

## MEDICATION RISK MANAGEMENT IN PATIENT: DRUG DISPENSING CENTER

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The assurance of medication safety and efficacy are critical component in healthcare delivery with drug dispensing centers playing a pivotal role in this process. This research explores the implementation and impact of Quality Risk Management within patient drug dispensing centers, emphasizing its significance in minimizing medication errors, ensuring regulatory compliance and enhancing patient safety. QRM provides a systematic approach to identifying, assessing, controlling and reviewing risks associated with drug dispensing activities, aligning with standards outlined in the World Health Organization and International Council for Harmonization. Key risk factors identified include human error, improper labeling, storage deficiencies and workflow inefficiencies. The




ISBN: 978-81-980623-8-3

implementation of QRM tools such as Failure Mode and Effects Analysis, Risk Ranking and Filtering, and Root Cause Analysis proved effective in proactively addressing these vulnerabilities. Findings indicate that structured QRM frameworks not only reduce the incidence of dispensing errors but also foster a culture of continuous improvement and accountability among pharmacy staff. Furthermore, integrating QRM into standard operating procedures enhances decision-making, resource allocation and stakeholder confidence. This study underscores the necessity for regulatory bodies and healthcare institutions to mandate QRM adoption as an integral part of pharmaceutical service delivery. In conclusion, quality risk management is an essential strategy for optimizing safety and operational excellence in drug dispensing centers.
**KEYWORDS:** Medication, Harmonization, Dispensing, vulnerabilities, WHO.

**PL-661**

**IN VIVO SCREENING OF ANALGESIC AND ANTIULCER ACTIVITY ON CARUM CARVI SEEDS**

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The present study was designed to investigate the antiulcer and analgesic potential of carum carvi seeds. caraway seeds use is common in diet, so there is no need for special administration of the drug and by little increase in intake quantity, the use of analgesics is abolished. Antiulcer activity was also evaluated by aspirin induced ulcer models. Effect of concurrent administration of ethanolic and aqueous extracts of seeds extract Carum carvi at a dose of 100 and 200 mg/kg b.w. respectively was given by oral route. Ethanolic and aqueous extracts of Carum carvi seeds significantly reduction in gastric content, total acidity, ulcer index, and increase in pH of gastric pylorus ligation ulcer model. In comparison with the standard drug, the results of hydro alcoholic extract at 100 mg dose showed good analgesic & at 200 mg dose showed antiulcer activity compared with a standard drug. Extracts of Carum carvi may be useful as a natural analgesic in the treatment of ulcer, inflammation, and pain.
**Keywords:** Carum carvi, Caraway seeds, In vivo study, Analgesic activity, Antiulcer activity, Pain management, Ulcer protection, Experimental animals.

**PL-662**

**STANDARDIZATION AND EVALUATION OF NEUROPROTECTIVE POTENTIAL OF BACOPA MONNIERI AND NARDOSTACHYS JATAMANSI EXTRACTS: INVITRO AND IN VIVO STUDIES**

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A relatively easy and predictable High Performance Thin Layer Chromatographic technique designed was presented to identify bacoside A in Bacopa monnieri as well nardosinone in Nardostachys jatamansi. In addition, physicochemical and phytochemical evaluation of the two herbs taken in present study was also done. FTIR spectroscopy was used to further standardize the active ingredients. Both of these herbs have long been used in a variety of medical procedures and are widely recognized for their therapeutic qualities. The components using the High Performance Thin Layer Chromatography, were isolated upon stationary phase, which included silica gel GF254 pre-coated. Solvent mixture used was made of Methanol, Toluene, Ethyl Acetate and Glacial Acetic Acid (3:3:4:1v/v). Absorbance peak at 540 nm was scanned and quantified for detection of both bacoside A as well nardosinone. The linearity, accuracy, along with precision of the approach demonstrated was also confirmed. Also, in-vitro oxidation scavenging potency of ethanolic extract of both the herbs in terms of DPPH free-radical hunting, hydrogen peroxide and FRAP activity, was also tested. From the study presented, it can be inferred that, Bacoside A in B. monnieri and Nardosinone in Nardostachys jatamansi herbal extracts may be identified, evaluated, and quantified using the suggested approach, which was proven to be accurate as well sensitive.
**Keywords:** HPTLC, ATR-FTIR, DPPH, Bacoside A, Nardosinone

**PL-663**

**EFFECTS OF PHARMACIST-LED INTERVENTION ON QUALITY OF LIFE AND CLINICAL OUTCOME AMONG COPD PATIENTS IN NEPAL**

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Chronic obstructive pulmonary disease (COPD) is a progressive lung condition characterized by persistent airflow obstruction that cannot be fully reversed. As the number of COPD cases continues to rise globally, including in Nepal, there is a pressing need to enhance the quality of life (QoL) for affected individuals through various interventions. The objective of this study was to assess the QoL and clinical outcomes among COPD patients attending hospitals before and after pharmacist's intervention. An interventional study was conducted to evaluate the impact of the pharmacist-led intervention on both QoL and clinical outcomes among adult COPD patients. Structured questionnaires were administered before and after the intervention at the Medicine OPD ward of GP Koirala National Centre for Respiratory Disease, Dulegaunda, Tanahun, Nepal. The intervention technique consisted of counseling sessions conducted by pharmacists and the distribution of informative leaflets to patients. Following a one-month period, patients were re-evaluated using the same questionnaire to measure changes in QoL and clinical outcomes. Pharmacist intervention significantly enhanced QoL and clinical outcomes. This study underscores the potential for pharmacists to play a crucial role in improving overall clinical outcomes, particularly among individuals managing chronic conditions.
**Keywords**: clinical outcome, COPD, intervention, pharmacist, quality of life

**PL-664**

**"EFFECTIVENESS OF TREATMENT STRATEGIES IN REDUCING PAIN AND IMPROVING MOBILITY IN ADULT AND ELDERLY ORTHOPAEDIC PATIENTS"**

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Orthopaedic disorders such as osteoarthritis, fractures, and ligament injuries are common causes of pain and impaired mobility. These conditions significantly affect quality of life, particularly in the aging population. Effective pain management and functional recovery require integrated, multidisciplinary approaches combining pharmacological and supportive therapies.A six-month prospective observational study was conducted in the Department of General Medicine, Sri Aurobindo Hospital, Indore. Sixty inpatients aged 20–60 years were enrolled based on predefined criteria. Data were collected through patient interviews, medical records, and prescription reviews. Pain and mobility were assessed using the Numerical Pain Rating Scale (NPRS) and Visual Analogue Scale (VAS). Associations between treatment adherence and outcomes were analyzed using the chi-square test. All patients showed notable improvements in pain and mobility. A statistically significant association was found between adherence to clinical guidelines and pain score reduction ($p < 0.00001$). Patients receiving multimodal therapy—including NSAIDs, pregabalin, physiotherapy, and nutritional supplements—achieved superior outcomes. Most participants were prescribed NSAIDs with gastroprotective agents and calcium/vitamin D3 supplementation. Elderly males (60–69 years) were most affected, reflecting degenerative trends. Integrated treatment strategies effectively reduced pain and enhanced mobility in orthopaedic patients. Adherence to guideline-based multimodal therapy resulted in better outcomes, underscoring the importance of combining pharmacological and supportive interventions in orthopaedic care.
**Keywords:** Orthopaedic disorders, pain, mobility, multimodal therapy, guideline adherence

**PL-665**

**REDUCING NSAID PRESCRIPTIONS IN PATIENTS RECEIVING ACE INHIBITORS / ARBS AND DIURETICS**


ISBN: 978-81-980623-8-3

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Nonsteroidal anti-inflammatory drugs (NSAIDS) are widely prescribed,but their concurrent use with angiotensin – II receptor blockers (ARBs) and Diuretics can significantly increase the risk of acute kidney injury (AKI). This "triple whammy" of the medications presents a major safety concern in hypertensive patients. At the Health care centre, a quality improvement (QI) initiative was launched to address the frequent prescribing of NSAIDs to patients receiving ACE inhibitors/ ARBs and diuretics Aim: This project aimed to reduce NSAIDs prescription by 50% among patients receiving ACE inhibitors/ ARBs and diuretics within three months may to (july to july 2025) by raising awareness among health care providers and educating patients on the associated risks. A multidisciplinary team implemented several interventions, including provider education on safe prescribing practices and patient councelling at the pharmacy. Data was collected monthly through audits from the health center's electronic medical records to monitor the prescription rates of NSAIDs in the target population. The effectiveness of these interventions was evaluated through the reduction in NSAIDs prescription. Over the three- month period, NSAID prescription in patients on ACE inhibitors/ ARBs and diuretics decreased form 31% in May to 10% in July .The success of the was attributed to improved provider adherence to prescribing guidelines and increased patient awareness of NSAID risks This QI initiative effectively reduced the prescribing of NSAIDS in high- risk patients, enhancing patient safety and preventing medication – related AKI. The project highlights the importance of targeted education and can serve as a model for similar initiative in other healthcare settings.

**Keywords:** NSAIDs, ACE inhibitors, ARBs, Diuretics, Acute kidney injury.

**PL-666**

**PIONEERING BOVINE PON1 PURIFICATION IN INDIA: UNRAVELING CHRONIC MASTITIS FIBROSIS AND CIPROFLOXACIN-BASED THERAPEUTIC STRATEGIES**

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Bovine mastitis (BM) causes substantial economic losses in dairy production due to reduced milk yield, therapy costs, and premature culling, severely impacting rural economies. Pathologically, BM is an inflammatory response in the mammary gland parenchyma triggered by pathogens like Staphylococcus aureus, leading to acute, sub-acute, and chronic forms. Detection relies on somatic cell count (SCC), inflammatory cytokines, enzyme activity (e.g., LDH, NAGase), and electrical conductivity, with California Mastitis Test (CMT) as a common preliminary tool. Current antibiotic treatments face resistance and residue issues. This study pioneers the first purification of bovine paraoxonase 1 (PON1) using chromatographic techniques in India, alongside recombinant PON1. A murine mastitis model was developed to investigate PON1's role in inflammation and fibrosis. We evaluated ciprofloxacin's anti-fibrotic potential and synergistic effects with antibiotics. Future work will elucidate molecular mechanisms of BM-associated fibrosis and discover novel therapeutic molecules, with potential translational benefits for human inflammatory conditions. This integrated approach addresses BM's economic burden while advancing innovative, sustainable treatment strategies for veterinary and clinical medicine.

**PL-667**

**"Assessment of Cognitive Function in Elderly Patients Receiving Anxiolytic Medications"**

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Anxiety is common among older adults and is often treated with anxiolytic drugs such as benzodiazepines and non-benzodiazepine sedatives. Although these medications relieve anxiety symptoms, they may adversely affect cognitive abilities, including memory, attention, and executive functions. Evaluating these effects in local healthcare settings provides insights relevant to clinical practice.To assess the influence of anxiolytic therapy on cognitive performance in elderly patients, focusing on short-term memory, attention, and executive functioning. A six-month prospective observational study was conducted at the Department of General Medicine, Sri Aurobindo Hospital, Indore from 11 January to 11 July 2025. The study included 200 elderly patients, with 100 individuals receiving anxiolytics and 100 controls. Cognitive assessments were conducted at baseline and post-treatment using the Mini-Mental State Examination (MMSE) and the Montreal Cognitive Assessment (MoCA). Data were analyzed to determine the relationship between drug type, dosage, duration, and cognitive changes. Patients treated with anxiolytics showed a significant reduction in MMSE and MoCA scores compared to controls. Cognitive decline was more pronounced with higher doses and longer treatment duration, affecting memory, attention, and executive functions. Use of anxiolytic medications in elderly patients is associated with measurable cognitive decline. Healthcare providers should carefully weigh the benefits against potential cognitive side effects and monitor cognitive function during treatment.

**Keywords:** Anxiolytics, elderly, cognitive performance, MMSE, MoCA, benzodiazepines

**PL-668**

**NEUROPROTECTIVE EFFECTS OF CONVOLVULUS PLURICAULIS ON CUMS-INDUCED NEUROINFLAMMATION AND DEPRESSIVE-LIKE BEHAVIOUR IN RATS**

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Depression is a complicated disease that is increasingly being considered an inflammation-related condition. Indian medicine Convolvulus pluricaulis (CP), a traditional antidepressant in Indian medicine against nervous conditions, has not been well tested in terms of its antidepressant activity in chronic animal models and the biochemical mechanism underlying the action is still not understood. This paper examined how methanolic extract of CP aerial part (CPE) could attenuate the depression caused by chronic unpredictable mild stress (CUMS) in rats in terms of neuroinflammation, liver biomarker, and brain monoamines. CPE was given orally at the amounts of 25, 50 and 100mg/kg throughout one week. The activity of antidepressant was determined by the use of the following tests: the sucrose preference test, forced swim test (FST) and locomotor behaviour by the open field test (OFT) and actophotometer. CPE (50 and 100 mg/kg) or fluoxetine (10 mg/kg, p.o.) treatment had a significant positive effect on the preference of the rats to sucrose, their immobility during the FST, and locomotor activity, compared to the CUMS-exposed rats. High levels of pro-inflammatory cytokines (IL-1b, IL-6, TNF-α) and liver biomarkers (ALT, AST) were also significantly decreased, as well as serotonin and noradrenaline concentrations in the hippocampus and prefrontal cortex were replenished. Moreover, CPE at 25 mg/kg had insignificant protective effects. These results are indicative of the hypothesis that CPE causes antidepressant-like effects in stressed rats by anti-inflammatory, liver biomarker and monoaminergic neurotransmission rescue.

**Keywords:** Convolvulus pluricaulis, Chronic Unpredictable Mild Stress (CUMS), depression, cytokines, tumour necrosis factor-α

**PL-669**

**INNOVATIVE APPROACH TO THYROID FUNCTION TESTING: SENSOR – BASED MONITORING**

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The evaluation of thyroid hormone levels is traditionally performed through invasive blood tests that measure serum concentrations of T3, T4, and TSH. Recent technological advancements are exploring non-invasive approaches for thyroid monitoring, including wearable and skin-based biosensors. A skin sensor placed over the throat, near the thyroid gland, can potentially detect biochemical, thermal, and optical changes associated with hormone activity. Such sensors rely on techniques like infrared spectroscopy, electrochemical sensing, or photoplethysmography to capture physiological signals correlated with




ISBN: 978-81-980623-8-3

thyroid function. This approach offers a painless, rapid, and patient-friendly alternative to routine blood tests, with potential applications in continuous monitoring, early diagnosis of thyroid dysfunctions (hypothyroidism, hyperthyroidism), and personalized treatment adjustments. While promising, these technologies are still under development and require further validation to ensure accuracy, sensitivity, and long-term stability compared to standard diagnostic methods.

**Keywords**: technology, thyroid hormone levels, biosensors

**PL-670**

## EVALUATION OF CHEMOPREVENTIVE EFFECT OF ACHYRANTHES ASPERA LEAF EXTRACT AGAINST DMBA /CROTON OIL INDUCED SKIN CARCINOGENESIS IN MICE

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This study investigated the chemopreventive potential of Achyranthes aspera aqueous leaf (AA) extract against chemically induced skin cancer in mice. A two-stage carcinogenesis model was employed, using 7,12-dimethylbenz(a)anthracene (DMBA) as the initiator and croton oil as the promoter over 16 weeks. The experimental groups received daily topical applications of AA leaf extract and Flonida 5% cream of 5-Fluorouracil (5-FU) (standard) following DMBA exposure. Treatment with the extract significantly reduced tumor development parameters. Biochemical analysis revealed that the extract enhanced antioxidant activity, as evidenced by increased levels of superoxide dismutase (SOD) and catalase (CAT) near to the standard group. Additionally, malondialdehyde (MDA) levels in the extract treated group were nearly same to normal mice, while reduced glutathione (GSH) activity was higher than in the carcinogen treated control group. Histopathological examination of the carcinogen treated control group showed hyperplasia, dyskeratosis, well-differentiated squamous cell carcinoma, and keratinized pearls, whereas these abnormalities were markedly reduced in both the extract and standard drug treated groups. The findings demonstrate that A. aspera leaf extract possesses significant anticancer properties, supporting its potential as a natural chemopreventive agent against skin cancer.

**Keywords:** Achyranthes aspera, anticancer, antioxidant, DMBA, 5-FU

**PL-671**

## THERAPEUTIC POTENTIAL OF COLEUS FORSKOHLII AGAINST DIABETES AND WOUND DYSFUNCTION: A MULTI-MODEL EVALUATION IN ALLOXAN-INDUCED DIABETIC RATS

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Diabetes mellitus, a persistent metabolic disorder, markedly delays wound healing due to sustained inflammation, impaired neovascularization, and compromised fibroblast activity. The current study investigates the wound healing efficacy of Coleus forskohlii (CF) through a multidisciplinary evaluation incorporating in vivo, in vitro and in silico methodologies. Initial in vitro assays were conducted to evaluate the antioxidant and anti-diabetic properties of CF. The extract exhibited potent free radical scavenging activity in DPPH assays, alongside substantial total phenolic and flavonoid content. In glucose uptake assays, CF significantly enhanced cellular glucose absorption, indicating improved insulin sensitivity. An alloxan-induced diabetic wound model in rats was used to assess the therapeutic efficacy of CF. Animals administered 400 mg/kg CF orally in conjunction with topical 20% w/w hydrogel exhibited pronounced improvements in glycemic control, lipid metabolism, and wound contraction compared to controls. These physiological benefits were associated with upregulation of critical signaling cascades, particularly PI3K/Akt, VEGF, and HIF-1 pathways, which are integral to tissue regeneration and angiogenesis. Network pharmacology and computational modeling identified forskolin, coleon E, and 1-deoxyforskolin as primary bioactive constituents. These molecules were predicted to modulate pivotal proteins including PIK3R1, NOS3 and EGFR, key regulators of insulin signaling, inflammation, and wound repair. Although EGFR was minimally represented in initial target prediction datasets, molecular docking and dynamic simulations confirmed strong and stable ligand-receptor interactions, underscoring its therapeutic relevance in diabetic wound healing. The convergent evidence from in vivo, in vitro and in silico assessments supports the wound-healing and anti-diabetic efficacy of CF. These findings warrant further translational and clinical investigations to validate its potential as a phytotherapeutic agent for diabetic wound management.

**Keywords:** Diabetic Wound Healing, Diabetic Foot Ulcer, Diabetes Mellitus, Coleus forskohlii (CF), Alloxan Monohydrate, Excision Wound Model, In silico

**PL-672**

## ANTIBACTERIAL EFFECT OF CRUDE AND PARTIALLY PURIFIED BACTERIOCIN PRODUCED BY PEDIOCOCCUS ACIDILACTIC MTCC 7442 STRAIN AGAINST PATHOGENS

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Antimicrobial peptides are small, positively charged, amphipathic molecules of variable amino acid composition and length. Such peptides known as bacteriocins, are antimicrobial molecules produced by certain bacteria, exhibit significant potency against other bacteria (including antibiotic-resistant strains), and can have narrow or broad activity spectra. The present study is designed to purify bacteriocin from microbial strain Pediococcus acidilactici MTCC 7442. Further interaction study with different excipients would be carried out to screen suitable excipient for better stability of purified bacteriocin in formulation. Ammonium sulphate precipitation at 60%w/w fraction showed highest antimicrobial activity against different pathogens especially Staphylococcus aureus MTCC 3160. Both agar cup plate and dilution methods were used to evaluate the antimicrobial efficacy. The partially purified product was characterized for its stability in organic solvent such as methanol, acetonitrile, DMSO. Stability against proteolytic digest with pepsin, trypsin, proteinase K was checked. Stability under acidic and alkaline pH conditions were tested and stability at higher temperature ranged (70 deg C to 90 deg C) was also evaluated. The partially purified bacteriocin was loaded in hydrogel formulation and stability studies were performed and it was found that partially purified bacteriocin was stable in optimized hydrogel formulation. The purified product showed potential activity against pathogenic strains screened.

**Keywords:** Antimicrobial peptides, antimicrobial resistance

**PL-673**

## A NOVEL COMBINATION STRATEGY USING VANADIUM PENTOXIDE AND GINGER FOR SAFER ANTIDIABETIC THERAPY

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Diabetes mellitus is chronic metabolic disorder affecting millions globally, often accompanied by complications like infertility due to damage to nerves,blood vessels. Vanadium pentoxide has demonstrated insulin-mimetic and antidiabetic effects but its clinical use is limited by associated reproductive toxicity. This study investigates combined antidiabetic efficacy and reproductive safety of vanadium pentoxide and aqueous ginger extract in Alloxan-STZ induced diabetic rats. Experimental groups includes normal controls, diabetic controls, treatment sets with pioglitazone, vanadium pentoxide, ginger extract, and the combination. Antidiabetic activity was assessed by tracking fasting blood glucose, glycogen levels in liver and muscle, as well as reproductive organ weights, sperm count, viability, and histopathology of testes. The combination therapy of vanadium pentoxide with ginger extract produced a more significant reduction in fasting blood glucose levels and improvement in glycogen stores compared to individual treatments ($p<0.05$). Crucially, inclusion of ginger extract mitigated reproductive toxicity typically associated with vanadium pentoxide, evident by improvements in sperm count, viability, preservation of reproductive organ structure. Histopathological analysis supported these findings, showing almost normal testicular histology in combination group. This synergistic approach highlights potential of




ISBN: 978-81-980623-8-3

integrating herbal agents with trace element therapy to improve both efficacy and safety in diabetes management.

**Keywords:** Diabetes mellitus, Ginger, Reproductive toxicity, Antidiabetic activity, Alloxan-STZ, Vanadium pentoxide,

**PL-674**

**A MULTI-MECHANISTIC POLYHERBAL FORMULATION FOR DIABETES: IN SILICO DOCKING-GUIDED INSIGHTS INTO B-CELL REGENERATION**

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Diabetes mellitus type 2, a chronic metabolic disorder marked by insulin resistance and progressive β-cell dysfunction, remains a global health concern. The present study explores a polyherbal approach targeting multiple mechanisms using Rhynchostylis retusa, Camellia sinensis, and Diplazium esculentum. R. retusa, traditionally used in South and Southeast Asia, exhibits highly potent activity at 50ug microgram doses, effectively lowering fasting blood glucose and inhibiting α-amylase with efficacy comparable to standard drugs. C. sinensis, a potent dipeptidyl peptidase-4 (DPP-4) inhibitor, was selected to minimize drug toxicity and prevent hypoglycemic shock in combination therapy. D. esculentum, an edible fern, showed mild inhibition of α-amylase and α-glucosidase while promoting regeneration of pancreatic β-cells and restoration of insulin secretion upon prolonged administration. In vitro investigations revealed that protocatechuic acid (PCA) acted as a reversible, mixed-type inhibitor of α-glucosidase, forming a stable enzyme-PCA complex through hydrogen bonds and van der Waals interactions, thereby inducing conformational changes and steric hindrance at the catalytic site. PCA further demonstrated postprandial hypoglycemic activity in diabetic mice, supporting its potential role in dietary management of diabetes. Complementary molecular docking studies highlighted productive binding modes of gallic acid and catechin with α-glucosidase, exhibiting binding energies of –6.58 kcal/mol and –7.25 kcal/mol, respectively, with key residues including Tyr63, Arg197, Asp198, Glu233, Asn324, and Asp326 involved in interactions. Molecular dynamics simulations confirmed the stability of both complexes compared to the apo-enzyme. Taken together, this forms the hypothesis that the three selected plants, through complementary mechanisms, may act synergistically as antidiabetic agents.

**Keywords:** Diabeties mellitus, alpha glucosidase, alpha amylase, dipeptidyl peptidase 4, molecular docking.

**PL-675**

**NAEGLERIA FOWLERI: EMERGING THREAT OF PRIMARY AMOEBIC MENINGOENCEPHALITIS AND THE ROLE OF PHARMACY IN INFECTION PREVENTION AND CONTROL**

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The free-living thermophilic protozoan Naegleria fowleri, sometimes known as the "brain-eating amoeba," lives in warm freshwater environments such as lakes, rivers, hot springs, and swimming pools with insufficient chlorination. Primary amoebic meningoencephalitis (PAM), a rare but nearly always fatal infection of CNS, is brought on by this bacterium. When contaminated water enters nasal passages and causes infection, the amoeba can travel to the brain through the olfactory nerve. PAM symptoms, such as a severe headache, fever, nausea, vomiting, stiff neck, disorientation, seizures, and hallucinations, can come suddenly and with great severity. Within one to two weeks, a coma and death are frequently the results of the illness's rapid progression. Treatment includes aggressive therapy using Miltefosine, rifampin, amphotericin B, fluconazole and azithromycin. There was a significant illness i.e a case study from kerala, a 13 years old patient following 2 months of having swim in a river began to show headache, fever and a confused state of mind. Vancomycin and meropenem were the treatment given, still his condition worsned leading to unconsciousness and death. The diagnosis was done by the microbiological studies and analysis of cerebrospinal fluid. Kerala had identified 80 cases related to PAM as of September 23,2025. Infections with fowleri are rare but require medical attention.Greater awareness, prompt diagnosis and adherence can prevents the consequences caused by fatal waterborne illness.

**Keywords**: Naegleria fowleri, Amphotericin B, Brain eating amoeba, Olfactory nerve, meropenem.

**PL-676**

**LONG TERM SAFETY AND EFFICACY METHODS TO TREAT PRESBYOPIA**

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This study evaluated the long-term safety and efficacy of Benozzi's pharmacological method for treating presbyopia with topical eye drops (pilocarpine and diclofenac). A retrospective, nonrandomized case series was conducted in Buenos Aires, Argentina, from 2011 to 2018, including 910 emmetropic patients aged 40–59 years with good distance vision but reduced near vision. After at least one year of follow-up, and up to eight years, results showed significant improvement in uncorrected near visual acuity (UNVA), decreasing from a baseline of 4.74 ± 1.53 to 1.36 ± 0.48 (Jaeger scale), while uncorrected distance visual acuity (UDVA) remained unaffected. Reported side effects (light perception decrease, headaches, ocular dryness, dizziness) were mild and resolved spontaneously within one year. The findings suggest that Benozzi's method is a safe and effective nonsurgical alternative for emmetropic presbyopia, offering patients an option to avoid glasses or surgery.

**PL-677**

**EFFECT OF MEDICATION REGIMEN COMPLEXITY ON ADHERENCE AMONG ADULT AND GERIATRIC PATIENTS**

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The complexity of medication regimens significantly influences patient adherence, especially among adult and elderly populations who often manage multiple medications for chronic conditions. Factors such as dosing frequency, medication forms, and special instructions contribute to increased regimen complexity, which can adversely affect adherence and lead to suboptimal therapeutic outcomes. Multiple factors play a role in adherence behavior. This study aimed to evaluate the impact of medication regimen complexity on adherence in adult and elderly patients within a hospital setting. A prospective observational design was employed, utilizing data from patient medical records and interviews. The Medication Regimen Complexity Index (MRCI) was used to quantify regimen complexity. Statistical analyses, including independent t-tests and Pearson correlation, were conducted to explore the relationship between MRCI scores and various variables. Preliminary results revealed that geriatric patients generally had moderate MRCI scores compared to adults, indicating that age alone may not be a decisive factor in regimen complexity. While age demonstrated a weak positive correlation with MRCI scores ($r = 0.1631$), this association was not statistically significant ($p = 0.056$). Other variables showed weak or negligible correlations. The findings suggest that simplifying medication regimens, particularly for elderly patients, may improve adherence and lead to better health outcomes. This study underscores the importance of routinely assessing and minimizing medication regimen complexity as part of clinical care. Overall, no significant difference in MRCI scores was observed between adult and geriatric groups.

**Keywords**: Medication Regimen Complexity Index (MRCI), adherence, therapeutic outcomes, independent t-test, Pearson correlation.

**PL-678**

**HYPERTENSION AWARENESS AND MANAGEMENT AMONG HYPERTENSIVE ROAD TRANSPORT PROFESSIONALS IN URBAN AREAS**

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ISBN: 978-81-980623-8-3

In the entire world, hypertension is a major factor in morbidity and mortality. The health of occupational workers has several determinants at the workplace leading to accidents, communicable and non-communicable disease and stress related states. In professional drivers are one such group who have tendency to develop above mentioned conditions as they spend most of their time in pollutant, noisy and stressful environments. In Bagalkote city, India, we set out to assess the Knowledge Attitude & Practice of hypertension in a professional road transport driver. To assess knowledge, attitude and practice towards hypertension among the hypertensive road transport drivers in urban city. This is a Cross-sectional study which was carried out in Bagalkote city. The study included hypertensive drivers above 18 years age and Collection of Data is done by approaching various drivers like bus, truck using self-administered questionnaire which includes parameter of knowledge, attitude and practice and their socio demographic details such as age and Habits. The data collected will be analysed for the Knowledge, Attitude and Practice parameters. In our study, highest participants 39.1% were in the age group of 31-40years and least 2.8% were in the >60years. Mean Systolic Blood Pressure & Diastolic Blood Pressure was 158.41±6.47 & 92.13±5.36 respectively. Out of n=69 participants, (68.98%) had Good Knowledge and only (31.01%) had Poor Knowledge. And (60.86%) had Good Attitude, (39.130%) had Poor Attitude, (31.159%) had Good Practice & (68.840%) had Poor Practice towards Hypertension. Majority of participants has good Knowledge and positive Attitude but poor Practice. Continuous reinforcement and education can bring a positive change and adhere to regular check-up and treatment and helps reduce morbidity and mortality.

**Keyword**: Hypertension, Road transport drivers, Knowledge, Attitude, Practice.

**PL-679**

## BIOLOGICAL EVALUATION OF IN VITRO AND IN VIVO ANTI-INFLAMMATORY AND ANALGESIC ACTIVITIES OF LEAF EXTRACT OF THALICTRUM FOLIOLOSUM

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Thalictrum foliolosum (family Ranunculaceae) has been traditionally used in folk medicine for the management of pain and inflammation; however, comprehensive pharmacological studies supporting these uses are limited. In the present study, fresh leaves of T. foliolosum were collected from Kilbury, Nainital, Uttarakhand, and subjected to extraction using suitable solvents. Preliminary phytochemical screening revealed the presence of bioactive constituents such as alkaloids, flavonoids, tannins, and phenolic compounds, which are often associated with anti-inflammatory and analgesic activities. The in vitro anti-inflammatory potential of the leaf extract was evaluated using protein denaturation assays, demonstrating significant inhibition in a concentration-dependent manner, indicative of its protective effect against protein denaturation associated with inflammation. In vivo studies were conducted using animal models to further validate the pharmacological potential of the extract. Anti-inflammatory activity was assessed in rats using the carrageenan-induced paw edema model, which revealed dose-dependent suppression of edema comparable to standard drugs such as Ibuprofen and Indomethacin. Analgesic activity was evaluated in mice using tail-flick and hot-plate methods, where the extract significantly increased reaction time, suggesting central and peripheral analgesic effects. Overall, these findings provide scientific evidence for the traditional use of T. foliolosum in pain and inflammation management, highlighting its potential as a natural therapeutic agent and warranting further investigation for drug development.

**Keywords**: Pharmacological, phytoconstituents, inflammatory, analgesic, therapeutic.

**PL-680**

## ASSESSMENT OF ADVERSE DRUG REACTION REPORTING FOR SELECTED ANTIBIOTICS BY HEALTHCARE PROFESSIONALS.

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Adverse drug reactions (ADRs) remain a significant public health concern, particularly with the widespread use of antibiotics. In the current research, assessment of adverse drug reaction reporting has been performed. The objective behind the research was to evaluate the awareness and practices related to ADR reporting among physicians and hospital pharmacists, specifically concerning commonly prescribed antibiotics. ADR reporting facilitates the monitoring of drug safety in real world through post marketing surveillance, thereby providing understanding of a drug's risk profile. This study aims to assess the knowledge, attitudes, and practices (KAP) of healthcare professionals regarding ADR reporting for selected antibiotics, and to identify barriers contributing to underreporting. India with vast genetic diversity, variations in disease prevalence, dietary habits and healthcare assessment may response individually, making ADR monitoring essential. Pharmacovigilance Programme of India (PvPI) encouraged to report any suspected ADRs to ensure drug safety and protect public health. This study concludes that; there is a gap between healthcare professionals and reporting for adverse drug reaction related to selected antibiotics largely influenced by their awareness and training levels. Strengthening education on pharmacovigilance and simplifying the reporting process are essential steps to enhance ADR reporting, ultimately improving patient safety and antibiotic use monitoring.

**Keywords:** PvPI, Awareness, Reporting process, Antibiotic use monitoring, post-marketing surveillance.

**PL-681**

## ANTICOAGULATION THERAPY MANAGEMENT

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Anticoagulation therapy plays a vital role in the prevention and treatment of thromboembolic disorders such as atrial fibrillation, deep vein thrombosis, pulmonary embolism, and mechanical heart valve-associated thrombosis. However, its clinical management remains complex due to the narrow therapeutic window, variability in patient response, drug interactions, and the risk of serious bleeding complications. This presentation explores the principles and challenges of anticoagulation therapy management, focusing on commonly used agents including vitamin K antagonists (e.g., warfarin), direct oral anticoagulants (DOACs), and parenteral anticoagulants (e.g., heparin, low molecular weight heparin). Emphasis is placed on patient selection, dosing strategies, monitoring protocols (such as INR for warfarin), and the management of bleeding risks and reversal agents. Additionally, the presentation will address the role of clinical guidelines, patient education, and multidisciplinary approaches to optimize therapeutic outcomes. Special populations, including the elderly, patients with renal impairment, and those undergoing surgery, will also be discussed to highlight individualized care approaches. Effective anticoagulation therapy management requires a balance between minimizing thrombotic risk and preventing bleeding complications, necessitating careful assessment, ongoing monitoring, and patient-centered care.

**Keywords:** Anticoagulation Therapy, Thromboembolism, Warfarin, Direct Oral Anticoagulants (DOACs), Heparin, Bleeding Risk, Patient-Centered Care, Clinical Guidelines, Drug interactions.

**PL-682**

## COMPUTATION DESIGN AND BIOLOGICAL EVALUATION OF CERTAIN SYNTHESIZED FLAVONOIDS FOR CARDIOPROTECTIVE EFFECT

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Myocardial infarction (MI) is irreversible necrosis of heart muscle. According to WHO 19 million died due to CVD by 2022. Angiotensin Converting Enzyme converts angiotensin-I to angiotensin-II. The inhibition of ACE effectively reduces MI. Flavonoids possess anticancer, anti-inflammatory and cardioprotective activity. In silico studies of 50 semisynthetic flavonoids was done using Autodock 4.2. Based on docking results one compound(F3) was selected for in vitro ACE inhibitory activity. Acute toxicity study of synthetic flavonoid was carried out employing OECD- TG 420 and was found to be non-toxic dose up to




ISBN: 978-81-980623-8-3

2000mg/kg. In vivo studies was evaluated using 30 Wistar rats and were divided into five groups (n=6). Group-I served as control, Group-II negative control, Group-III and group IV received 100 and 200mg/kg of flavonoid, Group V was given enalapril (10 mg/kg). Group II-V received doxorubicin 10mg/kg i.p. on 26th day and on 29th day animals were euthanized; blood serum was collected for measuring CK-MB, LDH, ALT,, AST, ALP, TGL, TC, HDL, LDL and VLDL levels. Results of in silico studies exhibited binding energy between -10.44 kcal/mol to -6.59 kcal/mol. Out of 50 compounds F3 flavonoid produced excellent binding energy. IC50 of enalapril and F3 compound was found to be 69.85± 25 and 85.65 ± 16 µg/ml respectively. Treatment with F3 and enalapril reduced the levels of CK-MB, LDH, ALT, AST, ALP, TGL, TC, LDL, VLDL and increased HDL levels marking the protection offered by flavonoid. Flavonoids have the potency to correct MI and can be used to correct cardiovascular diseases.

**Keywords**: Myocardial infarction, angiotensin converting enzyme, doxorubicin, enalapril.

**PL-683**

## EXTRACTION, PHYTOCHEMICAL SCREENING, AND EVALUATION OF HEPATOPROTECTIVE ACTIVITY OF *Ficus hispida* BARK IN RATS

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The present study involves the extraction, phytochemical screening, and assessment of the hepatoprotective activity of *Ficus hispida* bark in rats. Ethanolic extraction of the bark was carried out, followed by preliminary phytochemical screening, which revealed the presence of flavonoids, tannins, alkaloids, glycosides, and other secondary metabolites. To evaluate hepatoprotective potential, liver injury was induced in rats using paracetamol (2 g/kg, p.o.). The bark extract was administered orally at doses of 200 mg/kg and 400 mg/kg, while silymarin (25 mg/kg and 100 mg/kg, p.o.) was used as a standard reference drug. Liver function markers such as SGOT, SGPT, ALP, and total bilirubin were estimated, and reduced glutathione (GSH) levels were measured to determine antioxidant status. In addition, histopathological study was also carried out. Rats treated with *Ficus hispida* bark extract showed a significant, dose-dependent improvement in hepatic function. The extract markedly decreased SGOT, SGPT, ALP, and total bilirubin levels, while elevating GSH levels compared to the toxic control group. Histological examination further demonstrated reduced necrosis, diminished inflammation, and restoration of normal hepatocyte structure. The protective effects observed were comparable to those of silymarin. These results indicate that the ethanolic bark extract of *Ficus hispida*, supported by its phytochemical constituents, possesses promising hepatoprotective activity against paracetamol-induced liver damage.

**Keywords:** *Ficus hispida*, hepatoprotective activity, phytochemical screening, paracetamol, silymarin.




ISBN: 978-81-980623-8-3

PT-01

## EXPLORING THE PHYTOCHEMICAL AND ANTIOXIDANT PROPERTIES OF CAMELLIA SINENSIS VAR. ASSAMICA GROWN IN DIFFERENT DISTRICTS OF ASSAM

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This study aims to analyse the antioxidant activities of green tea leaves from various districts in Assam, focusing on their industrial, cultural, and medicinal significance. Green tea leaves were collected, identified, and extracted from different districts in Assam. Phytochemical content was quantified, and total phenolic content and antioxidant properties were evaluated. Organoleptic features were assessed, and various phytochemical tests were conducted to detect presence of bioactive compounds such as flavonoids, tannins, phenolic compounds, quinones, and saponins. The organoleptic study showed that green tea leaves (Camellia sinensis var. assamica) have a slightly bitter taste, characteristic odour, and yellow colour. Phytochemical analysis revealed the presence of flavonoids, tannins, phenolic compounds, quinones, and saponins in tea leave samples from Biswanath, Nagaon, and Kamrup Metro districts. The pH of the tea extract was recorded as 7.24. The antioxidant properties of the extracts were measured using the DPPH assay, showed significant activity with IC50 values of 45.278 for tea leave samples collected from Kamrup Metro, 54.821 for Nagaon, and 47.119 for Biswanath Chariali, compared to 23.033 for ascorbic acid. This study highlights the importance of natural resources and the need for sustainable practices. The findings provide insights into the medicinal potential of plants, particularly the antioxidant activities of green tea leaves collected from Biswanath, Nagaon, and Kamrup Metro districts of Assam supporting their use in health and wellness.

**Keywords**: Camellia sinensis var. assamica, antioxidant activities, total phenolic content, Phytochemical screening.

PT-02

## UNVEILING THE MEDICINAL TREASURE OF PSEUDERANTHEMUM PALATIFERUM: PHYTOCHEMICAL AND THERAPEUTIC PERSPECTIVES

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Pseuderanthemum palatiferum (Nees) Radlk., belonging to the Acanthaceae family, is a medicinal plant native to Northern Vietnam, discovered in 1990. This plant is characterized by its multi-branched shrub morphology and simple opposite decussate leaves, making it amenable to cultivation. In traditional Vietnamese and Thai medicine, its leaves are used to treat a wide range of conditions, including hypertension, diarrhea, arthritis, hemorrhoids, stomach aches, tumors, colitis, bleeding, wounds, constipation, flu, and colon-related issues. The study aims to validate the promising therapeutic properties of Pseuderanthemum palatiferum and explore its potential for further medicinal applications. Chemical analysis revealed compounds like β-sitosterol, stigmasterol, kaempferol, saponins, and amino acids. Pharmacological studies assessed its anti-diabetic, anti-bacterial, anti-inflammatory, and antioxidant effects, among others. Research highlights the diverse pharmacological properties of Pseuderanthemum palatiferum. However, some of its traditional uses, such as for hypertension, arthritis, hemorrhoids, stomachache, tumors, colitis, hemorrhage, wound healing, constipation, flu, colon issues, and nephritis, have not yet been validated by pharmacological tests. Further studies are needed to confirm its potential and validate unexplored medicinal applications.

**Keywords:** Pseuderanthemum palatiferum, Acanthaceae, Vietnam, pharmacological properties, Folklore medicine.

PT-03

## INVESTIGATIONAL STUDY OF ENICOSTEMMA AXILLARE PLANT EXTRACTS AGAINST DENGUE AND THEIR MOSQUITO REPELLENT ACTIVITY

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Mosquito-borne diseases such as dengue, yellow fever, Zika fever, malaria, and chikungunya continue to pose major public health challenges worldwide. Enicostemma axillare, a medicinal plant, is known to contain bioactive phytoconstituents such as quercetin, kaempferol, coumarins, polyphenols, and β-sitosterol with potential pharmacological activity. In this study, compounds including apigenin, catechin, galangin, genkwanin, isovitexin, myricetin, saponarin, betulin, Beta Amyrin, and others were subjected to in silico docking against the dengue vector target protein (PDB ID: 1K4R). Docking results revealed strong binding affinities ranging between -7.2 to -8.7 and compliance with Lipinski's Rule of Five, suggesting their potential as anti-dengue agents. Furthermore, ethanol, methanol, ethyl acetate, acetone, and aqueous extracts of the plant were used to prepare mosquito repellent formulations such as creams, sprays, incense sticks/cones, and fast cards. Among three tested concentrations, the cream and spray formulation F3 (15% extract) exhibited the highest repellent activity. Incense sticks and cones showed satisfactory burning times (40–50 min and 20–25 min, respectively) with effective repellency, while fast cards provided a rapid short-duration effect. As per the results of the study, it may be concluded that Enicostemma axillare is a promising source for creating effective, natural and safe mosquito repellent products and as per the in- silico docking studies, may be used further for in vitro and in vivo testing to validate the efficacy and safety of the phytochemicals as potent agents against most challenging global vector-borne diseases.

**Keywords:** Enicostemma axillare, herbal mosquito repellent, dengue, molecular docking, formulation

PT-04

## PHYTOCHEMICAL, BIOLOGICAL AND COMPUTATIONAL SCREENING OF TECTONA GRANDIS BARK

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Tectona grandis (teak) is widely recognized for its diverse applications, especially in traditional medicine. This study focused on the isolation, characterization, and evaluation of bioactive molecules from its bark extracts, employing both experimental and computational approaches to explore their pharmacological potential. Methanolic and chloroform extracts of the bark were subjected to preliminary phytochemical screening, and the compounds were isolated using chromatographic techniques. Structural elucidation was performed using $^{1}H$ NMR, $^{13}C$ NMR, MASS, and FTIR spectroscopy. The biological activities of the extracts and isolated compounds were evaluated through antioxidant, anti-inflammatory, cytotoxic, and anti-cancer assays. Additionally, computational methods such as SWISS ADME, TCMSP, and molecular docking were employed to predict drug-likeness and receptor binding affinities. From the chloroform extract, stigmasterol (TGBC-1) and lanceolatine B (TGBC-2) were isolated, while the methanolic extract yielded 24-methyl-cholest-5(6),24(25)-diene-3-β-ol (TGBM-1) and apigenin 7-O-(6''-O-P-Z-Coumaryol-α-β-D-Glucopyranoside) (TGBM-2). Notably, lanceolatine B and apigenin 7-O-(6''-O-P-Z-Coumaryol-α-β-D-Glucopyranoside) were reported for the first time in this species. The biological screening demonstrated significant antioxidant, anti-inflammatory, and cytotoxic activities, with chloroform extracts showing greater potency. Computational docking studies supported these findings, indicating strong receptor interactions, particularly for anti-cancer targets. These results highlight the therapeutic promise of Tectona grandis bark bioactive molecules and suggest their potential for further drug development.

**Keywords:** Tectona grandis, phytochemical isolation, anti-cancer activity, molecular docking.

PT-05

## ISOLATION OF VINGA RADIATA MUCILAGE AND ITS EVALUATION AS GELLING AGENTS IN DICLOFENAC SODIUM GEL

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ISBN: 978-81-980623-8-3

The objective of present work is to find out the gelling potential of mucilage from Vigna Radiata. Mucilage was isolated from Vigna Radiata seeds by soaking, extraction and boiling with distilled water as solvent and precipitating by addition of acetone as non-solvent and drying at 50 – 60 0C. The isolated mucilage was subjected to safety and preformulation studies for its suitability as a gelling agent. Physicochemical characteristics such as solubility, ash values, swelling index, loss on drying and pH were studied. In the present study total six formulations were prepared, in that five formulations of Diclofenac Sodium gel were prepared corresponding to 2.0 4.0, 6.0, 8.0 and 10% w/w of Vigna Radiata mucilage, 1% w/w Diclofenac sodium, 15% w/v Glycerin, and 0.02% Methyl paraben. The sixth formulation was prepared with 2% synthetic gelling agent as a HPMC K100M. The gels were evaluated for drug content, viscosity, in vitro permeation and skin irritation etc. The prepared gels did not produce any dermatological reactions and were well tolerated by the albino mice. The formulation F5 containing 10 gm of mucilage was found to be ideal and it shown similar anti-inflammatory activity in compared to the F6 and commercial preparation. Studies indicate that the isolated mucilage may be a good substitute as a pharmaceutical excipient specifically as a gelling agent.

**Keywords:** Vigna Radiata, Diclofenac Sodium, Mucilage, Gelling agent and Anti-inflammatory activity.

**PT-06**

## PAPAYA (CARICA PAPAYA) LEAVES: A NATURAL SOURCE OF ANTICANCER PHYTOCHEMICALS

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Papaya (Carica papaya), often called the “fruit of angels,” is valued not only as a nutritious fruit but also as a traditional remedy. In recent years, its leaves have drawn attention from researchers for their promising role in cancer management. Rich in natural compounds such as alkaloids, flavonoids, phenolics, saponins, and tannins, papaya leaves act as a natural pharmacy against abnormal cell growth. These bioactive molecules work in different ways: they trigger cancer cells to undergo programmed death (apoptosis), slow down their uncontrolled multiplication, block the formation of blood vessels that feed tumors, and strengthen the immune system. Their strong antioxidant properties also protect healthy cells from damage caused by free radicals, a key factor in cancer development. Laboratory studies on various cancer types—including breast, lung, cervical, and pancreatic cancers—have shown encouraging results, while animal experiments suggest potential benefits in reducing tumor growth. Although clinical evidence in humans is still limited, these findings highlight papaya leaves as a cost-effective, natural source of anticancer agents that may complement conventional therapies. With more research, especially clinical trials, papaya leaf extracts could evolve into a safe and accessible support in modern cancer care.

**Keywords:** Papaya leaves, Cancer treatment, Anticancer agent, Carica papaya, Phytochemicals.

**PT-07**

## PHYTOPHARMACEUTICAL GUMMIES OF MOMORDICA DIOICA: A NOVEL STRATEGY FOR DIABETES CONTROL

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Diabetes mellitus is a chronic metabolic disorder marked by hyperglycemia due to insulin deficiency or resistance. Long-term drug therapy often causes side effects, increasing interest in natural alternatives. Momordica dioica (spiny gourd), rich in flavonoids, phenolics, and saponins, has shown antidiabetic potential through α-amylase/α-glucosidase inhibition, antioxidant action, and insulin-mimetic effects. Gummies offer an attractive nutraceutical delivery system by masking bitterness, improving palatability, and enhancing compliance. To develop and evaluate anti-diabetic gummies containing Momordica dioica extract. To formulate gummies using standardized M. dioica extract with natural sweeteners. To evaluate in vitro antidiabetic activity and sensory properties. To assess stability and potential applicability as a nutraceutical. Standardized extract was incorporated with gelatin as gelling agents, with a suitable sweetener, and natural flavors. The mixture was molded into gummies and evaluated. For physical and chemical properties. Results: Formulated gummies exhibited satisfactory texture, taste, and consumer acceptance. In vitro assays confirmed significant enzyme inhibitory activity, indicating potential glucose-lowering effects. Stability studies supported acceptable shelf-life. Anti-diabetic gummies with Momordica dioica extract provide a novel, patient-friendly nutraceutical approach. They combine traditional medicinal value with modern formulation technology, offering promising support in diabetes management.

**Keywords:** Anti-diabetic gummies, Nutraceuticals, α-Amylase/α-Glucosidase inhibition, Herbal formulation

**PT-08**

## PHYTOCHEMICAL ISOLATION OF FLAVONOIDS AND NEUROPROTECTIVE POTENTIAL OF PEDALIUM MUREX LINN.

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Neurodegenerative diseases (NDs) pose a growing global health challenge, often accompanied by behavioral manifestations such as depression, anxiety, memory loss, and stress. The search for effective natural therapeutics is therefore of paramount importance. In the present study, we investigated the phytochemical profile and neuroprotective potential of Pedalium murex Linn. (PM) leaves against lipopolysaccharide (LPS)-induced endotoxemia in rats. Ethanolic extract of Pedalium murex (EEPM, 90% v/v) yielded two isolated compounds, designated PM I and PM II. Spectral characterization suggested that PM I shared structural similarities with 4’,5,7-trihydroxyflavone (likely Apigenin), while PM II exhibited resemblance to 3,5,7-trihydroxy-2-(4-hydroxyphenyl)-4H-chromen-4-one (likely Kaempferol). Experimental findings revealed that LPS administration significantly reduced food and water intake as well as body mass, whereas EEPM treatment restored these parameters. EEPM also mitigated depression- and anxiety-like behaviors. Moreover, LPS-induced reductions in antioxidant enzyme levels (SOD, CAT, GR, and GPX) were reversed by EEPM. Histopathological analysis further confirmed the protective role of EEPM against LPS-mediated neurodegeneration. In conclusion, EEPM demonstrated promising neuroprotective activity, likely attributable to its rich flavonoid content and potent antioxidant properties, suggesting its potential as a therapeutic candidate for LPS-induced brain injury.

**Keywords:** Pedalium murex, Ethanolic extract, EEPM, LPS, Rats

**PT-09**

## PHYTOCHEMICAL & PHARMALOGICAL EVALUTION OF AERVA SANGUINOLENTA BY ACETONE EXTRACT

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Aerva sanguinolenta L. Blume is a perennial herb that belongs to the Amaranthaceae family. The plant has widely been used as a traditional medicine for long time. It is rich in phytochemical constituents such as tannins, flavonoids, terpenoids, sphingolipids, polyphenolic compounds and betacyanins. Moreover, it has significant therapeutic effects, including antihyperglycaemic, hepatoprotective, antioxidant, antimicrobial, anti-inflammatory, diuretic, anti-leishmania and anti-tuberculosis activities. The scientific validation is essential for the acceptance of medicinal plants as therapeutic agents against several disorders. Hence, the traditional uses, phytochemical constituents, medicinal significance and pharmacological effects of the plant are discussed in this review. The present study focuses on the phytochemical screening and pharmacological evaluation of Aerva sanguinolenta using an acetone extract. Aerva sanguinolenta, a medicinal plant traditionally used in folk medicine, was subjected to preliminary phytochemical analysis which revealed the presence of bioactive compounds such as flavonoids, alkaloids, tannins, saponins, and phenolics. The extract was then evaluated for its pharmacological activities, including anti-inflammatory, antioxidant, and antimicrobial properties using standard in vitro and in vivo models. Results indicated significant biological




ISBN: 978-81-980623-8-3

activity, supporting the plant's traditional therapeutic applications. The acetone extract demonstrated notable efficacy, particularly in antimicrobial and antioxidant assays, suggesting its potential for further development into natural therapeutic agents. This study provides scientific validation for the traditional use of Aerva sanguinolenta and highlights its promise as a source of bioactive compounds.

**Keywords:** A. sanguinolenta, Phytochemical Constituents, Traditional Uses, Medicinal Significance, Pharmacological Activities

**PT-10**

## IN-VITRO CYTOTOXICITY ASSAY OF AQUEOUS EXTRACT OF RAGS AND SEED COAT OF ARTOCARPUS HETEROPHYLLUS

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Artocarpus heterophyllus commonly known as jackfruit, is a plant with a long history of use in traditional medicine. Various parts of the plant, including the leaves, fruit, and seeds, are rich in bioactive compounds such as phenols, flavonoids, and tannins associated with a range of therapeutic properties, including antioxidant, anti-inflammatory and anticancer activity. This research will seek to determine the in vitro cytotoxic activity of an aqueous extract of Artocarpus heterophyllus against defined cancer cell lines. An aqueous extract was obtained from [define plant part, e.g., dried mature leaves] of Artocarpus heterophyllus through cold maceration method. The extract was subsequently screened for its cytotoxic activity against two human cancer cell lines, [ e.g., MCF-7 (breast cancer) and HepG2 (liver cancer)]. The cytotoxicity was assessed by the MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay, which assesses cell viability and metabolic activity. The water extract of Artocarpus heterophyllus showed dose- and time-dependent cytotoxicity towards both cell lines. The extract showed significant inhibitory activity against the HepG2 cell line with IC {50} values and against the MCF-7 cell line with IC {50} values following treatment for 48 hours. These findings suggest that the extract is more effective against liver cancer cells compared to breast cancer cells. This study indicates that aqueous extract of rags and seed coat of Artocarpus heterophyllus is extremely active in vitro against human cancer cell lines. The dose- and cell-line-dependent activities indicate its promise as a source of new anticancer compounds. The report validates the traditional application of Artocarpus heterophyllus and presents the groundwork for future in vivo investigations and possible therapy.

**Keywords:** Maceration, aqueous extract, cytotoxicity, anticancer.

**PT-11**

## BALANCE BITE: PLANT-BASED NUTRITIVE BAR FOR EFFECTIVE WEIGHT MANAGEMENT

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This study describes the development and evaluation of a plant-based nutritive diet bar for effective weight management. The balanced bite consists of cereals (oats, millets) and seeds mix (pumpkin, sunflower, chia, flax, watermelon and muskmelon) together with natural sweetener (50 g of organic jaggery + 7 g of honey). Phytochemical screening revealed carbohydrates, flavonoids, alkaloids, tannins, fatty acids, saponins, terpenoids, phenols and proteins as active constituents of a bioactive profile. Functional characterization revealed a relevant thermogenic activity (29 °C vs. 21 °C for glucose control) and antioxidant as well as anti-inflammatory activity confirmed by the inhibition of albumin denaturation. Anti-hyperlipidemic activity was confirmed in colorimetric cholesterol assay, showing 65% decrease in absorbance (0.40 > 0.14 AU) after 30 minutes. Physical characterization resulted in an average weight of bars of 18.61±0.117 mg and hardness of 8 kg/cm2 guaranteeing palatability and structural integrity. Taken together, these results suggest that Balance Bite is a physiologically active biological and nutrient-rich functional food able to induce safety, increase metabolic activity and promote lipid regulation which makes this food formulation a promising weight management dietary approach.

**Keywords:** Plant, Functional, Thermogenic, Lipid, Weight.

**PT-12**

## FORMULATION AND EVALUATION OF HERBAL HAIR GEL CONTAINING PSIDIUM GUAJAVA LEAF EXTRACT

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Hair care products perform a vital role in preserving scalp health, preventing hair fall, and enhancing the overall appearance of hair. However, the broad use of synthetic chemicals in commercial gels and serums often leads to adverse effects such as scalp itching, dryness, and permanent damage. Over the past few years there has been an expanding requirement for herbal formulations due to their safety, efficacy, and biocompatibility. Psidium guajava (guava) leaves, traditionally used in Ayurveda, contain abundant amounts of flavonoids, tannins, and antioxidants, making them a promising candidate for the formulation of a natural hair gel with therapeutic properties. In the current research, a novel herbal hair gel formulation was developed, including Psidium guajava leaf extract as a natural substitute for synthetic hair care products. The gel base was prepared using Carbopol 940 as a gelling agent, aloe vera gel as a soothing agent, glycerin as a humectant, and suitable excipients to optimize consistency and stability. Evaluation of the prepared formulation was based on physicochemical parameters, including appearance, color, pH, viscosity, spreadability, washability, and stability. The maximize gel showed a smooth texture, a translucent greenish appearance, a pH range of 6.2–6.4, a viscosity of 4800–5100 cps, a spreadability of 6.8 g·cm/sec, and good washability with no observed phase separation over 30-day stability testing. Evaluation of antimicrobial property indicated a notable inhibition area against Escherichia coli and Staphylococcus aureus, signalling capability in minimizing dandruff and overall scalp infections. The observations suggest that the formulated guava leaf–containing herbal hair gel is an effective, safe & stable natural formulation. Its antimicrobial, cosmetic, and therapeutic potential highlights its promise as an eco-friendly alternative to chemical-based hair care products.

**Keywords:** Psidium guajava, herbal hair gel, antimicrobial activity, scalp health, stability

**PT-13**

## PREPARATION AND EVALUATION OF A POLY HERBAL HAND WASH AND HERBAL SANITIZER

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The present study focused on the formulation and evaluation of polyherbal hand sanitizer and hand wash using plant-based extracts with proven antimicrobial properties. The herbal hand sanitizer was prepared by incorporating neem, peppermint, tulasi, aloe vera, lemon juice, turmeric, and essential oils in a hydroalcoholic base, with carbopol 940 as gelling agent and parabens as preservatives. Similarly, the herbal hand wash was formulated with neem, tulasi, aloe vera, rita powder, lemon, turmeric, and sodium lauryl sulfate, ensuring foaming, cleansing, and skin-conditioning effects. Both formulations were subjected to organoleptic, physicochemical, and microbiological evaluation. Parameters such as pH, viscosity, appearance, foam height, and retention were found within acceptable limits. Antibacterial activity was determined by the cup plate method against pathogens including Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, Salmonella typhi, and Aspergillus niger. Results demonstrated that the polyherbal hand sanitizer exhibited a wider zone of inhibition than the marketed herbal standard, particularly against S. aureus and E. coli, while the hand wash showed significant antimicrobial efficacy with stable foaming and no skin irritation. The enhanced activity is attributed to phytoconstituents such as alkaloids, saponins, flavonoids, tannins, and anthraquinones, which possess antibacterial, antifungal, antioxidant, and wound-healing properties. The findings confirm that polyherbal formulations containing neem (Azadirachta indica), tulsi (Ocimum sanctum), aloe (Aloe barbadensis), lemon (Citrus limon), eucalyptus oil (Eucalyptus globulus), and other herbal excipients offer effective antimicrobial protection and are promising alternatives to synthetic products.




ISBN: 978-81-980623-8-3

**Keywords:** Herbal hand sanitizer, Herbal hand wash, antimicrobial activity, Polyherbal formulation, Zone of inhibition

**PT-14**

## FORMULATION AND EVALUATION OF CITRUS SINENSIS PEEL & AZADIRACHTA INDICA INFUSED TOOTHPASTE

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In the present research, a herbal toothpaste formulation integrating Citrus sinensis (orange) peel powder and Azadirachta indica (neem) leaf extract was expand as a natural substitute for conventional dentifrices. The objective was to evaluate the antimicrobial potency and physicochemical properties of the formulation while utilizing orange peel as a value-added agro-waste. Neem extract, having azadirachtin and nimbin, was incorporated for its wide-range antibacterial and plaque-reducing properties, while orange peel served as a source of vitamin C, flavonoids, and organic acids providing to whitening and antioxidant effects. The formulation was prepared using natural abrasives (calcium carbonate, sodium bicarbonate) and excipients (glycerin, peppermint oil) to optimize spreadability, stability, and consistency. Physicochemical properties of the toothpaste were evaluated (pH, foaming capacity, spreadability, stability, and organoleptic attributes) and evaluation of antimicrobial activity against common oral pathogens. The findings suggest that the perfect formulation indicated effective antibacterial activity, Preferred sensory properties, and acceptable physicochemical characteristics, with neem extract enhancing microbial inhibition and orange peel giving whitening effect and freshness. Thus, The study determines that the developed formulation serves as a safe, bioinert, and eco-friendly variant to conventional toothpastes, establishing the potential of herbal bioactive and agro-waste in promoting eco-sustainable approaches to oral care.

**Keywords:** Herbal toothpaste, Azadirachta indica, Citrus sinensis, antimicrobial activity, oral hygiene.

**PT-15**

## DEVELOPMENT AND ANALYTICAL STANDARDIZATION OF A POLYHERBAL DRY SHAMPOO

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The development of herbal substitutes for conventional hair care products has been driven by the rising demand for natural and eco-friendly cosmetic formulations. In the present study, a polyherbal dry shampoo was formulated using Hibiscus (Hibiscus rosa-sinensis), Fenugreek (Trigonella foenum-graecum), Manjistha (Rubia cordifolia), Curry leaves (Murraya koenigii), Reetha (Sapindus mukorossi), and Shikakai (Acacia concinna). The formulation was designed to reduce dependency on synthetic surfactants while providing effective cleansing, oil absorption, scalp nourishment, and hair conditioning. Analytical standardization was performed using ultraviolet (UV) spectrophotometry, high-performance liquid chromatography (HPLC), and Fourier-transform infrared spectroscopy (FTIR) to ensure quality and reproducibility. UV spectrophotometry enabled preliminary phytochemical screening and quantitative estimation of bioactive constituents. HPLC was employed to establish a chemical fingerprint profile, ensuring batch-to-batch consistency and detecting key phytoconstituents such as saponins, flavonoids, alkaloids, and phenolic derivatives. FTIR analysis further confirmed the presence of functional groups associated with cleansing, antioxidant, and conditioning activities. Results demonstrated that the polyherbal dry shampoo exhibited favourable physicochemical characteristics, consistent phytochemical profiles, and compliance with essential quality standards. The combined use of HPLC, UV, and FTIR provided a comprehensive analytical framework for reliable standardization and enhanced reproducibility. This study highlights the potential of polyherbal dry shampoos as safe, effective, and sustainable alternatives to synthetic hair care products and supports the broader incorporation of herbal cosmetics into modern formulations. Analytical study was identified as crucial for ensuring product quality, safety, and consumer acceptance.

**Keywords:** Polyherbal dry shampoo, UV spectrophotometry, HPLC, FTIR, Standardization

**PT-16**

## QUALITATIVE AND QUANTITATIVE ESTIMATION OF A POLYHERBAL SYRUP FORMULATED FOR KAPHA–VATA SAMAKA ACTIVITY

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Herbal medicines are increasingly recognized for their therapeutic potential, affordability, and lower side effect profiles compared to synthetic drugs. Ajwain (Trachyspermum ammi) and garlic (Allium sativum) are two widely used medicinal plants that have long been utilized in traditional medical systems to treat infectious, respiratory, and gastrointestinal disorders. Because plant-based elements are complex, standardizing polyherbal formulations is still a significant issue despite their shown pharmacological benefits. In compliance with Indian Pharmacopoeia guidelines, this study intends to develop and analytically standardize a polyherbal syrup comprising extracts of garlic and ajwain using validated analytical techniques: UV-Visible spectroscopy, Fourier Transform Infrared Spectroscopy, and High-Performance Liquid Chromatography. Ajwain seeds and garlic bulb hydroalcoholic extracts were combined to create a syrup, which was then tested for important physicochemical and organoleptic characteristics such as pH, viscosity, and specific gravity. Utilizing UV-Vis spectrophotometry, the total phenolic and flavonoid contents were measured. HPLC made it possible to quantitatively estimate the bioactive markers—allicin and thymol from garlic and ajwain, respectively, while FTIR analysis found functional groups associated with important phytochemical classes. The syrup's stability and physicochemical characteristics were satisfactory. HPLC verified steady levels of important actives, FTIR spectra showed distinctive peaks for alcohols, alkenes, and phenolics, and UV-Vis findings verified a notable presence of antioxidant-rich compounds. The work develops a methodical and repeatable approach to standardize polyherbal mixtures analytically. It helps herbal syrups be included into evidence-based conventional healthcare and supports their scientific validation, quality control, and regulatory compliance.

**Keywords:** Garlic, Ajwain, UV-Visible spectroscopy, FTIR, HPLC

**PT-17**

## A COMPLEX HERBAL FORMULATION FOR OSTEOPOROSIS

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This research aimed to develop and evaluate a novel Ayurvedic kadha formulation incorporating Salvia miltiorrhiza (Danshen), a medicinal herb known for its antioxidant, anti-inflammatory, and circulatory benefits, with promising osteoprotective potential. Osteoporosis, a chronic metabolic bone disorder characterized by reduced bone mineral density and compromised bone microarchitecture, increases fracture risk and often requires long-term pharmacological interventions. However, these are associated with adverse effects, prompting the search for safer, natural alternatives. The study commenced with an extensive literature review to validate the selection of Salvia miltiorrhiza for its reported efficacy in enhancing bone metabolism. Supportive herbs were also incorporated to synergize the therapeutic effect. The roots of Salvia miltiorrhiza were extracted using a Soxhlet apparatus with a hydroalcoholic solvent system (ethanol: water), optimizing parameters like temperature and time to maximize phytoconstituent yield. Preliminary phytochemical screening confirmed the presence of key bioactive compounds such as flavonoids, phenolics, terpenoids, and alkaloids, all known for their bone-supporting and antioxidant properties. UV-Visible spectroscopy showed absorption peaks around 270–290 nm, indicating phenolic and flavonoid content. FTIR analysis further confirmed the presence of functional groups like hydroxyl (O–H), carbonyl (C=O), and ether (C–O–C), which contribute to therapeutic efficacy. The kadha formulation was developed by blending the extract with complementary Ayurvedic herbs, ensuring traditional relevance. It was standardized and evaluated for organoleptic characteristics, pH, viscosity, and specific gravity to ensure consistency and quality. Stability studies conducted under accelerated conditions (40°C ± 2°C, 75% RH ± 5%) over three months showed minimal changes in physicochemical




ISBN: 978-81-980623-8-3

properties, indicating good stability. In vitro antioxidant evaluation using the DPPH assay demonstrated significant free radical scavenging activity, supporting the formulation's protective role against oxidative stress-induced bone loss. Overall, the developed Salvia miltiorrhiza-based kadha shows strong potential as a safe and effective natural therapeutic agent for managing osteoporosis.

**Keywords:** Salvia miltiorrhiza, Osteoporosis, Herbal formulation, Kada, Tanshinone, Bone mineral density, Soxhlet extraction, Phytochemical screening, UV-Visible spectroscopy, FTIR analysis.

**PT-18**

## EXPLORING THE ANTIDIABETIC POTENTIAL OF PRUNUS CERASOIDES AND PYRACANTHA CRENULATA

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Diabetes mellitus is a prevalent metabolic disorder characterised by high blood sugar levels. Particularly, type 2 diabetes is characterized by insulin resistance. This study explores the antidiabetic potential of Prunus cerasoides leaves and Pyracantha crenulata fruits through in silico and in vitro approaches. The phytoconstituents identified in P. cerasoides leaves include Quercetin-3-rhamnoglucoside, kaempferol while P. crenulata fruits are rich in quercetin. Based on these bioactive compounds, a hypothesis was generated that these plant extracts may possess antidiabetic activity. In silico molecular docking studies were conducted to evaluate the interaction of these constituents with multiple target receptors implicated in type 2 diabetes, such as α-amylase, α-glucosidase, dipeptidyl peptidase-IV (DPP-IV),and peroxisome proliferator-activated receptor gamma (PPAR-γ). The docking analysis revealed strong binding affinities and stable interactions, suggesting their potential to modulate key pathways involved in glucose metabolism. In vitro enzyme inhibition assays using α-amylase and α-glucosidase models further supported these findings, demonstrating significant inhibition in a dose-dependent manner. The combined in silico and in vitro results indicate that P. cerasoides leaves and P. crenulata fruits may exert antidiabetic effects by targeting carbohydrate-digesting enzymes and insulin-related receptors. These findings provide a scientific rationale for the potential use of these plant extracts as natural therapeutic agents in the management of type 2 diabetes, warranting further pharmacological and clinical investigation.

**Keywords:** Type 2 diabetes mellitus, Prunus cerasoides, Pyracantha crenulata, quercetin, kaemperol

**PT-19**

## EVALUATION OF ANTICANCER ACTIVITY OF ABUTILON INDICUM BY HYDROALCHOLIC EXTRACT

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The problem of cancer has been one of the primary causes of death worldwide. The common treatment approaches like surgery, chemotherapy, radiotherapy and hormone therapy are commonly utilized and are very expensive, have serious side effects and fail to ensure that cancer recurrence will not occur. Due to such challenges, scientists are shifting their focus to the medicinal plants as safe, cheap and supportive options in cancer treatment. The anticancer effects of Abutilon indicum (also referred to as Indian mallow) which belongs to the Malvaceae family were examined in this study. A hydroalcoholic maceration was employed in the extraction of plant to extract it, after which the plant was dried and then extracted. Analysis of the extract was done to determine the chemical constituents of the extract. Phytochemical screening did determine the presence of flavonoids, alkaloids, glycosides, tannins, proteins, carbohydrates and saponins-compounds that are frequently associated with the inhibition of abnormal cell growth. The MTT test was used to investigate the anticancer property of the extract on EAC (Ehrlich Ascites Carcinoma) cell lines. The findings revealed that the hydroalcoholic extract exhibited a significant cytotoxic effect, and the IC50 was 274.6 -1 g / ml which is an indication that the extract was effective in killing cancerous cells. All in all, the results indicate that Abutilon indicum can have promising anticancer effects. Nevertheless, the future research, especially in animal models and at a molecular level, is required to corroborate its possible use in future cancer treatment.

**Keyword:** Abutilon indicum, Medicinal Plant, Abutilon indicum Anticancer activity, Ehrlich Ascites Carcinoma (EAC), MTT assay, Hydroalcoholic extract, IC -value, Cancer cell inhibition.

**PT-20**

## FORMULATE AND EVALUATE OINTMENT USING PLANT EXTRACT (LEONOTIS NEPTIFOLIA) TO FIND ANTIBACTERIAL ACTIVITY

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The study aims to identify active plant compounds in Leonotis neptifolia leaves, evaluate their antibacterial activity, formulate and test herbal ointment parameters, and compare it with standard cream. The plant material was collected from Mohadi and Tumsar farms and pulverized using a mechanical grinder. The leaves were dried and powdered using ethanol. The extraction process involved a Soxhlet apparatus, where fresh leaves. Were dried, pulverized, sieved, and filtered. The fine leaf powder was then extracted using a 640ml ethanol solution and filtered using filter paper. The extract was tested for its phytochemical properties, including its antibacterial activity against E.coli and P aeruginosa. The active component was used to create an ointment, with parameters such as pH, water washability, consistency, non-irritation, and skin spreadability.The formulation and evaluation of an antibacterial ointment from the leaf extract of Leonotis neptifolia was performed successfully. Ointment Preparation successfully, evaluation parameter are checked.

**Keywords:** Plant-based approach, Soxhlet apparatus, Phytochemical evaluation, Antibacterial Activity, Comparative study

**PT-21**

## STANDARDIZATION OF POLYHERBAL FORMULATION FOR PEPTIC ULCER

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This work provides a concise overview of peptic ulcers, highlighting pathophysiology, risk factors, epidemiology, treatment, and healthcare costs, while employing modern approaches such as network pharmacology and molecular docking to identify potential phytochemicals with promising antiulcer activity. Peptic ulcer is lesion on the lining of the stomach that develops when the mucosa of the gastrointestinal system reduces as a result of several contributing causes. We examined interactions between these active constituents and molecular targets associated to peptic ulcers using network pharmacology, developing a network model to clarify the relationship between them. A promising ingredient was chosen for preclinical research based on the study. Peptic ulcers are a prevalent gastrointestinal disorder, particularly in developing nations, associated with recurrent symptoms, complications, and diminished quality of life. Contributing factors include Helicobacter pylori infection, widespread NSAID use, and limited healthcare access. Standard therapies such as H2 receptor antagonists and proton pump inhibitors, though effective, have notable limitations, while synthetic drugs are often costly and associated with adverse effects compared to herbal alternatives. The ultimate goals of treating peptic ulcer disease are reducing pain, curing ulcers, and preventing recurrence. While various treatment options exist, there's a need for more effective and less costly alternatives, particularly in developing nations where the burden of this condition is higher.

**PT-22**

## PHYTOPHARMACEUTICALS IN ACNE CARE: HARNESSING PLANT POWER FOR TOPICAL THERAPY

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This study aimed to develop and assess a herbal face wash gel for acne management using natural ingredients with antimicrobial, anti-




ISBN: 978-81-980623-8-3

inflammatory, and skin-soothing properties. A combination of aqueous extracts from Neem, Tulsi, Aloe vera, and Turmeric, along with vitamin E as a preservative, was formulated into a gel base. The herbal extracts' antioxidant and anti-inflammatory potential supported their inclusion. Various batches were prepared and evaluated for physical parameters like color, consistency, pH, and spreadability. Batch F2 showed the most promising results in terms of appearance, texture, and stability. Compared to commercial synthetic products, the herbal gel demonstrated significant potential without adverse effects. This eco-friendly formulation offers a sustainable alternative for acne care, highlighting the therapeutic value of plant-based ingredients. The study successfully developed a safe and effective herbal anti-acne face wash gel, showcasing the benefits of natural ingredients. The formulation's key ingredients - Neem, Tulsi, Aloe vera, and Turmeric - work synergistically to provide antimicrobial, anti-inflammatory, and soothing benefits. This herbal face wash gel is a promising solution for acne management, offering a natural and sustainable option for skincare. With its desirable physical characteristics and stability, this formulation has the potential to become a popular choice for those seeking a chemical-free alternative for acne care. Overall, this study demonstrates the potential of herbal formulations in skincare and paves the way for further research in this area.

**Keywords:** Anti-acne, Herbal gel, Neem, Aloe vera.

**PT-23**

**THE PHARMACOGNOSTIC STUDY OF CLERODENDRUM CHINENSE LEAVES EXTRACT ALONG WITH ITS TABLET FORMULATION AND EVALUATION**

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The emergence of antimicrobial resistance has prompted renewed interest in bioactive compounds derived from natural sources. Plants from the genus have been traditionally documented for their therapeutic properties; however, plant Clerodendrum Chinese remains less explored. The present study was undertaken to investigate the Pharmacognostic study including antimicrobial potential and tablet of C. Chinese. Following authentication at the Botanical Survey of India, Pune, the leaves of the plant subjected to successive extraction using water, ethanol, chloroform, and petroleum ether. Preliminary phytochemical screening, chromatographic study and antimicrobial activity of the aqueous extract was conducted using varying concentrations and compared with a standard drug. The aqueous fraction exhibited notable inhibitory effects against selected microorganisms. To assess its applicability, tablets were formulated by using the aqueous extract, suitable excipients, and the prepared dosage form was evaluated for standard parameters. The findings, highlighted the antimicrobial potential of C. Chinese and support its possible development into various pharmaceutical formulations such as tablets, syrups, gels, or ointments, offering promising avenues for future research.

**Keywords:** Antimicrobial resistance, Clerodendrum Chinese, Tablet

**PT-24**

**In vitro Evaluation of Methanolic Extract of Tamarindus indica seeds for Nootropic and Antioxidant Activities.**

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According to traditional systems, Tamarindus indica, is a popular medicinal plant with a variety of pharmacological qualities. This study assesses the methanolic extract of Tamarindus indica seeds in vitro nootropic efficacy with an emphasis on how well it may improve cognitive function. Utilizing acetylcholinesterase (AChE) inhibition assays, which quantify the inhibition of AChE, an enzyme essential to cholinergic neurotransmission and cognitive function, the nootropic impact was evaluated. Bioactive substances such as flavonoids, phenolics, and alkaloids were detected by phytochemical screening of the methanolic extract and these chemical constituents may be responsible for the extract's neuropharmacological activities. Significant AChE inhibitory action was shown by the extract, indicating that it may improve cognition, especially in neurodegenerative diseases like Alzheimer's. Strong free radical scavenging and reducing capabilities were also demonstrated by the extract when its antioxidant capacity was assessed utilizing, 2-diphenyl-1-picrylhydrazyl (DPPH) and Hydrogen peroxide (H2O2) radical scavenging assays. Because oxidative stress is a major contributor to cognitive decline, these antioxidant qualities may mitigate it and promote neuroprotection. The results shown prominent natural nootropic and antioxidant properties for the methanolic extract of Tamarindus indica seeds. It is necessary to do additional in vivo research and clinical studies to confirm these results and investigate their potential therapeutic uses.

**PT-25**

**FORMULATION AND EVALUATION OF POLYHERBAL HYDROGEL TO TREAT PSORIASIS**

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This study aimed to develop and optimize polyherbal hydrogels containing curcumin and aloe extracts for the topical treatment of psoriasis. Psoriasis is a chronic inflammatory skin condition characterized by rapid skin cell proliferation, leading to erythematous and scaly plaques. Conventional treatments often cause side effects, motivating the search for safer, effective herbal formulations. Curcumin, derived from turmeric, possesses potent anti-inflammatory and antioxidant properties, while aloe vera exhibits skin-soothing, moisturizing, and wound-healing benefits. Combined, these agents offer synergistic effects beneficial for managing psoriasis symptoms. The hydroalcoholic extraction of curcumin and aloe was performed using Soxhlet extraction, followed by formulation into hydrogels using polymers such as Carbopol 934, hydroxypropyl methylcellulose (HPMC), and acacia. Various formulations with differing polymer ratios were prepared and evaluated for physicochemical properties including pH, viscosity, spreadability, and drug entrapment efficiency. Analytical techniques like FTIR confirmed chemical compatibility between extracts and polymers. In vitro drug release studies demonstrated sustained release profiles fitting Higuchi diffusion kinetics, with the optimized formulation achieving over 85% drug release within 24 hours. Texture analysis indicated favorable mechanical properties essential for topical application and adherence. Phytochemical screening revealed the presence of important bioactive constituents including flavonoids, tannins, and alkaloids supporting therapeutic efficacy. The formulation's stability, skin compatibility, and enhanced drug delivery suggest its potential as an effective, patient-friendly topical therapy for psoriasis. Future studies should focus on in vivo efficacy evaluations and clinical trials to validate therapeutic outcomes. Overall, this research underscores the promise of combining herbal actives within hydrogels to develop novel, safe, and effective dermatological treatments for chronic inflammatory skin disorders.

**Keywords:** Polyherbal Hydrogels, Psoriasis Treatment, Curcumin, Aloe Vera, Controlled Drug Delivery.

**PT-26**

**Facile One-Pot Green Chemistry Approach in Formulation of Alkyl Polyglucoside-Based Hibiscus Extract Herbal Shampoo**

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In the present study design, micellar extracts of Hibiscus rosa-sinensis L. obtained by Microwave-assisted extraction (MAE) and Ultrasounds-assisted extraction (UAE), using aqueous solutions of alkyl polyglucosides (APGs) following green chemistry. Phytochemical properties, such as , total phenolic and contents of extracts, were measured using spectrophotometric and chromatographic methods. Generally, the determined concentration of antioxidants was higher for extracts obtained by MAE than UAE. Hair shampoo with micellar hibiscus extract had strong foaming properties and superior compared to the base shampoo. APGs are non-ionic, biodegradable surfactants that are safe and mild to the skin. The obtained pH values of hibiscus-based formulations fell within the optimal range of 6.5-7.0, indicating compatibility with the scalp and skin. The viscosity value obtained was 2,500-4,000 cp at 25°C falling within the optimal range for easy




ISBN: 978-81-980623-8-3

application and effective cleansing. The foam stability for different shampoos were in the range of 2 to 4 minutes. The findings showed that the hibiscus-based shampoo formulated by one-pot green chemistry approach enhanced the softness, shine, and manageability of the hair, displaying positive physicochemical properties that fell within the typical range for herbal shampoos. Hibiscus extraction with microwave and ultrasound leads to reduction in extraction time and increase in yield by disintegrating plant tissues. This investigation supports the fusion of traditional knowledge with modern cosmetic development using green chemistry by highlighting hibiscus extract as a viable natural component in producing herbal shampoos, which are safe, environmentally friendly, and effective.

**Keywords:** Hibiscus Extract, Green Chemistry, Herbal Shampoo, Microwave-assisted extraction, Ultrasounds-assisted extraction.

**PT-27**

## EVALUATION OF ANTIOXIDANT AND ANTI-INFLAMMATORY STUDIES ON ETHANOLIC EXTRACT OF SIDA ACUTA

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Sida acuta (Malvaceae) generally called broomweed. In the present work, we studied antioxidant and anti- inflammatory activity of ethanolic extract of Sida acuta by integrating in vitro assays and phytochemical analysis. Ethanolic extract of Sida acuta was prepared by maceration method. GC- MS analysis was done to characterize the chemical factors. Antioxidant activity was evaluated by DPPH radical quenching assay using ascorbic acid as standard. Protein denaturation inhibition assay was performed to estimate anti- inflammatory activity of ethanolic extract of Sida acuta. Phytochemical screening revealed the presence of alkaloid, flavonoid, tannin, phenol, saponin, terpenoid, and glycoside. DPPH assay revealed strong antioxidant eventuality of ethanolic extract of Sida acuta. The IC50 value of DPPH assay was set up to be 65.42 µg/ ml. Protein denaturation assay displayed remarkable anti- inflammatory activity of ethanolic excerpt of Sida acuta. The IC50 value of protein denaturation inhibition assay was set up to be 75.42 µg/ ml which is nearly analogous to standard medicine diclofenac sodium (IC50= 73.71 µg/ ml). we conclude that Ethanolic extract of Sida acuta displayed strong antioxidant and anti- inflammatory activity. Different phytochemical composites were set up to be present in ethanolic extract of Sida acuta as characterized by GC- MS analysis. These phytochemicals might be responsible for antioxidant and anti- inflammatory extract of Sida acuta through synergistic goods. From our findings, it can be inferred that Sida acuta has implicit to be explored as a natural remedial agent against oxidative stress and seditious conditions.

**Keywords:** Sida acuta, DPPH assay, Protein denaturation assay, GC-MS analysis.

**PT-28**

## DEVELOPMENT AND CHARACTERIZATION OF HERBAL GUMMIES WITH JASMINUM GRANDIFLORUM AND PSIDIUM GUAJAVA

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Recurrent aphthous stomatitis, also known as mouth ulcers, are frequent and painful sores that impact numerous individuals. This study focused on formulation and evaluation of herbal gummies derived from Jasminum grandiflorum and Pisidium guajava for treating oral ulcers. The gummies were created using extracts from these plants, which have historically been utilized to address different issues, such as mouth ulcers. The extracts were examined for their phytochemical test and antimicrobial properties against Gram-positive and Gram-negative bacteria. The findings demonstrated notable antimicrobial effects, presumably because of the presence of bioactive substances like flavonoids, saponins, glycosides, terpenoids, and phenolic compounds. Gummies were formulated using gelatine, sugar, glucose syrup and were assessed based on several factors, such as clarity, shape, stickiness, grittiness, pH level, thickness, average weight, and dispersion time. The findings showed acceptable results for every assessed parameter. The finding indicate that the formulated herbal gummies could serve as an effective natural solution for oral ulcers, presenting a hopeful substitute for traditional therapies. The gummies might assist in reducing pain, encouraging healing, and stopping the reappearance of mouth ulcers. In summary, this study emphasizes the promise of herbal gummies as an innovative and efficient therapy for oral ulcers, offering a fresh approach to addressing this widespread and distressing issue.

**Keywords:** Mouth Ulcers, Herbal Gummies, Jasminum grandiflorum, Pisidium guajava

**PT-29**

## TARGETING INFLAMMATION AND METABOLIC DYSREGULATION: NETWORK PHARMACOLOGY-BASED MOLECULAR DOCKING INSIGHTS INTO HERBAL MEDICINE

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The complex pathogenesis of metabolic and autoimmune disorders such as diabetes, obesity, and rheumatoid arthritis is driven by dysregulation in key genes including INS, AKT1, TNF, IL-6, EGFR, GADPH, SRC, and BCL2. This study employs a network pharmacology approach to unravel gene-disease associations and prioritize plant-based therapeutic candidates. Key molecular insights reveal that AKT1 contributes to lipid accumulation, TNF impairs metabolism and leptin regulation, INS affects insulin production and sensitivity, and GADPH induces diabetic complications. Additionally, IL-6 mediates inflammatory joint damage in rheumatoid arthritis, while EGFR is implicated in abnormal immune responses. Based on their multi-target potential, a list of medicinal plants was ranked for therapeutic relevance, with Eucalyptus globulus, Moringa oleifera, and Salvia officinalis emerging as top candidates. These plants harbour bioactive compounds capable of modulating the identified gene targets, supporting their use in integrative disease management. This study highlights the utility of network pharmacology in bridging genomic insights with phytotherapeutics, offering a promising direction for the development of multi-target herbal interventions for chronic diseases.

**Keywords:** Network pharmacology, INS, AKT1, TNF, IL-6, Medicinal plants, multi-target therapy, Herbal intervention

**PT-30**

## ISOLATION AND POTENTIAL USE OF HIBISCUS ROSA-SINENSIS GUM AS A SUSPENDING AGENT

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Hibiscus rosa-sinensis gum, a natural polysaccharide, was isolated and evaluated as a suspending agent in pharmaceutical formulations. The gum was extracted from the leaves of Hibiscus rosa-sinensis and characterized for its physicochemical properties. The suspending properties of the gum were assessed using zinc oxide suspensions, and its performance was compared with that of traditional suspending agents like acacia and tragacanth. The gum was isolated through aqueous extraction, and its viscosity, solubility, and pH were determined. Zinc oxide suspensions were prepared using different concentrations of the gum, and their sedimentation volume, redispersibility, and rheological properties were evaluated. The results showed that Hibiscus rosa-sinensis gum exhibited good suspending properties, comparable to those of acacia and tragacanth. The gum's viscosity and concentration significantly affected the stability of the suspensions. This study suggests that Hibiscus rosa-sinensis gum has potential as a natural, safe, and effective suspending agent in pharmaceutical formulations, offering a promising alternative to synthetic excipients. Further studies are needed to explore its applications in various pharmaceutical products.

**Keywords:** Hibiscus rosa-sinensis gum, Zinc oxide suspensions, Natural suspending agents




ISBN: 978-81-980623-8-3

**PT-31**

## ANTIOXIDANT STUDY OF ETHANILIC EXTRACT OF CALOTROPIS GIGANTEA LEAVES

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The present study evaluates the antioxidant potential and phytochemical profile of the ethanolic leaf extract of Calotropis gigantea, a medicinal plant widely recognized for its traditional therapeutic uses. Qualitative phytochemical screening revealed the presence of alkaloids, flavonoids, tannins, saponins, steroids, terpenoids, and phenols—compounds noted for their pharmacological activities and health benefits. Antioxidant activity was assessed using in vitro hydrogen peroxide and DPPH radical scavenging assays. The extract demonstrated notable free radical scavenging effectiveness, with $IC_{50}$ values of 34.96 µg/ml for hydrogen peroxide and 39.45 µg/ml for DPPH, showing strong concentration-dependent activity despite being slightly less potent than ascorbic acid (22.59 µg/ml and 20.12 µg/ml, respectively). The findings confirm that Calotropis gigantea leaves are a rich source of natural antioxidants, which may contribute to mitigating oxidative stress and supporting overall health. These results validate the traditional use of the plant and provide scientific evidence for its therapeutic potential, highlighting its value as a basis for further development of natural antioxidant agents.

**Keywords:** Calotropis gigantea, Phytochemical screening, Antioxidant activity, Hydrogen peroxide assay, DPPH assay

**PT-32**

## SPECTROSCOPIC CHARACTERIZATION AND ANTICANCER POTENTIAL OF PHYTOCHEMICALS FROM METHANOLIC ROOT EXTRACT OF ACHYRANTHES ASPERA

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The Methanolic root extract of Achyranthes aspera was throughly characterized by spectroscopy and its, anticancer potential was evaluated. Phytochemical screening identifyied a wid range of bioactive compounds including as alkaloids, flavanoids, tannins, saponins, and phenolic. Two thorough chromatography [HPLC], revealed several unique phytoconstituents peaks, suggesting a complex chemical composition. Using spectroscopic techniques such as fourier- transform infrared spectroscopy [FTIR], the structural properties of the isolated molecules were further elucidated. These techniques detected compounds like caffeic acid, ferulic acid, and derivatived of quercetin. Elements analysis was used to identify key macro-micro elements that are essential to the efficacy of treatment. Given its high phenolic and flavanoid content, the extracts potent antioxidant activity implied that it would be able to scavenge free radicals. The anticancer potential was assessed using cytotoxicity tests on a number of cancer cell lines. The methanolic root extract superiors ability to supress cancer cell proliferation and induce apoptosis validated its antiproliferative properties. These effects could be caused by thr identified phytochemicals synergistic activity. All things considered, the study shows that achyranthes asperas methanolic root extract, enhancedwith a variety of phytochemicals identified by spectroscopy, has encouraging anticancer potential. The results highlight the importance of traditional medicinal herbs in drug discovery and encourage more research into this plant's potential for use as a natural anticancer agent. The ethnomedical use of Achyranthes aspera roots is scientifically validated by this study, which also lays the groundwork for upcoming pharmacological and clinical research aimed at maximizing its therapeutic advantages.

**Keywords:** Achyranthes aspera, methanolic root extract, phytochemical characterization, spectroscopic analysis, antioxidant activity, anticancer potential/cytotoxicity.

**PT-33**

## FORMULATION AND EVALUATION OF HERBAL LIPSTICKS

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This research focuses on the formulation and evaluation of herbal lipsticks utilizing natural colorants from Betavulgaris (beetroot) and Mirabilisjalapa (Four O'clock flower). Conventional lipsticks often contain synthetic dyes and chemicals that can be detrimental to health. We aim to develop a safer, natural alternative by harnessing the vibrant pigments present in these readily available plant sources. The project involved systematically extracting pigments from Beta vulgaris (beetroot) and Mirabilis jalapa using optimized methods to ensure maximum yield and color intensity. Various lipstick bases were explored, by incorporating natural waxes, oils, to achieve desirable texture, spreadability, and stability. Six formulations were optimised in a period of one month with varying concentrations of the natural colorants to achieve a different range of shades, all formulations were optimized producing unique shades of color based on concentration of pigment and variation in base composition. The prepared herbal lipsticks underwent a comprehensive evaluation, showing the range of pH between 4.2-5.1, melting point ranges between 42℃ -51℃, breaking point limits between 4-8gms with no skin irritation and surface anomalies, with acceptable sensory evaluation (e.g., appearance, odor, spreadability) to assess their quality and consumer acceptability. The research evidences all the evaluation parameters are within the limitations. This research highlights the potential of natural plant-based colorants as a sustainable and healthier alternative in cosmetic formulations, paving the way for the development of innovative and safe herbal lip care products.

**Keywords**: Herbal lipsticks, Natural colorants, Beta vulgaris, Mirabilis jalapa.

**PT-34**

## FORMULATION OF A HERBAL GEL CONTAINING CUSTARD APPLE LEAF EXTRACT FOR THE TREATMENT OF ORAL CANCER

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Oral squamous cell carcinoma (OSCC) is a significant global health challenge characterized by high morbidity and limited therapeutic options. This study aimed to develop a novel herbal nano gel using Annona squamosa (custard apple) leaf extract to enhance therapeutic efficacy and minimize adverse effects. Ethanolic extract of A. squamosa leaves was prepared, and its phytochemical composition was confirmed via GC-MS analysis, identifying bioactive compounds with potential anticancer properties. In silico molecular docking revealed strong binding affinities of the phytoconstituents to key oncogenic proteins. The oral nano gel formulation was optimized using a Box-Behnken design, with the optimized batch (F4) exhibiting a particle size of 282.0 nm, zeta potential of –24.3 mV, viscosity of 185.6 cPs (12 rpm), and spreadability of 23.6 g·cm/s. In vitro MTT assay on KB oral cancer cell lines demonstrated $IC_{50}$ values of 78.41 µg/mL for the crude extract and 118.01 µg/mL for the nano gel, indicating potent cytotoxicity. In vivo studies on 4NQO+ arecoline-induced oral cancer models showed significant improvements in haematological parameters, antioxidant markers and histopathological recovery with near-normal epithelial architecture. The formulation exhibited no mucosal irritation or acute toxicity at 2000 mg/kg dose and maintained stability for 30 days under ICH guidelines which confirmed the formulation robustness. These findings suggest that Custard apple leaf-based nano gel is a promising, safe, and effective alternative for OSCC management.

**PT-35**

## AYURVEDIC BHASMA PARIKSHA REVISITED: CORRELATING TRADITIONAL PARAMETERS WITH PHYSICOCHEMICAL AND SPECTROSCOPIC DATA OF YASHADA BHASMA

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significance, standardisation and quality assessment of commercial products remain challenging. This study compares two Yashada Bhasma products from Dhootpapeshwar and Bharadwaj Pharmaceuticals,




ISBN: 978-81-980623-8-3

combining traditional Ayurvedic methods with modern analysis. Classical tests like Varitaratva, Rekhapurnata, Nirdhuma, and Apunarbhava assessed traditional quality standards. Additionally, physicochemical tests (loss on drying, ash values, pH) and advanced techniques such as SEM, FTIR, AAS, Zeta Potential, and DLS were used. Results showed that both samples met basic Ayurvedic criteria, but the Bharadwaj formulation demonstrated better compliance- finer particles (100–300 nm), greater stability (Zeta Potential: –34.5 mV), clearer ZnO FTIR spectra, and fewer impurities in ash analysis. This research confirms traditional tests with modern science and emphasises the need for integrated quality control. It highlights the value of combining disciplines to improve the credibility, safety, and global acceptance of Ayurvedic metallic formulations.

**Keywords:** Yashada Bhasma, Zinc Calx, Ayurveda.

**PT-36**

## FORMULATION OF SAPTARANGI PLUS GEL BY DOE APPROACH AND ITS EVALUATION FOR QUALITY

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About 80% of the total world population now has been using Herbal medicines in the primary healthcare system, this increase in the popularity is mainly due to its less or no adverse effects which is generally considered as safe. The two of the most leading skin disorders are Psoriasis and Eczema which affects almost 8 to 25% of the global population ranging from age mostly 15 - 35. Many Conventional medicines are available in the market to treat these disorders but, most of them inhibit some or the other side effects that is why, herbal medicines are now in trend which shows less side effects and gives a promising result. The drug delivery system which is the most suitable for these types of disorders are topical gels, creams, lotions etc. Therefore, in this present study an herbal hydrogel was developed using three plant extracts such as Salacia Chinensis, Tinospora Cordifolia and Curcuma Longa. Raw material analysis was performed on these extracts by TLC plate technique for the qualitative analysis and Rf values were observed to be 0.2 for TC and 0.68 for CL. Solubility and organoleptic properties were also checked in this present study. Pre-formulation study was carried out by screening of Carbopol 940 was performed to fix the concentration to be added to prepare a hydrogel and preservatives were selected on the basis on their ability to restrict the microbial growth in various batches. 2% Carbopol 940 and methyl paraben were selected for the formulation of gel. The effect of factors (A): SC, (B): TC and (C): CL concentration on the viscosity was studied by BBD; Box Behnken Design using design expert software version 7. Seventeen Experimental runs were generated by the software and viscosities for each batch were observed as responses. Along with that Texture analysis and pH were also carried out. The range of Viscosity was found to be 118000 cps to 191000 cps, pH was recorded between 5.9 to 6.1 and Texture analysis results were observed to lie in the range of 54.5 to 68.3. Through the optimization and analysis of the data obtained from DoE, batch 13 was finalized. Process validation of initial three batches viz SPG 001, SPG 002 and SPG 003 was carried out. Based on comparative results, SPG 002 was considered to be taken forward for DPPH assay and HPTLC analysis. At 900 ppm, Ascorbic acid showed an antioxidant activity of 87.42, SC, TC and CL of 84.6, 89.66 and 82.78 respectively. The antioxidant activity of hydrogel was calculated to be 59.79 with a synergistic activity of 1.18 which confirmed that developed formulation exhibits an antioxidant property.

**Keywords:** Herbal medicines, Saptarangi Plus gel, Psoriasis, Eczema, Salacia Chinensis, Tinospora Cordifolia, Curcuma Longa, DoE, Box Behnken Design, DPPH, HPTLC

**PT-37**

## INFLUENCE OF NONI FRUIT JUICE ON THE HYPOGLYCEMIC EFFECT OF SULFONYL UREAS

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The present study investigated the influence of Noni Fruit Juice (NFJ; 2 ml/kg bw. po.) on the hypoglycemic effect of glibenclamide (0.45 mg/kg bw. po.) in streptozotocin-induced diabetic rats. Blood glucose concentrations were measured at 0, 1, 2, 3, 4, 6, 8, 10, 12, and 16 h following drug administration using the glucose oxidase-peroxidase (GOD-POD) method. Glibenclamide alone demonstrated a maximum reduction in blood glucose at the 4th hour, whereas NFJ produced its peak hypoglycemic effect (31% reduction) at the 6th hour. NFJ alone produced a significant reduction in blood glucose levels, which may be attributed to improved insulin sensitivity and inhibition of hepatic glucose output. There is 44% and 46% in reduction of blood glucose during 6 h in single & multiple dose treatment of glibenclamide & NFJ respectively, suggesting either an additive pharmacodynamic interaction or a pharmacokinetic interaction via competitive inhibition of glibenclamide metabolism by CYP2C9 and CYP3A4. These findings suggest that NFJ potentiates the hypoglycemic activity of glibenclamide and highlight the need for caution in concurrent use of herbal formulations with antidiabetic agents.

**Keywords:** Streptozotocin, Hypoglycemia, Glibenclamide, Glipizide, Noni Fruit Juice

PT-38

## PHYTOCHEMICAL SCREENING: IN-VITRO ANTIOXIDANT AND IN-VIVO ANTI-OBESITY ACTIVITY OF VACCINIUM MACROCARPON (CRANBERRY)

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This study was aimed at evaluating the phytochemical profile, in-vitro antioxidant potential, and in-vivo anti-obesity activity of Vaccinium macrocarpon (cranberry), a fruit known for its rich bioactive compounds and therapeutic properties. In this research the preliminary phytochemical screening of ethanolic and aqueous extracts of Vaccinium macrocarpon was carried out to identify the presence of secondary metabolites such as flavonoids, tannins, phenols, alkaloids, glycosides, and saponins. Total phenolic content (TPC) and total flavonoid content (TFC) were quantified using spectrophotometric methods. In-vitro antioxidant assays, including DPPH radical scavenging activity, hydrogen peroxide scavenging, and ferric reducing antioxidant power (FRAP), were performed to assess free radical neutralizing potential. For in-vivo evaluation, an anti-obesity study was conducted on high-fat diet (HFD) induced obese Wistar rats. The animals were divided into groups and administered varying doses of V. macrocarpon extract for 6 weeks. Body weight, body mass index (BMI), lipid profile, and biochemical markers were monitored, along with histopathological evaluation of adipose tissue. In the in-vivo model, administration of Vaccinium macrocarpon extract led to a significant reduction in body weight gain, BMI, total cholesterol, triglycerides, and low-density lipoprotein (LDL), while increasing high-density lipoprotein (HDL) levels compared to the HFD control group. The findings demonstrate that Vaccinium macrocarpon possesses potent antioxidant activity and exhibits promising anti-obesity effects, likely mediated through its rich phytoconstituents. These results support its potential role as a natural therapeutic agent in managing oxidative stress and obesity.

Keywords: Vaccinium macrocarpon, phytochemical screening, antioxidant, anti-obesity, flavonoids, phenolic compounds

**PT-39**

## DUAL THERAPEUTIC POTENTIAL OF TYLOPHORA INDICA MERR: UNVEILING ITS PHYTOCHEMISTRY, IN-VITRO ANTIOXIDANT AND IN-VIVO ANTI-UROLITHIATIC PROPERTIES IN PRECLINICAL MODELS

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Tylophora indica, an Ayurvedic climber, known for its medicinal properties such as diuretic and antioxidant. However, there isn't much thorough data on its combined antiurolithic and antioxidant properties. The purpose of this work was to evaluate T. indica leaf extracts' phytochemistry, in-vitro antioxidant performance, and in-vivo




ISBN: 978-81-980623-8-3

antiurolithic potential using preclinical models. Leaves were collected, authenticated, and hydroalcoholically extracted with a Soxhlet apparatus. Phytochemical screening confirmed the presence of alkaloids, flavonoids, tannins, and glycosides. Antioxidant potential was assessed using DPPH and nitric oxide scavenging assays, yielding IC50 values of 266.06 µg/mL and 188.30 µg/mL, respectively. For in-vivo evaluation, an ethylene glycol-induced urolithiasis rat model was used, where the extract's 200 mg/kg and 400 mg/kg preventive and curative regimens were contrasted with an established medication (Cystone). The phytochemical-evaluation showed the presence of bioactive components. Significant free radical scavenging activity was shown with IC50 values of 188.30 µg/mL (nitric oxide) and 266.06 µg/mL (DPPH). In vivo, the 400 mg/kg dosage improved magnesium levels (2.0 ± 0.16 mg/dL) while significantly lowering urinary phosphorus levels (10.7 ± 0.49 mg/dL), calcium levels (8.3 ± 0.65 mg/dL), and oxalate levels (2.54 ± 2.07 mg/dL). Reduced calcium oxalate deposition and tube damage were verified by histopathological investigation in treated groups, especially with the curative 400 mg/kg dosage. T. indica's phytochemical richness probably contributes to its strong antiurolithic and antioxidant qualities.

**Keywords:** Tylophora indica, Antioxidant, Urolithiasis, Phytochemistry, Ethylene Glycol, Animal Model Study

**PT-40**

## EVALUATION OF IN VITRO ANTI-INFLAMMATORY AND ANTI-OXIDANT ACTIVITIES OF ETHANOLIC EXTRACT OF HIBISCUS CANNABINUS ROOTS

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The current study evaluated the antioxidant and anti-inflammatory properties of ethanolic extracts derived specifically from the roots of Hibiscus cannabinus (kenaf), underscoring their potential as natural alternatives to conventional synthetic agents. Antioxidant activity was determined via the DPPH radical-scavenging assay using ascorbic acid as a standard. The root extract exhibited a clear dose-dependent free-radical scavenging effect; at higher concentrations (0.8–1.0 µg/mL), its activity was found to be comparable to or slightly surpass that of ascorbic acid. Anti-inflammatory potential was assessed using the BSA assay, with aspirin serving as the reference agent. The extract again demonstrated a concentration-dependent response, and at 50 µg/mL, it nearly matched the anti-inflammatory efficacy of aspirin-suggesting robust bioactivity. These effects are likely attributed to the phytochemical constituents present in the roots, including phenolics, flavonoids, tannins, and saponins, all known to modulate antioxidant and anti-inflammatory pathways. Notably, the extract's efficacy exhibited only marginal differences when compared with standard drugs, highlighting its promise as a competitive natural alternative with potentially fewer adverse effects. Given these encouraging results, H. cannabinus root extract emerges as a promising source of bioactive for applications across pharmaceuticals, nutraceuticals, food preservation, and cosmetics. To advance its potential further, additional phytochemical characterization, mechanistic elucidation, and in vivo evaluations are strongly recommended.

**Keywords**: Hibiscus cannabinus roots, antioxidant, anti-inflammatory, DPPH assay, BSA assay, phenolics, flavonoids, saponins.

**PT-41**

## FINGERPRINTING PROFILING OF POLYHERBAL FORMULATIONS

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Medicinal plants contain various phytochemical constituents, widely used in the development of therapeutic formulations. For the development of drugs that provide beneficial effects for various diseases, the correct identification and selection of herbal components are crucial as every herb has unique phytochemical constituents. High-Performance Thin-Layer Chromatography (HPTLC) and Thin-Layer Chromatography (TLC) are reliable analytical techniques for standardisation and quality evaluation of herbal drugs. In this study, fingerprinting profiling of the hydroalcoholic extract of Liquorice and Cinnamon was carried out to confirm the standardisation. Hydroalcoholic extracts of Liquorice and Cinnamon were analysed using TLC and HPTLC techniques. TLC was performed on pre-coated silica gel plates with ethyl acetate: chloroform (7:5) as the mobile phase. Rf values were determined for glycyrrhizic acid, cinnamaldehyde, and the polyherbal formulation, confirming marker compounds. Furthermore, HPTLC analysis was performed, where bands were applied with a precision applicator, developed in a chamber after a 30-minute saturation period, and scanned at 254 nm under UV detection. TLC analysis showed distinct Rf values: 0.29 for glycyrrhizic acid, 0.35 for cinnamaldehyde, and 0.27 and 0.32 for the polyherbal formulation, confirming marker compounds. HPTLC analysis further validated the reproducibility and reliability of the developed method for quality control.Fingerprinting profiling by TLC and HPTLC confirms active phytoconstituents and ensures standardisation of polyherbal formulations. The studied herbs, Liquorice and Cinnamon, possess significant therapeutic potential, including anti-inflammatory and antimicrobial activity. This study confirms the need to improve techniques to achieve faster, cost-effective detection of active constituents in polyherbal formulations.

**Keywords:** HPTLC, Liquorice, Glycyrrhizic, anti-inflammatory, anti-microbial.

**PT-42**

## IN VITRO ANTIMICROBIAL ACTIVITY OF TULSI (OCIMUM SANCTUM) AGAINST BACTERIAL STRAINS ISOLATED FROM TOMATO (SOLANUM LYCOPERSICUM)

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Plants have long been recognized as valuable sources of bioactive compounds with significant antibacterial potential and have traditionally been used in the treatment of various diseases worldwide. Tulsi (Ocimum sanctum), widely cultivated in India for medicinal and religious purposes, is regarded as the "Queen of Herbs" due to its diverse pharmacological properties, including antioxidative, antimicrobial, antistress, antidiabetic, and antiviral activities. It is among the most important aromatic herbs utilized in the pharmaceutical industry, primarily in the form of extracts and oils. Tulsi leaf extracts exhibit strong inhibitory effects against a wide range of spoilage and pathogenic microorganisms such as Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli, Klebsiella pneumoniae, Proteus mirabilis, Salmonella typhimurium, Salmonella typhi, Shigella dysenteriae, Bacillus pumilus, Bacillus cereus, Aspergillus spp., Candida albicans, and Penicillium spp. Notably, the antibacterial efficacy of O. sanctum extracts against Bacillus cereus, a Gram-positive rod-shaped bacterium associated with tomato (Solanum lycopersicum), has been well documented. These findings emphasize Tulsi as a potent natural antibacterial agent with promising applications in the development of vegetable cleansers to reduce microbial contamination.

**Keywords:** Ocimum sanctum (Tulsi), Medicinal plants, Antibacterial activity, Plant extracts and essential oils, Foodborne pathogens, Bacillus cereus, Natural antimicrobial agents, Vegetable cleansers.

**PT-43**

## EXPEDITED AUTHORIZATION OF VACCINES IN PUBLIC HEALTH EMERGENCIES: INSIGHTS FROM U.S., EU, AND JAPAN

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The COVID-19 pandemic underscored the need for regulatory systems capable of rapidly authorizing vaccines while upholding safety, efficacy, and quality standards. This review critically examines three expedited pathways - the United States' Emergency Use Authorization (EUA), the




ISBN: 978-81-980623-8-3

European Union's Conditional Marketing Authorization (CMA), and Japan's Special Approval for Emergency (SAFE). A descriptive qualitative approach was adopted, drawing on official regulatory documents, peer-reviewed literature, and international health agency reports published between 2019 and 2025. Comparative analysis focused on legal frameworks, procedural timelines, eligibility criteria, and post-authorization obligations, with case studies of Comirnaty, Spikevax, and Novavax used to illustrate real-world implementation. Results show that the U.S. EUA enabled rapid approvals based on interim data with robust post-marketing safety surveillance; the EU's CMA reduced review timelines from 210 to under 150 days while mandating annual reassessments and eventual transition to full approval; and Japan's SAFE pathway facilitated approvals in as little as 58 days through reliance on foreign clinical trial data and stringent post-approval monitoring. Despite these achievements, challenges such as incomplete datasets, evolving risk-benefit profiles, and reliance on external regulatory decisions were evident. The findings demonstrate that expedited approval mechanisms can accelerate vaccine deployment without undermining regulatory rigor, provided they are supported by transparency, scientific robustness, and ongoing pharmacovigilance. For Asia-Pacific nations with constrained regulatory capacity, reliance-based strategies, digital modernization, and collaborative platforms such as the WHO Collaborative Registration Procedure and ASEAN Joint Assessments represent vital opportunities to strengthen preparedness and ensure equitable access during future health emergencies.

**Keywords:** Emergency Use Authorization (EUA), Conditional Marketing Authorization (CMA), Special Approval for Emergency (SAFE), COVID-19 Vaccines, Expedited Regulatory Pathways.

**PT-44**

## FROM DESERT PLANT TO HORMONE BALANCE: ANASTATICA'S VAGINAL CYTOLOGY STORY

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Vaginal cytology serves as a pivotal tool in understanding the physiological changes occurring in the female reproductive tract, particularly during post-menopausal stages. In this study, we delve into the intricate dynamics of post-menopausal symptoms through a comprehensive vaginal cytology examination using female Wistar rat model. After treating with Anastatica hierochuntica extract entrapped pellets, the research focuses on the activity of the Anastatica hierochuntica extract pellets and utility of vaginal cytology in elucidating post-menopausal symptomatology and an analysis of vaginal cytological samples collected from the animal models exhibiting post-menopausal symptoms. Through systematic observation and classification of cellular morphology and patterns, the characteristic changes indicative of hormonal fluctuations and reproductive tract alterations associated with menopause were studied. The findings offer valuable insights into the utility of vaginal cytology as a non-invasive diagnostic tool for assessing post-menopausal symptoms in animal models. Furthermore, the elucidation of cellular changes provides a foundation for understanding the underlying mechanisms contributing to symptom manifestation, thus facilitating the development of targeted therapeutic interventions. In summary, this research underscores the significance of vaginal cytology in enhancing the understanding of post-menopausal symptomatology and highlights its potential as a valuable research tool for investigating reproductive health in animal models.

**Keywords:** Menopause, Anastatica hierochuntica, Pellets, Vaginal Cytology, Hormonal Replacement Therapy

**PT-45**

## DEVELOPMENT OF HPTLC FINGERPRINTS FOR CYMBOPOGON CITRATUS, OCIMUM SANCTUM, AND ASPARAGUS RACEMOSUS FOR IDENTIFICATION OF PRODUCT SAFETY

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In the current study, High-Performance Thin-Layer Chromatography (HPTLC) fingerprints were developed for the identification and product safety of Cymbopogon citratus, Ocimum sanctum, and Asparagus racemosus. The isolation and identification of phytochemicals in these plant extracts was accomplished by the optimization and validation of the HPTLC method. The fingerprints that have been created can be used to standardize extracts and identify particular components. HPTLC analysis of each extracts of Cymbopogon citratus, Ocimum sanctum and Asparagus racemosus were conducted using mobile phases like Toluene: Ethyl acetate (9.3: 0.7 v/v), Toluene: Ethyl acetate: Acetic acid (4.5:5.5:0.5 v/v/v) and Ethyl acetate: Methanol: Water (7.5: 1.5: 1 v/v/v) respectively and Rf values of biomarkers were found to be 0.42(citral), 0.78(ursolic acid) and 0.45(Shatavarin IV). The results demonstrate the potential of HPTLC fingerprinting for ensuring product safety and efficacy in the pharmaceutical and herbal industries. The fingerprints can also serve as a reference for future studies and quality control purposes. The developed method is simple, rapid, and cost-effective, making it suitable for routine analysis. This study highlights the importance of HPTLC fingerprinting and method development for above plant materials in ensuring the quality and authenticity of herbal products.

**Keywords:** HPTLC fingerprinting, Cymbopogon citratus, Ocimum sanctum, Asparagus racemosus, phytochemicals.

**PT-46**

## CRACKING THE WITHANOLIDE CODE: A COMPARATIVE STUDY OF POLYHERBAL FORMULATIONS

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In recent years, remarkable advancements have been made in natural and Ayurvedic drug delivery systems, with the goal of enhancing the bioavailability and therapeutic potency of herbal formulations. The need for robust standardization techniques is paramount to ensure the safety, efficacy, and quality of herbal medicines. The polyherbal formulation Ashwagandhadi churna have been used in traditional medicine for centuries. It contains Withania somnifera, Piper longum, Ipomoea digitata, Piper nigrum and Zingiber officinale, which offer immunomodulatory activity with therapeutic benefits in treating general debility, stress-related disorders, digestive weakness, respiratory ailments, musculoskeletal pain and reproductive and overall health issues. This study presents a comparative analysis of a laboratory-prepared formulation of Ashwagandhadi churna and a commercially available counterpart, with a focus on the presence and quantification of withanolide as a key marker compound. The results indicated a difference in withanolide content between the lab formulation and the marketed product, highlighting variability in the quality and efficacy of herbal formulations. The findings suggest that laboratory formulations can provide more consistent and higher levels of active constituents compared to some commercial products. This research underscores the importance of standardization and quality control in herbal preparations to ensure therapeutic effectiveness.

**Keywords**: Withanolide, Ashwagandhadi, immunomodulatory, polyherbal.

**PT-47**

## ANTIBACTERIAL AND ANTHELMINTIC ACTIVITIES OF POLYHERBAL SUSPENSION

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In the current research, polyherbal formulation of Eleusine coracana, Macrotyloma uniflorum, Phoenix dactylifera, and Prunus dulcis was formulated. The objective behind the research was to evaluate the Anti-bacterial and Anthelmintic activities of a polyherbal suspension. Prepared from seed extracts of Eleusine coracana, Macrotyloma uniflorum, Phoenix dactylifera by Soxhlet apparatus using ethanol and Prunus dulcis by maceration process using distilled water. The extracts were subjected to phytochemical screening revealed the presence of alkaloids, flavonoids, tannins, glycosides, phenols, and terpenoids. Two




ISBN: 978-81-980623-8-3

suspensions (F1 and F2) were formulated and further evaluated for Anti-bacterial and Anthelmintic activity using Agar diffusion method and Adult Worm Mortality Assay. Four different concentrations (25ul, 50ul, 75ul, 100ul) of formulations F1 and F2 were tested and obtained zone of inhibition diameters (F1= 0,0,0,2mm and F2=0,0,1,2mm) respectively was found that F2 formulation was more effective against E. coli than F1 formulation when compared to standard Amoxicillin (zone of inhibition=3mm at 100ul concentration). Formulations F1 & F2 also showed effective anthelmintic activity against earthworms by showing immobility and death at (F1=3.12 & 4.00 min and F2 =2.27 & 3.04 min) respectively when compared against standard Piperazine citrate (2.10 & 2.44 min). Therefore, poly herbal formulation has been successfully formulated as it was observed that it possesses promising Anti-bacterial and Anthelmintic activity. Further studies can be made to explore other parameters related to Anti-bacterial and Anthelmintic properties.

**Keywords:** Anti-bacterial, Anthelmintic, Eleusine coracana, Macrotyloma uniflorum, Phoenix dactylifera, Prunus dulcis, Poly herbal suspension, E. coli, Earthworms.

**PT-48**

## STUDY OF SYMPLOCOS RACEMOSA AND ASPARAGUS RACEMOSUS EXTRACT FOR ACUTE TOXICITY IN WISTAR RATS

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The hormonal illness known as PCOS, or polycystic ovary syndrome, affects women who are of reproductive age. The prevalence of this condition is to be between 20 and 33% in the general population. Menstrual cycle irregularities, obesity, hirsutism, acne, and aberrant biochemical profiles, including higher serum concentrations of LH, testosterone, androstenedione, and insulin, are some of these characteristics. The Present study investigates the acute toxicity of hydroalcoholic extract of Symplocos racemosa (SR) and aqueous extract of Asparagus racemosus (AR). The hydroalcoholic extracts of Symplocos racemosa were prepared by Soxhlet extraction method. The obtained extract of SR is slight sticky in appearance and the extract of AR is in powder form. The phytochemical Screening were performed for both the extracts. Extracts were evaluated for its safety profile in accordance with OECD guidelines for acute toxicity study. Healthy adult Wistar rats were administered single doses of extracts with different concentrations of 150,350,2000mg/kg body and observations were made for signs of toxicity which includes changes in behavior, body weight and mortality. The results indicate no significant signs of toxicity up to a dose of 2000mg/kg body weight with no mortality or severe adverse effects observed for all herbal extracts. The study concludes the extracts may have a favorable safety profile when administered acutely.

**Keywords:** Extract of Symplocos racemosa, aqueous extract of Asparagus racemosus, PCOS, Acute toxicity studies

**PT-49**

## PHYTOCONSTITUENTS TARGETING AMPK-MTOR PATHWAY FOR THE MANAGEMENT OF METABOLIC SYNDROME: AN INTEGRATIVE VALIDATION APPROACH

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Metabolic syndrome (MetS) is a cluster of interrelated abnormalities including central obesity, insulin resistance, dyslipidemia, and hypertension, predisposing individuals to diabetes, cardiovascular disease, and fatty liver. Dysregulation of the AMP-activated protein kinase (AMPK) and mammalian target of rapamycin (mTOR) axis is recognized as a central event in its pathogenesis.The present work aims to explore phytoconstituents capable of modulating AMPK activation and mTOR inhibition for restoring metabolic balance. The study will employ molecular docking to predict phytoconstituent-target interactions, followed by in vitro validation using appropriate cell lines to assess glucose uptake, lipid regulation, and pathway modulation. Promising compounds will subsequently be evaluated in vivo using rat and mice models of metabolic syndrome developed through a low-protein, high-carbohydrate (LPHC) diet. Gene and protein expression analysis, along with biomarker profiling, will be performed to generate mechanistic insights. This integrative approach is expected to identify potential phytoconstituents as novel leads for safer management of metabolic syndrome.

**Keywords:** Metabolic syndrome, AMPK, mTOR, phytoconstituents, LPHC diet model

**PT-50**

## FORMULATION AND EVALUATION OF HERBAL EMULGEL CONTAINING SYZYGIUM CUMINI LEAF EXTRACT

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The present study was to formulate emulgel using Syzygium cumini leaf extract. Polymers like sodium cardoxy methyl cellulose, carbopol 974P and xanthan gum were used as gelling agent in various proportions. Liquid paraffin was used as oil phase and a combination of Span 80 and Tween 80 were used as emulsifying agent. Various formulations were prepared by changing the gelling agent and their concentration. The prepared emulgels were evaluated for pH, spreadability co-efficient, physical stability, drug content and in-vitro drug release. Compatibility between the drug and polymers was studied by FT-IR method and there was found to be no interaction. The formulated emulgels were examined for their colour, homogeneity, consistency and phase separation after 24 hr of preparation. They were greenish, homogenous, clear and transparent and formed viscous gel preparation with a smooth homogenous appearance and there was no significant phase separation in the formulations. The pH of formulation F1-F6 was found to be in the range of 6.23-6.66. All the formulations were physically stable and have shown good spreadability coefficient in the range of 94-116 cm. In-vitro diffusion studies were carried out using phosphate buffer for all the formulations and the drug release was found to be in the range of 76.6 to 97.2%.Based on all the evaluation parameters F3 was considered as optimized formulation with good drug release of 97.2%.

**Keywords**: Emulgel, Syzygium cumini, Sodium carboxy methyl cellulose, invitro.

**PT-51**

## THERAPEUTIC POTENTIAL OF MEDICAGO SATIVA IN THE MANAGEMENT OF OSTEOPOROSIS IN FEMALE RATS

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Alfalfa (Medicago sativa L.), widely recognized as a traditional medicine and functional food, is rich in essential vitamins, minerals, and phytonutrients beneficial for bone health. It contains vitamins A, D, E, K, calcium, magnesium, and other bioactive compounds that are known to support bone formation and mineralization. Osteoporosis, a major skeletal disorder, is often associated with conditions such as long-term heparin therapy, which induces bone resorption by stimulating osteoclast activity and inhibiting osteoblast function. The present study aimed to evaluate the anti-osteoporotic potential of ethanolic extract of Medicago sativa in female rats, with alendronate used as a standard reference drug. Experimental groups received low dose (250 mg/kg) and high dose (500 mg/kg) of M. sativa extract for six weeks. Biochemical parameters including serum calcium, phosphorus, alkaline phosphatase (ALP), and tartrate-resistant acid phosphatase (TRAP) were estimated and compared among groups. In addition, femoral length, weight, volume, density, and fourth lumbar vertebra hardness were assessed. Body weight variations during treatment were recorded, and histopathological analysis of bone was performed.Results revealed significant improvement in biochemical and bone parameters, with the higher dose (500 mg/kg) demonstrating greater efficacy compared to the lower dose (250 mg/kg). Histopathological findings further confirmed positive structural changes in bone after M. sativa treatment.In conclusion, the study demonstrates that Medicago sativa exhibits promising anti-osteoporotic activity, supporting its role as a potential functional food for the prevention and management of osteoporosis.

**Keywords:** Medicago sativa; osteoporosis, antiosteoporotic activity; heparin; biochemical parameters.

**PT-52**

## EVALUATION OF THE IN VITRO ANTIBACTERIAL AND ANTIOXIDANT ACTIVITIES OF CASTELLA TEXANA

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ISBN: 978-81-980623-8-3

The present study was undertaken to systematically evaluate the in vitro antibacterial and antioxidant potential of Castella texana leaves in relation to their phytochemical composition. Preliminary phytochemical screening of ethanolic and methanolic leaf extracts revealed the presence of flavonoids, phenols, tannins, terpenoids, steroids, and cardiac glycosides, compounds well recognized for their diverse pharmacological activities. Antibacterial activity was assessed by agar disk diffusion and broth microdilution methods against six clinically relevant pathogens, namely Staphylococcus aureus, Enterococcus faecalis, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa, and Enterobacter cloacae. Both extracts demonstrated significant inhibitory effects, with Gram-positive organisms exhibiting greater susceptibility than Gram-negative strains. Minimum inhibitory concentration (MIC) determinations further confirmed the bacteriostatic potential, particularly against S. aureus and E. faecalis. In parallel, antioxidant potential was investigated using DPPH radical scavenging, hydrogen peroxide scavenging, and reducing power assays. The results indicated a concentration-dependent free radical neutralization, with ethanolic extracts showing comparatively higher activity, attributable to their rich phenolic and flavonoid content. The dual observation of notable antibacterial and antioxidant activities highlights the therapeutic promise of C. texana and supports its traditional use in managing infectious diseases and oxidative stress–related disorders. These findings provide a scientific basis for further bioassay-guided fractionation, isolation, and structural characterization of active constituents, as well as safety and in vivo efficacy evaluations, to establish C. texana as a potential source of novel phytopharmaceutical agents.

**Keywords:** Castella texana, Phytochemicals, Antibacterial activity, Antioxidant potential Flavonoids

**PT-53**

## EXTRACTION AND ANALYTICAL CHARACTERISATION OF BIOACTIVE PHYTOCHEMICALS FROM NERIUM OLEANDER LEAVES USING METHANOLIC SOXHLET EXTRACTION AND SPECTROSCOPIC TECHNIQUES

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This study investigates the effective extraction and detailed analytical profiling of bioactive phytochemicals from Nerium oleander leaves using Soxhlet extraction with methanol as the solvent. Shade-dried leaf powder underwent continuous methanolic extraction to produce a concentrated crude extract enriched with secondary metabolites. UV-Visible spectroscopy of the methanolic extract showed distinct absorbance peaks characteristic of phenolic compounds, flavonoids, and other conjugated systems. Complementary Fourier-transform infrared (FT-IR) spectroscopy identified key functional groups, including hydroxyl, carbonyl, and amine, confirming the presence of alkaloids, cardiac glycosides, tannins, and saponins. Preliminary qualitative phytochemical screening further supported the presence of terpenoids, glycosides, and flavonoids. The use of methanol as the extraction solvent proved highly effective in isolating pharmacologically active constituents from Nerium oleander, laying the foundation for advanced pharmacological, toxicological, and pharmaceutical research.

**Keywords:** Nerium oleander, Soxhlet extraction, methanol extract, UV-Visible spectroscopy, FT-IR spectroscopy, phytochemical screening, bioactive compounds, alkaloids, flavonoids, cardiac glycosides, secondary metabolites.

**PT-54**

## ULTRASOUND-ASSISTED EXTRACTION OF AGERATUM CONYZOIDES LEAVES FOR ENHANCED EXTRACT YIELD AND BIOACTIVE RECOVERY

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This study was aimed to optimize the extraction of Ageratum conyzoides (ACZ) leaves and to evaluate how the method of extraction influences the yield of extraction. In the current study, Conventional maceration was compared with ultrasound-assisted extraction (UAE), which was systematically optimized using Response Surface Methodology (RSM) with a Central Composite Factorial Design (CCFD). The RSM model identified the best UAE conditions such as sonication time of 37.78 minutes, limonene concentration of 70%, and a solvent-to-solid ratio of 26.16 mL/g, resulting in a maximum yield of 17.49%. In contrast, maceration produced lower yields under comparable settings, highlighting the advantages of ultrasound-based methods. The higher efficiency of UAE is attributed to ultrasonic cavitation, which disrupts plant cell walls and enhances solvent penetration. Evidence from Scanning Electron Microscopy (SEM) confirmed these effects by revealing significant tissue damage in the treated samples.Overall, the findings demonstrate that ultrasound-assisted extraction, when guided through RSM, is more effective and consistent than maceration for maximizing extract yield from Ageratum conyzoides. This integrated approach provides a promising framework for scaling up extraction processes and supports its application in herbal drug development.

**Keywords:** Ageratum conyzoides; extraction yield; ultrasound-assisted extraction; maceration; Response Surface Methodology (RSM); Central Composite Factorial Design (CCFD); Scanning Electron Microscopy (SEM)

**PT-55**

## DEVELOPMENT AND EVALUATION OF A POLYHERBAL FACIAL SCRUB FOR ENHANCED ANTIMICROBIAL SKIN CARE

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A polyherbal face scrub was prepared with natural coffee powder, Curcuma longa, and Azadirachta indica extracts to provide effective and affordable skincare. The formulation was assessed for colour, odour, consistency, pH, spreadability, and viscosity. Evaluation included antimicrobial assays against E. coli and Staphylococcus aureus. The results showed that the face scrub was non-irritating and satisfactory to apply. Neem extract contributed potent antibacterial properties, while Curcuma longa offered antioxidant benefits. Both together improved cleansing, exfoliation, and anti-inflammatory effects, supporting comprehensive skin health. The study highlights the importance of synergy between herbal ingredients for optimal cleansing and microbial protection. Continued standardization, stability, and biological studies could further establish the formulation as a successful herbal face scrub.

**Keywords:** Face Scrubber, Neem Extract, Curcuma longa, Antibacterial, Exfoliation

**PT-56**

## FROM ROADSIDE TO REMEDY: BREAST CANCER ACTIVITY OF MARTYNIA ANNUA FLOWER EXTRACT

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Martynia annua is often used in traditional medicine because of its medicinal properties. Flavonoids and phenolic compounds, both bioactive phytochemicals found in its flowers, have been linked to anticancer effect. Despite these claims, there is minimal scientific evidence that extracts of M. annua flowers can prevent cancer, especially breast cancer. This study used Gas Chromatography and Mass Spectrometry (GCMS) to identify the phytochemical composition of the floral ethanolic extracts and assess their cytotoxic effects on breast cancer cell lines. The powdered, shade-dried flowers were extracted with 99.9% ethanol. Flavonoids and anthocyanins, like cyanidin glycoside, luteolin, and apigenin, were identified through phytochemical profiling using GCMS. The cytotoxic potential of the extracts was assessed on breast cancer cell line MCF-7 (ER-positive), with an MTT assay. A dose-response analysis of extract treatment was done to study cell viability. Several bioactive compounds characteristic of anticancer properties were identified using GCMS. The ethanolic floral extract significantly decreased the viability of breast cancer cells in a concentration-dependent manner, It is worth mentioning that the MCF-7 cells had a greater inhibition. The cytotoxicity may be associated with the flavonoids and anthocyanins. Martynia annua flower ethanolic extract shows potent anticancer activities on MCF-7 cell lines, supporting its potential as a natural form of medicine and the need for more studies utilizing bioassay-guided fractionation and in-vivo assays.




ISBN: 978-81-980623-8-3

**Keywords:** Martynia annua, Breast cancer, Anti-cancer activity, Apoptosis, MCF-7 cells.

**PT-57**

## NOVEL POLYHERBAL ANTIBACTERIAL AND ANTIFUNGAL CREAM: A STABLE SULPHUR-ASAFOETIDA FORMULATION FOR EFFECTIVE MANAGEMENT OF SKIN INFECTIONS

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Herbal medicine has long been considered for its therapeutic applications in the management of infectious and non-infectious skin disorders. The present work focuses on the formulation and evaluation of stable antibacterial and antifungal cream containing Gandhak (sulphur), Hing (asafoetida), Jatyadi oil and Karanji oil. The natural ingredients have been chosen for their reported antimicrobial, anti-inflammatory and wound healing properties. The cream was formulated by conventional emulsification techniques using excipients like beeswax, borax, stearic acid and cetostearyl alcohol for consistency as well as stability. The formulation was analyzed for physicochemical properties, organoleptical properties, pH assessment, spreadability, washability and stability studies. Microbiological tests were run against Staphylococcus aureus, Escherichia coli and Candida albicans. Results showed that the cream had acceptable pH (5-5.6), texture, washability characteristics and stability for 28 days without phase separation. Antimicrobial activity was determined showing the presence of substantial inhibition zones against bacterial and fungal strains confirming its effectiveness. Irritancy studies were conducted and no impairment to the skin was noticed. The results exhibits that this polyherbal cream is safe, effective and eco-friendly topical preparation for the treatment of skin infections as compared to synthetics.

**Keywords:** Polyherbal, Cream, Antibacterial, Antifungal, Effectiveness.

**PT-58**

## A NATURAL APPROACH TO SKINCARE: FORMULATION OF A POLYHERBAL SCRUB

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Natural or herbal cosmetics are developed using natural ingredients to treat wrinkles, acne, and balance the production of oil. The major objective of this study was to develop a polyherbal scrub. This preparation's active ingredients include fenugreek (Trigonella foenum-graecum) seed powder, coconut oil, rose water, Aloe vera gel, sodium lauryl sulphate, methyl parabens, and glycerine. As a natural exfoliator, fenugreek seeds were added, and glycerine, coconut oil, and aloe vera gel provide calming and hydrating properties. The natural toner was rose water, the preservative was methyl paraben, and the cleaning agent was sodium lauryl sulphate. The formulation was prepared by mixing fenugreek powder with a gel base, and its organoleptic properties, pH, Spreadability, foamability, washability, grittiness, viscosity, stability, and skin irritation were all evaluated. According to the research, the prepared face scrub has a pleasant appearance, a pH between (5.5-6.0), good Spreadability, stable foaming, easy washing, homogeneous grittiness, and no indications of skin irritation. The study concluded that an herbal face scrub made from fenugreek is a safe, stable, and efficient alternative for synthetic scrubs in terms of cleansing and exfoliating.

**Keywords**: Herbal cosmetics, fenugreek, aloe vera, facial scrub.

**PT-59**

## DEVELOPMENT OF NEEM BARK-BASED ANTIBACTERIAL GEL: AN HERBAL APPROACH TO SKINCARE AND DERMATOLOGICAL THERAPY

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Topical drug delivery plays an important role in dermatological therapy by providing site-specific treatment while avoiding systemic side effects and improving bioavailability compared to oral administration. The present study focused on the formulation and evaluation of an antibacterial gel prepared from neem bark (Azadirachta indica), a medicinal plant widely used in traditional medicine for its antibacterial, anti-inflammatory, and wound-healing properties. Neem bark was collected, shade-dried, and extracted with methanol. The extract was incorporated into gel formulations using Carbopol 940 as the gelling agent, triethanolamine as a neutralizer, and methylparaben and propylparaben as preservatives. Three formulations containing varying concentrations of neem bark extract were prepared and evaluated for physicochemical parameters, including pH, viscosity, Spreadability, and skin irritation. Antibacterial activity was assessed using the agar well diffusion method against selected bacterial strains. The results revealed that all formulations exhibited suitable viscosity, excellent Spreadability, and a skin-compatible pH range of 5.6–6.3, ensuring patient acceptability. Skin irritation studies demonstrated the safety of the gels, showing no adverse effects. Antibacterial evaluation confirmed significant activity, with inhibition zones increasing at higher extract concentrations. These findings validate the traditional therapeutic role of neem in treating bacterial skin infections and highlight the potential of neem bark-based gels as safe, effective, and economical herbal formulations. Such gels offer promising applications in dermatology and skincare, combining traditional medicine with modern topical delivery systems.

**Keywords:** Neem bark, Azadirachta indica, antibacterial gel, herbal skincare, topical formulation

**PT-60**

## EVALUATION OF A NOVEL POLYHERBAL SERUM FOR SKIN BRIGHTENING, ANTI-AGING, AND ANTIMICROBIAL ACTIVITY

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Herbal face serum including Citrus aurantium (bitter orange), Hibiscus rosa sinensis (hibiscus), and Glycyrrhiza glabra (liquorice) was formulated and evaluated to determine its potential for enhancing skin health. It is known for its antioxidant, anti-inflammatory, and skin-brightening qualities, and also Glycyrrhiza glabra is useful in lowering skin irritation and pigmentation. Hibiscus rosa sinensis is rich in peptides, alpha-hydroxy acids, good for exfoliating and anti-aging. Citrus aurantium promotes collagen synthesis and amplifies the serum's overall skin-rejuvenating effect because of its high vitamin C concentration. Using maceration techniques, the dried plant components were extracted hydroalcoholic. The resultant extracts were mixed with glycerine, propylene glycol, aloe vera gel, and essential oils to create a serum basis. Physicochemical characteristics including pH, viscosity, spreadability, and stability under various storage circumstances were assessed for the produced formulation. The DPPH radical scavenging method was used to evaluate antioxidant activity, while the agar well diffusion method was used to test for antibacterial activity against Staphylococcus aureus. The serum had outstanding spread ability, a pH that was suitable for skin, and exceptional physical stability. Citrus aurantium added to the antibacterial activity and scent, while antioxidant tests revealed high radical scavenging activity, particularly from Glycyrrhiza glabra. Preliminary patch testing revealed no irritation or negative reactions. Three medicinal herbs are combined in this innovative herbal serum mixture to provide multipurpose skincare benefits. Its promise as an herbal cosmetic product that is safe, efficacious, and marketable is supported by the results.

**Keywords:** Herbal serum, Glycyrrhiza glabra, Hibiscus rosa-sinensis, Citrus aurantium, skincare, antioxidant, formulation

**PT-61**

## DEVELOPMENT OF A NAIL LACQUER CONTAINING SILVER NANOPARTICLES OF MULTI HERBES; NEEM, TULSI, TURMERIC, AND PAPAYA LEAF EXTRACTS FOR SYNERGETIC ANTIMICROBIAL ACTIVITY

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Nail infections such as onychomycosis are common and often resistant to conventional antifungal treatments. Herbal remedies offer promising alternatives with less side. This study aimed to develop a nail lacquer




ISBN: 978-81-980623-8-3

incorporated with silver nanoparticles of multi herbal extracts known for their antimicrobial and antifungal properties. Alcoholic extraction of Neem (Azadirachta indica), Tulsi (Ocimum sanctum), Turmeric (Curcuma longa), and Papaya leaf (Carica papaya) was carried out by maceration process. Silver nanoparticles of these individual herbal extracts were prepared by reduction reaction with silver nitrate solution and optimized for particle size (PS), zeta potential (ZP), poly dispersity index (PDI) and entrapment efficiency (EE). These nanoparticles were added in to nail lacquer prepared from Eudragit RL 100, ethyl cellulose as film formers, dibutyl phthalate as plasticizer and salicylic acid as permeation enhancer. The nail lacquer was evaluated for drying time, viscosity, non-volatility, smoothness and thickness of film, gloss, water resistance, stability and antifungal activity using the disc diffusion method against Candida albicans. The PS, ZP, PDI and EE of the nanoparticles and physicochemical properties of nail lacquer exhibited acceptable range. Uniform, glossy non-sticky coat with a drying time of 120 seconds was recorded. Antifungal testing revealed significant zones of inhibition against Candida albicans, indicating strong synergetic activity of the combined herbal extract's silver nanoparticles. The developed herbal nail lacquer demonstrated suitable, stability, and potent antifungal properties. It can be concluded that the prepared nail lacquer containing silver nanoparticles of herbal extracts has the potential of alternative to conventional antifungal nail treatments.

**Keywords:** Herbal nail lacquer, Neem, Tulsi, Turmeric, Papaya leaf, Antifungal activity, Onychomycosis

**PT-62**

## IN VIVO ANTICANCER POTENTIAL OF A POLYHERBAL FORMULATION IN MICE

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A polyherbal formulation containing extracts from Ixora coccinea flowers, Vitis viniferae seeds, and Piper longum roots was used to investigate its in vivo anticancer effects on Ehrlich Ascites Carcinoma (EAC) cells in male Swiss albino mice. Acute and chronic toxicity studies were performed following the OECD guidelines. Over 14 days, parameters such as body weight, mortality, tumor volume, and average survival time were monitored. The mice were divided into four groups: a control group, a standard treatment group receiving vincristine, and two groups administered different doses of the polyherbal formulation (250 and 500 mg/kg). Viable tumor cell counts were determined using trypan blue and hemocytometers. The findings indicate the efficacy of the polyherbal formulation in treating Ehrlich Ascites Carcinoma in mice, indicating its potential anticancer properties. Further investigation is needed to understand its mechanisms of action and possible clinical applications in humans. Data analysis was conducted using one-way analysis of variance (ANOVA), followed by Student's t-test.

**Keywords:** Tumor, Polyherbal formulation, EAC cells, in vivo anticancer

**PT-63**

## ISOLATION, CHARACTERIZATION, AND PHARMACEUTICAL EVALUATION OF STARCH FROM BANANA PSEUDOSTEM WASTE WITH FIBER CO-PRESERVATION

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Banana cultivation generates substantial agro-waste, with the pseudostem alone contributing nearly 60–65% of the total biomass discarded after harvest. While this waste is often left unutilized in fields, it remains a rich source of starch and fiber—two industrially significant biopolymers. Conventional extraction approaches, however, focus on starch recovery while destroying the fibrous fraction, thereby limiting integrated utilization. In this study, pseudostems were analysed at four developmental stages (growth, development, maturity, harvest), with the harvest stage identified as optimal for starch yield. Time-course studies showed that immediate extraction within 12–24 hours post-harvest preserved starch quality, whereas prolonged retention reduced starch and nutrient stability. Four isolation techniques—grating & crushing, mechanical grinding, sugarcane juicing, and fiber decortication—were compared, each performed with a fixed water ratio. Among these, fiber decortication gave the highest starch recovery while also preserving fibers as a viable co-product.The isolated material was confirmed as starch through IR, $^{1}H$ NMR, $^{13}C$ NMR, and mass spectral analysis. Comparative rheological studies and tablet formulations demonstrated that banana pseudostem starch performs at par with maize starch as a binder and disintegrant in conventional dosage forms. This is the first systematic protocol to isolate and characterize native banana pseudostem starch while simultaneously conserving fibers, thereby unlocking dual-product recovery from agricultural waste and highlighting its potential as a sustainable pharmaceutical excipient.

**Keywords:** Banana pseudostem waste, native starch isolation, fiber co-preservation, pharmaceutical excipient, starch characterization, sustainable utilization

**PT-64**

## DEVELOPMENT OF TOOTHPASTE FROM MARKETED KAMDHENU GOMAY BHASMA DANTAMANJAN (GO-VIGYAN ANUSANDHAN KENDRA, DEOLAPAR)

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Ayurveda, the ancient Indian system of medicine, highlights the importance of cow-derived products such as milk, curd, ghee, urine, and dung in treating various human ailments. Among these, cow dung is known for its healing properties. Toothpaste prepared from cow dung can improve dental health and protect against oral infections. Its use also makes oral care more economical and environmentally friendly. This toothpaste has been specially designed to reduce toothache and related problems. For this, the formulation was prepared by mixing toothpaste ingredients with cow dung ash. In simple terms, formulation means preparing a mixture of different substances according to a specific formula. The ingredients used to prepare the toothpaste include Kamdhenu Gomay Bhasma Dantmanjan, Gomay Bhasma, calcium carbonate, sodium saccharin, sodium lauryl sulphate, carboxymethyl cellulose, menthol, glycerin, clove oil, peppermint oil, and distilled water. Three batches were prepared (Trial-1 to Trial-3) by changing the concentration of the abrasive agent. For preparation, each ingredient was sieved and weighed carefully. All the dry powders were mixed in a mortar and pestle. Then glycerin, water, clove oil, peppermint oil, and menthol were added and triturated to make a smooth paste. Finally, the toothpaste was stored in well-sealed containers. Out of the three batches, Trial-2 showed the best results, with the right consistency, and was selected for further evaluation as per the Bureau of Indian Standards. The final product, "Kamdhenu Gomay Bhasma Dantmanjan Toothpaste," successfully combines the traditional healing benefits of its ingredients with modern oral care needs. It represents a blend of heritage and science, offering a safe, natural, and holistic solution for dental health.

**PT-65**

## DEVELOPMENT AND EVALUATION OF A TOPICAL GEL FROM WEDELIA TRILOBATA EXTRACT

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The present research aims to formulate and evaluate a herbal gel using the ethanolic extract of Wedelia trilobata (now known as Sphagneticola trilobata), a plant recognized for its ethnomedicinal value and bioactive constituents. The primary goal is to assess the extract's pharmacological properties, especially antibacterial and analgesic activities, and its potential for topical therapeutic applications. Although Wedelia trilobata is widely used in traditional medicine, it remains underexplored pharmacologically, particularly in gel-based delivery systems. There is limited research on the development of a standardized, stable gel formulation using this plant's extract for effective therapeutic use. The dried powdered leaves of Wedelia trilobata was extracted by cold maceration method using ethanol as a solvent and the extract was




ISBN: 978-81-980623-8-3

subjected to physicochemical analysis (including loss on drying, ash value, and extractive values) and phytochemical screening (identifying flavonoids, alkaloids, saponins, tannins, etc.). A gel formulation was developed and evaluated for organoleptic properties, pH, spreadability, viscosity, and stability. The gel was smooth, homogeneous, and free from grittiness. The average pH was 6.48, indicating good compatibility with skin. Spreadability was measured at 4.2 g·cm/sec, suggesting ease of application. The gel showed a moderate and stable viscosity averaging 49.9 centipoise, supporting optimal consistency for topical use. In vitro antibacterial studies revealed moderate inhibition zones against Escherichia coli and Staphylococcus aureus. Analgesic activity, evaluated using the hot plate method in animal models, showed a significant increase in reaction time, indicating effective pain-relieving potential. The study demonstrates that Wedelia trilobata possesses notable antibacterial and analgesic properties when incorporated into a gel base, supporting its use as a natural alternative to synthetic formulations. The findings also emphasize the need for further research to isolate active constituents, explore mechanisms of action, and establish clinical safety. With its pharmacological promise and ecological abundance, Wedelia trilobata is a valuable candidate for future herbal drug development.

**Keywords:** Wedelia trilobata, Herbal gel, Antibacterial activity, Analgesic activity, Phytochemical screening.

**PT-66**

## EXTRACTION AND EVALUATION OF FLAXSEED (LINUM USITATISSIMUM) MUCILAGE AS A BINDER IN TABLET DOSAGE FORM

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The powders hold together by a binder to form granules. Some excipients of natural origins are currently available as an alternative over the synthetic ones in pharmaceutical formulation. The aim of this study was to isolate the mucilage from flaxseed and compare them to evaluate the binding effects. In present study an effort was made to study the efficacy of mucilage obtained from flax seeds as tablet excipient. The mucilage was extracted from selected seeds by conventional method by precipitation of soaked and blended seeds in acetone. The dried mucilage were subjected to several phytochemical and physicochemical properties. Granules were formulated by wet granulation method by using extracted mucilage as a binding agent then, punch the tablet and comparison was made against the tablet prepared with standard binder as gelatine. The tablet evaluated by various evaluation parameters of tablet dosage form. The results showed that the tablet prepared from extracted mucilage as a binder had good binding property and disintegration properties, hardness, friability all evaluated parameters were within the permissible limits. Thus, mucilage could be used as an alternative binding agent in tablet dosage form.

**Keywords**: Flaxseed, Mucilage, Natural binder, Tablet Formulation, Wet granulation, pharmaceutical excipients

**PT-67**

## NATURAL HAIR CARE: POLYHERBAL SHAMPOO WITH ANTIOXIDANT ACTIVITY TO IMPROVE HAIR HEALTH

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The present research has centered on developing a polyherbal shampoo containing hydroalcoholic extracts of which are known to be a good source of flavonoids, phenolics, saponins, and sulfur compounds, which could target hair rejuvenation and possess antioxidant properties. Ten formulations (F1-F10) of polyherbal shampoos were prepared using sodium lauryl sulfate as surfactant, xanthan gum and guar gum as thickeners, and parabens as preservatives. The physicochemical properties of all the formulations were evaluated, including pH, viscosity, surface tension, foaming ability, cleansing properties, and skin compatibility. Formulation F6 had the most acceptable cosmetic properties and the potential antioxidant activity among all formulations, following were the values of pH (5.10 ± 0.01), viscosity (293), surface tension (32.68), foaming ability (73ml), cleansing properties (dirt removal efficiency of 88%). Antioxidant activity demonstrated by DPPH free radical scavenging activity was 72.19% and the greatest ascorbic acid equivalent antioxidant capacity was 95.64 µg/ml by CUPRAC assay, the phytochemical screening of the extracts confirmed the presence of bioactive ingredients responsible for the bioactivity. This study demonstrates developing a safe and effective herbal-based alternative to conventional shampoos. The optimized formulation (F6) represents the potential prospective antioxidant contributors for managing hair-related oxidative stress concerns that can meet acceptable criteria for consumer acceptability before reaching the market.

**Keywords:** Polyherbal shampoo, Antioxidant activity, Hair and scalp protection.

**PT-68**

## FORMULATION AND EVALUATION OF HYDRO-ALCOHOLIC EXTRACT OF KALANCHOE PINNATA LEAF FOR MEDICINAL ACTIVITY

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This study aimed to develop and evaluate a transdermal drug delivery system incorporating the hydroalcoholic extract of Kalanchoe pinnata leaves, known for their traditional medicinal properties. Extraction was carried out using a hydroalcoholic solvent system (ethanol: water) to optimize the yield of bioactive constituents. Phytochemical screening confirmed the presence of flavonoids, alkaloids, tannins, saponins, glycosides, and phenolic compounds—compounds with established anti-inflammatory and antioxidant effects. The extract was formulated into transdermal patches using the solvent casting method, with various polymeric combinations of hydroxypropyl methylcellulose (HPMC), polyvinyl alcohol (PVA), and ethyl cellulose, along with suitable plasticizers to ensure flexibility, adhesion, and uniformity. The patches were evaluated for physicochemical properties, showing desirable characteristics: brownish color, smooth texture, transparency, thickness (0.117–0.133 mm), weight variation (0.731–0.885 g), folding endurance (93.67–98.33), moisture uptake (1.165–1.305%), and drug content (90.16–96.84%). In vitro evaluations demonstrated significant biological activity. The hydrogen peroxide ($H_2O_2$) scavenging assay indicated antioxidant activity with 50.65–74.50% inhibition. Anti-inflammatory potential was confirmed via protein denaturation inhibition using bovine serum (46.32–65.73%) and egg albumin (24.47–61.40%). The study concludes that the formulated transdermal patches offer a promising, controlled-release system for delivering Kalanchoe pinnata extract. These findings support their potential use in managing inflammatory conditions while providing antioxidant benefits, paving the way for future pharmaceutical and clinical applications.

**Keywords**: Kalanchoe pinnata, transdermal patch, hydroalcoholic extract, anti-inflammatory, antioxidant.

**PT-69**

## NEUROPROTECTIVE POTENTIAL OF QUERCETIN-ENRICHED BANANA PEEL EXTRACT VIA GABA AND NMDA RECEPTOR MODULATION: IN SILICO AND IN VITRO APPROACHES

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Neurodegenerative disorders such as Alzheimer's and Parkinson's disease are strongly linked with oxidative stress, excitotoxicity, chronic inflammation, and apoptosis. Banana peel, often considered agricultural waste, is rich in flavonoids and vitamins with potential neuroprotective effects. The present study investigated the hydroalcoholic extract of banana peel (HAEBP) for its phytochemical composition, antioxidant activity, and modulatory effects on GABAergic and glutamatergic neurotransmission, alongside its anti-inflammatory and anti-apoptotic potential. LC-MS analysis confirmed the presence of neuroactive compounds including quercetin, luteolin, and pyridoxine. In silico docking studies indicated quercetin as the most potent ligand, showing strong binding affinities with both GABA and NMDA receptors. In vitro assays demonstrated that HAEBP significantly enhanced antioxidant




ISBN: 978-81-980623-8-3

enzyme activities (SOD and catalase), increased GABA levels, and modulated neuroinflammatory and apoptotic markers—elevating Bcl-2 expression while reducing IL-1β, TNF-α, Bax, and caspase-3. The results highlight quercetin as a key contributor to these effects. Overall, HAEBP exhibits substantial neuroprotective potential through its flavonoid-rich composition, acting via antioxidant enhancement, neurotransmitter regulation, and inhibition of inflammation and apoptosis. These findings suggest HAEBP as a promising natural candidate for managing neurodegeneration, warranting further preclinical and in vivo investigations.

**Keywords:** Banana peel extract, Quercetin, Flavonoids, Neuroprotection, GABA receptor, NMDA receptor, In silico docking, LC-MS analysis

**PT-70**

**FROM FOREST TO PHARMACOLOGY: ANTIDIABETIC EFFECTS OF PTEROCARPUS MARSUPIUM IN STZ-INDUCED DIABETIC RATS**

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Pterocarpus marsupium, a widely cultivated species in India, is recognised for its nutritional value and traditional medicinal uses in conditions such as rheumatism, venomous bites, and microbial infections. In addition to these properties, the plant has been reported to contain bioactive compounds with potential antidiabetic and antioxidant effects. The present study was undertaken to evaluate the efficacy of methanolic extracts of Pterocarpus marsupium in the management of streptozotocin (STZ)-induced diabetes in albino rats, with a focus on both biochemical and histological parameters. Methodology: Diabetes was induced in albino rats using STZ, and the animals were subsequently treated with methanolic extracts of Pterocarpus marsupium at doses of 100 mg/kg and 200 mg/kg for 21 consecutive days. The therapeutic effects were assessed by analysing blood glucose, nitric oxide, serum insulin, and protein levels, as well as oxidative stress markers in pancreatic tissue. Nuclear Magnetic Resonance (NMR) and Infrared (IR) spectroscopy were employed to characterise the extract, leading to the identification of two major phytoconstituents: quercetin and kaempferol. Histological examinations of pancreatic tissues were conducted to evaluate morphological changes. Treatment with Pterocarpus marsupium extract significantly reduced blood glucose and nitric oxide levels while simultaneously increasing serum insulin and protein concentrations in diabetic rats. Antioxidant status in pancreatic tissues improved markedly, demonstrated by elevated endogenous antioxidant levels and reduced thiobarbituric acid-reactive substances (TBARS). Histological evaluation revealed that STZ-induced degenerative changes in pancreatic β-cells were ameliorated following treatment, with restoration of islet cell integrity observed in the treated groups. The findings demonstrate that Pterocarpus marsupium exhibits significant antidiabetic and antioxidant activities in STZ-induced diabetic rats. The presence of quercetin and kaempferol as active phytoconstituents suggests that these compounds contribute to the observed therapeutic effects. Restoration of pancreatic histoarchitecture and improvement of biochemical parameters further support its potential as a natural antidiabetic agent. These results highlight the feasibility of isolating and developing active components of Pterocarpus marsupium for future clinical applications, instilling confidence in its translational value for diabetes management.

**Keywords:** Antidiabetic Effect, Pterocarpus marsupium, Streptozotocin, Oral Glucose Tolarance test.

**PT-71**

**FORMULATION AND EVALUATION OF DECOCTION OF CLITORIA Ternatea Leaves For Anti-Haemorrhoids Activity**

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Haemorrhoids are one of the most common anorectal disorders, characterized by swollen and inflamed venous structures in the rectal and anal region, leading to pain, bleeding, and discomfort. The limitations and side effects associated with conventional pharmacological treatments have directed attention toward herbal remedies with proven safety and efficacy. Clitoria ternatea has been traditionally used in Ayurvedic and folk medicine. Clitoria ternatea also known as Aparajita or Butterfly pea is considered as Medhya Drug to improve intelligence and enhance memory function. For the formulation and evaluation of the Anti-Haemorrhoids Properties of Clitoria ternatea Fresh leaves were collected, shade-dried, and subjected to aqueous extraction by decoction using leaves extract. Explore the use of Clitoria ternatea leaves extract for Anti-Inflammatory effect in treatment of Haemorrhoids. Analgesic and Wound-healing properties A decoction of Clitoria ternatea leaves was prepared for Extraction was done by decoction process. In vitro Anti-inflammatory activity of hydroethanolic extract of Clitoria ternatea leaves studied by bovine serum protein denaturation method. The Physicochemical test confirmed the presence of Alkaloids, Flavonoids, Tannins and Saponins. These phytoconstituents are responsible for Anti-Inflammatory effects. The activity of hydroethanolic extract of Clitoria ternatea leaves was compared with standard Anti-Inflammatory drug, Diclofenac.

**Keywords:** Anti-Inflammatory, Decoction, Extraction, Clitoria ternatea, Anti Haemorrhoids

**PT-72**

**Curcumin Herbal Suppository To Treat Colorectal Cancer**

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Colorectal cancer (CRC) remains one of the leading causes of cancer-related mortality worldwide, often associated with chemoresistance and severe adverse effects from conventional therapy. Herbal bioactive compounds have gained attention as complementary approaches due to their safety profile and multifunctional pharmacological properties. Curcumin, the principal polyphenolic compound derived from Curcuma longa (turmeric), exhibits potent anti- inflammatory, antioxidant, and anti-proliferative activities, effectively targeting colorectal cancer stem-like cells and suppressing key oncogenic pathways such as NF-κB and Wnt/β-catenin. However, curcumin's clinical application is limited by poor aqueous solubility, low gastrointestinal absorption, and rapid systemic metabolism. Co-administration with piperine, an alkaloid from Piper nigrum (black pepper), enhances bioavailability up to 2000% by inhibiting glucuronidation and P-glycoprotein efflux mechanisms. Formulating a curcumin– piperine herbal suppository offers a direct rectal route of administration, bypassing first-pass metabolism and achieving higher localized concentrations in the colorectal region. Such a delivery system may enhance therapeutic efficacy, reduce systemic toxicity, and provide a non- invasive adjunct to conventional CRC treatments. The results indicate that the curcumin- piperine herbal suppository demonstrated acceptable physicochemical properties, including smooth texture,uniform drug distribution, and rectal pH compatibility. In vitro release studies showed sustained curcumin release with enhanced bioavailability when combined with piperine compared to curcumin alone. In vivo permeability studies confirmed improved mucosal absorption through rectal tissue.

**Keywords:** Colorectal cancer, Curcumin, Piperine, Chemoresistance.

**PT-73**

**COMPUTATIONAL EVALUATION OF TRACHYSPERMUM AMMI L. SEED PHYTOCHEMICALS AS POTENTIAL ANTICANCER AGENT**

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Cancer remains the second leading cause of mortality worldwide, underscoring the urgent need for safer, cost-effective therapeutic strategies. Ethnomedicinal plant such as Trachyspermum ammi (ajwain) are rich in bioactive phytoconstituents with potential anticancer properties. This study identifies and evaluates phytoconstituents from T. ammi seeds using gas chromatography-mass spectrometry (GC-MS) followed by in silico drug discovery tools. Methanol (polar) and n-hexane (non-polar) extracts yielded 66 phytoconstituents (38 from methanol extract (TA_M1-M38) and 28 from n-hexane extract (TA_H1-H28). The compounds are virtually screened against five key oncogenic targets:




ISBN: 978-81-980623-8-3

cyclin-dependent kinase 4 (CDK4), Phosphatidylinositol-3-kinase (PI3K), topoisomerase 2α or (TOP2A), mammalian target of rapamycin (mTOR) and poly (ADP-ribose) polymerase 1(PARP1). Among the identified molecules, (N-(n-benzyloxycarbonyl-dl-alanyl)-d- glucosamine) (TA_M32) had docking scores of -9.1 kcal/mol against PARP1, -8.0 kcal/mol against CDK4 and PI3K. Similarly 2,4'-Methylene biscyclohexylbisisocyanate (TA_H6) demonstrated promising affinity against PI3K (-7.2kcal/mol) and PARP1 (-7.0 kcal/mol). These finding highlights T. ammi seeds phytochemicals as promising lead compounds with favourable drug likeness and safety profiles. Integration of ethnopharmacology with computational screening provides a cost-effective approach to accelerate anticancer drug discovery.

**Keywords:** Anticancer phytochemical, Ajwain seeds extract, Gas chromatography–mass spectrometry, Molecular docking, Toxicity and drug-ability prediction

**PT-74**

## FORMULATION AND EVALUATION OF HYDROALCOHOLIC EXTRACT OF MORINGA OLEIFERA LEAVES FOR ITS ANTI-INFLAMMATORY ACTIVITY

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It is well known that inflammation is a defence response of our body to hazardous stimuli, such as allergens or tissue injury. We introduce some herbs with their anti-inflammatory effects. Moringa oleifera is a highly valued nutritional plant. It is well known as the 'Drumstick' or 'Horseradish tree'. The study was conducted on Moringa Oleifera leaves. The primary goal of the research was to create and assess an anti-inflammatory ointment using flavonoids from Moringa oleifera leaf extract. It is possible to link the anti-inflammatory properties of flavonoids to their suppression of the enzymes lipoxygenase and cyclooxygenase. The extraction was done using maceration. The plant shows valuable pharmacological actions such as anti-asthmatic, anti-diabetic, hepatoprotective, anti-cancer, anti-microbial, and antioxidant effects. This study provides an overview of the plant and documents its anti-inflammatory activity. In addition to Moringa oleifera leaf extract, base, emulsifying, and stabilising agents were used. The formulation was prepared using the fusion method and evaluated for spreadability, washability, pH, colour, smell, texture, non-irritating, and anti-inflammatory activity. The Moringa oleifera ointment was stable, smooth, spreadable, and had good washability with a pH of 7.21 and a yellowish-green color, showing strong anti-inflammatory activity with 63.45–99.86% inhibition in the Bovine Serum Denaturation Assay and 56.41–94.07% in the Egg Albumin Denaturation Assay. According to the study found that it serves as a substitute for synthetic and chemical anti-inflammatory medications. These results confirm that the M. oleifera plant has been historically used as a successful treatment for conditions linked to inflammation.

**Keywords:** Moringa oleifera, Inflammation, Flavonoids, Ointment, Evaluation.

**PT-75**

## FORMULATION AND EVALUATION OF PSIDIUM GUAJAVA LEAVES EXTRACT GEL FOR ORAL APPLICATIONS

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Psidium guajava (Myrtaceae) leaves contain abundant phytochemicals with notable antimicrobial and anti-inflammatory activities. The leaves are often chewed, used as mouth rinses, or prepared as herbal remedies to alleviate tooth pain and manage oral infections, making them suitable for oral therapeutic formulations. The phytochemical screening of guava leaves extract confirmed the presence of reducing sugar, tannins, flavonoids, saponin, proteins, and the solubility of extract is found in ethanol and water. The maximum absorption value of pure drug was found at 260nm in ethanol. The leaves were subjected to hydroalcoholic extraction in (ethanol: water,1:1) and incorporated into a gel base, various batches were prepared with varied compositions of Carbopol 934, sodium CMC, and triethanolamine. The prepared gels were then assessed for organoleptic features, pH, viscosity, spreadability, drug content uniformity, and stability. In-vitro drug release studies for the oral gel formulations showed a release of 62.08% at 4.5 hours. Antimicrobial screening at different concentrations revealed that the 30 µg/ml zone exhibited the highest zone of inhibition (6.8 ± 0.19) mm against Escherichia coli and Staphylococcus aureus. The guava leaf–based oral gel showed strong antimicrobial activity along with satisfactory pharmaceutical attributes, highlighting its potential as a safe and effective natural remedy for mouth ulcers and related oral infections.

**Keywords:** Psidium guajava, leaves extract, oral application, antimicrobial, gel formulation.

**PT-76**

## DEVELOPMENT OF STANDARDIZATION PARAMETERS OF CLAYTONIA PERFOLIATA DONN EX WILLD WITH SPECIAL REFERENCE TO ITS PHARMACOLOGICAL APPROACHES

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Claytonia perfoliata Donn ex Willd., commonly known as miner's lettuce, is a traditionally valued leafy herb rich in bioactive compounds. Despite its ethnomedicinal applications, systematic standardization and pharmacological validation of this plant remain limited. The present study was undertaken to develop comprehensive standardization parameters of C. perfoliata with special reference to its pharmacological potential. Standardization was carried out by evaluating macroscopic and microscopic characteristics, physicochemical constants, fluorescence behavior, and phytochemical profiling to establish reliable quality control markers. Preliminary phytochemical screening revealed the presence of alkaloids, flavonoids, tannins, saponins, and phenolic compounds, suggesting a diverse chemical composition. Quantitative estimations of total phenolics and flavonoids were performed to support its antioxidant potential. Pharmacological assessments, based on in vitro antioxidant and anti-inflammatory assays, demonstrated promising activity, correlating with the phytochemical content. These findings reinforce the traditional uses of C. perfoliata and provide a scientific framework for its therapeutic applications. The study establishes baseline pharmacognostic and pharmacological parameters that can serve as a reference standard for quality assurance, future drug development, and further in vivo investigations. Overall, the work highlights the significance of Claytonia perfoliata as a potential source of natural bioactive agents and emphasizes the need for its inclusion in evidence-based herbal pharmacopoeia.

**Keywords:** Leaves, Claytonia perfoliata, Plant Extract, Pharmacology, Flavonoids

**PT-77**

## FORMULATION AND EVALUATION OF MICROSPHERES OF ISOLATED PIPERINE AS HERBAL REMEDY FOR TUBERCULOSIS

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The present study was aimed to formulate and evaluate Chitosan microspheres of isolated Piperine as a promising herbal remedy for the treatment of Tuberculosis. Piperine microspheres were prepared using ionotropic gelation method using TPP as the gelling counterion. The microspheres were evaluated for drug loading capacity, particle size analysis, Scanning Electron Microscopy, swelling index, Differential Scanning Colorimetry and % in-vitro drug release. The microspheres were found to be almost spherical, free flowing and non-aggregated and the size of spheres were ranged from 550-850µm. Among the 6 formulations, F2 was found to have better drug loading capacity of 89.02%, maximum swelling index and maximum cumulative release of 95.86%. Fickian diffusion was the mode of release for F2 formulation. From the results obtained from antimycobacterial study (REMA assay), it was concluded that the formulated microspheres (F2) possess anti-mycobacterial activity at a concentration of 100µg/ml. stability studies concluded that chitosan microspheres were stable physically and




ISBN: 978-81-980623-8-3

chemically for a period of 12 weeks because there was no change in the appearance and drug loading.

**Keywords:** Piperine, Antimycobacterial activity, Chitosan, Microspheres, Ionotropic gelation

**PT-78**

**INSILICO AND IN VITRO EVALUATION OF ANTIPROLIFERATIVE AND APOPTOTIC PROPERTIES OF LEAF EXTRACT OF LAWSOMIA INERMIS LINN**

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Medicinal plants rely on the integration of diverse approaches including botanical, phytochemicals, biological and molecular techniques. Medicinal plant drug discovery continues to offer new and important leads against different targets such as pharmacological, including anticancer activity. Medicinal plants are a rich source of bioactive phytochemicals. A single plant exhibited multiple biological properties like preventing and curing diseases, a boost of immunity, detoxification through its antioxidant property, and many more that could be attributed to its phytochemical constituents. Lawsonia Inermis plant showed the presence of various Phytoconstituents such as carbohydrates, alkaloids, tannins, phenolic compounds, flavonoids, glycosides, saponins, steroids, terpenoids, protein and amino acids. The present study deals with plant extract and respective chemical constituents for their in vitro cytotoxicity against K562 cancer cell line model as well as the mechanistic studies were determined through induction of apoptosis assay method. The data of our studies suggests that crude methanol extract of Lawsonia inermis Linn leaves showed IC50 value0.7mg/ml for MTT cellular viability assay and1.06E +06 (23.0 %) apoptosis profile of cells treated against K562 cells showed remark able cytotoxicity and anti-Proliferative activities in both the in-vitro methods tested. Furthermore, GC-MS analysis confirmed the existence of various bioactive components in the ethanol extract of lawsonia. The selected bioactive compounds were examined for their bioactivity through in silico molecular docking, which exhibited the strongest anticancer properties. Further in vivo studies may lead to the creation of a potent apoptosis and Anti-Proliferative activity of low toxicity and better therapeutic index. These findings support Lawsonia inermis linn conventional use, which is an effective source of anticancer substances that could be used in pharmaceuticals.

**Keywords:** Lawsonia Inermis, MTT cellular viability assay, apoptosis, cytotoxicity, K562 cancer cell line,GC/MS;Docking screening

**PT-79**

**ISOLATION AND CHARACTERIZATION OF SECONDARY METABOLITES FROM ENDOPHYTES ASSOCIATED WITH CALOTROPIS GIGANTEA AND NICOTIANA TABACUM**

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In the ongoing research work entitled “Isolation and Characterization of Secondary Metabolites from Endophytes Associated with Calotropis gigantea and Nicotiana tabacum,” we have specifically chosen toxic plants in the area surrounding the Andhra University, Visakhapatnam and isolated the parts of the Calotropis plant and Tobacco plant, and observed the abundant growth for the Calotropis sepals and Tobacco bud comparative to other parts of the mentioned plants parts such as flowers, latex, flower paste, seeds. The preliminary tests to identify endophytes were done by Gram staining, acid-fast, spore staining, motility of bacteria by using the hanging drop method, and growth in aerobic vs anaerobic conditions. The biochemical tests and molecular diagnostic techniques are to be evaluated. The extracts of Calotropis gigantea sepals and Nicotiana tabacum buds were purified by running Wet packing Column chromatography (Normal phase), then characterized the isolated compounds by NMR spectrometry. The microbial activity is evaluated for the isolated compounds using the cup-plate method. The compounds were found to have significant Anti-microbial activity. The anti-tubercular activity by MABA assay and anti-fungal activity by agar diffusion are to be evaluated.

**PT-80**

**DEVELOPMENT AND EVALUATION OF A POLYHERBAL TABLET WITH IMMUNOMODULATORY POTENTIAL**

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A polyherbal tablet comprising powdered extracts of Tinospora cordifolia (Giloy), Ocimum sanctum (Tulsi), and Emblica officinalis (Amla), all of which are well-known for their strong immunomodulatory and antioxidant qualities, is the main objective of the current investigation. The direct compression method was used to create the tablets because it was easy to use, economical, and appropriate for herbal compounds that are sensitive to heat and moisture.Every formulation had a thorough pre-compression assessment, which included Hausner's ratio, Carr's index, bulk and tapped density, and angle of repose. Weight variation, hardness, friability, disintegration time, and in-vitro drug release were all evaluated after compression. The outcomes showed that tablet performance was enhanced by raising the superdisintegrant concentration. In 45 minutes, batch F4 (25 mg of crospovidone) exhibited a 93.6% drug release and a disintegration time of 58 seconds. A disintegration time of 49 seconds and a drug release of 95.8% were the best overall findings for combination batch F5, suggesting that the two superdisintegrants worked in concert. Pharmacopeial limits for physical parameters were met by every batch. A viable option for oral herbal immunomodulatory therapy, the optimized formulation (F5) demonstrated improved dissolving, rapid disintegration, mechanical strength, and superior flow.

**Keywords:** Immunomodulatory, Pharmacopeial, superdisintegrant, antioxidant, crospovidone, Hausner's ratio, Carr's index.

**PT-81**

**PHYTOCHEMICAL SCREENING AND EVALUATION OF XYLOSMA CONTROVERSA EXTRACTS FOR NEUROPROTECTIVE, ANTHELMINTIC, ANTI-OXIDANT ACTIVITIES**

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Xylosma controversa a member of the Salicaceae family, is traditionally recognized in ethnomedicine for its diverse therapeutic applications. The present study aimed to perform a comprehensive phytochemical screening of its extracts and to evaluate their antioxidant, anthelmintic, and anti-neurodegenerative (anti-Alzheimer’s) activities. Phytochemical investigations revealed the presence of flavonoids, phenolic compounds, tannins, saponins, alkaloids, and glycosides. Ethanolic extracts of the plant demonstrated strong antioxidant activity, suggesting their potential in mitigating oxidative stress by the Free radical scavenging activity method (DPPH). Significant anthelmintic effects were observed in vitro, indicating possible applications in the management of parasitic infections. Furthermore, the extract contain xylocoside-G, it shows neuroprotective effect against β-amyloid neurotoxicity supporting their potential role in neuroprotection and the management of Alzheimer’s disease. The study highlights the therapeutic promise of X. controversa as a natural multi-target agent with potential applications in oxidative, parasitic, and neurological disorders.

**Keywords:** Xylosma controversa, Neurodegenerative.

**PT-82**

**FORMULATION, DEVELOPMENT AND EVALUATION OF POLYHERBAL NANOEMULGEL FOR THE TREATMENT OF RHEUMATOID ARTHRITIS**

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Arthritis is a chronic and painful joint condition that can affect mobility and quality of life. Rheumatoid arthritis (RA) is one of the most serious forms of arthritis. Rheumatoid arthritis (RA) is a chronic, progressive autoimmune disease characterized by synovial inflammation, destruction of cartilage, and joint abnormalities. RA affects 0.5–1% of




ISBN: 978-81-980623-8-3

the worldwide population and significantly deteriorates patients' ability to function in their daily lives, and also causes significant health and economic burdens. Current therapy options are effective, but they have limitations in relation to bioavailability, systemic exposure, and adverse reactions. this indicates a need for innovative drug delivery systems (DDS) to provide localized therapy with sustained effects. To address the limitations of long-term therapies for chronic, progressive diseases, innovative drug delivery systems have been developed, with a focus on localized and targeted approaches such as nanoemulgel-based DDS." Nanoemulsions are submicron (20–200 nm) oil-in-water dispersions of lipids of poor water-soluble drugs that increase the solubility, stability, and bioavailability of drugs. Nanoemulsions have smaller droplet sizes, resulting in deeper penetration across biological barriers including skin and synovial membranes. Nanoemulsions combined with gels are capable of sustained release of drug, extended residence time, and also provide localized delivery to inflamed joints. When combined, this approach improves therapy, limits the frequency of dosing, and minimizes systemic toxicity. In integrating nanotechnology with localised topical drug delivery, this is how nanoemulgels are able to represent a patient-friendly, site-specific, and very efficacious treatment, providing new avenues of precision and localized treatment.

**Keywords:** nanoemulsion, autoimmune disease, sustained effects, localized therapy, patient-friendly

**PT-83**

## IN VITRO ANTICANCER STUDY OF L-ASPARAGINASE FROM MARINE SOURCE

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Enzymes are biological catalysts essential for facilitating cellular reactions. Among them, L-asparaginase, a microbial enzyme, is extensively used as a chemotherapeutic agent, especially in the treatment of acute lymphoblastic leukemia (ALL). First discovered in 1922, it has since become vital in tumor therapy, particularly for ALL and lymphosarcoma, often as part of combined chemotherapy protocols. In this study, fungi isolated from Arabian Sea soil samples were screened for L-asparaginase production. Out of twelve isolates, five showed significant enzyme activity, with the $MS_4$ isolate demonstrating maximum activity at 30°C and pH 7. Over 80% of tested marine fungal strains were capable of producing the enzyme. The anticancer potential of L-asparaginase was evaluated against the AGS gastric cancer cell line using the MTT assay, revealing dose-dependent cytotoxicity with an $IC_{50}$ value of 112.58 µg/ml, confirming strong anticancer activity. Future research will focus on strain identification and optimization of enzyme yield for therapeutic applications.

**Keywords:** L-asparaginase, Enzymes, Marine fungi, Acute lymphoblastic leukemia, Anticancer.

**PT-84**

## PHARMACOGNOSTICAL AND PHYTOCHEMICAL EVALUATION OF THE STEM OF DALBERGIA MULTIFLORA

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The present study is focused on the botanical, physicochemical, and phytochemical properties of stems of Dalbergia multiflora. Dalbergia genus is widely distributed throughout tropical and subtropical regions. Traditional medical systems employ a wide variety of species in their therapy for the treatment of ringworm, leucoderma, dyspepsia, dysentery, syphilis, gonorrhea, stomach ache, leprosy, and scabies. Dalbergia multiflora is a large climbing shrub, frequently found in semi-evergreen forests belonging to fabaceae family. Dalbergia multiflora stem was evaluated for macroscopic, sensory, histological and phytochemical parameters. Physicochemical parameters such as total Ash (5.2 ± 0.1 %), acid insoluble ash (2.0 ± 0.1 %), water soluble ash (3.7 ± 0.2 %), foreign matter (Nil), loss on drying 8.1 ± 0.1 %, and extractive value was evaluated. Qualitative phytochemical analysis of petroleum ether, chloroform, ethyl acetate, ethanol, and water extracts was evaluated. The phytochemical analysis showed the presence of steroids, flavonoids, coumarin glycosides, alkaloids, phenolics, and tannins. The total flavonoid content was 65.99 ± 1.15 µg/ml, equivalent to standard quercetin. The total phenolic content was 36.72 ± 1.23 µg/ml, equivalent to standard gallic acid. HPTLC fingerprint analysis of the alcoholic extract was performed to reveal the phytoconstituents, and it showed a good resolution and separation. This data provides an essential pharmacognostic and phytochemical information for the proper identification of the drug and contributes in carrying out further research in the isolation of the potential candidates for drug discovery.

**Keywords:** Dalbergia multiflora, Qualitative analysis, Phenolic content, flavonoid content, HPTLC.

**PT-85**

## PHYTOPHARMACOLOGICAL INVESTIGATION ON LEAVES AND SEEDS OF TRICHOSANTHES CUCUMERINA (L.)

ANJU A VARGHESE

Phytopharmacological studies on leaves and seeds of Trichosanthes cucumerina (L.), with particular emphasis on their anthelmintic activity. The systemic study on leaves and seeds of Trichosanthes cucumerina Linn. was conducted right from the authentication subjected to physicochemical standardization. Soxhlet extraction using ethanol was employed to obtain bioactive compounds, followed by phytochemical screening. The anthelmintic activity was evaluated The findings support the traditional medicinal use of T. cucumerina as a natural anthelmintic agent and highlight its potential for further pharmaceutical applications. Standardisation involves evaluation of physicochemical properties such as ash value and extractive values. Phytochemical screening of these plant extracts indicated the presence of various secondary metabolites such as flavonoids, tannins, alkaloids, and saponins.

**Keywords:** Trichosanthes cucumerina, anthelmintic activity, ethanolic extract, flavonoids, Soxhlet extraction, Pheretima posthuma, medicinal plants

**PT-86**

## COST-BENEFITS ANALYSIS OF INVENTED PREMIX TEA WITH MARKETED GREEN/HERBAL TEA FOR CHOLESTEROL MANAGEMENT

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Recently increasing consumption of green and herbal teas, is well known recognised for their potential health benefits, has sparkled interest in their ability to manage hypercholesterolemia, a significant risk factor for cardiovascular diseases. While many green and herbal teas are marketed for their immune-boosting and antioxidant properties, very few claim to target cholesterol management specifically. This creates an emerging opportunity for developing teas designed to address hypercholesterolemia. In response to this need, we developed an instant premix tea containing goat milk and evaluated its effectiveness in preclinically for reducing cholesterol. This study aims to conduct a comprehensive cost-effectiveness and nutritional analysis of the newly invented premix tea in comparison to existing green and herbal tea products that claim to manage cholesterol levels. This study estimates its practical viability via applying assumptions and modeling to project the potential efficacy and cost of our invented instant premix tea for human consumption on daily basis. The nutritional comparison showed that our premix tea contains significantly lower levels of fat (0.2 g/100g), carbohydrates (6.4 g/100g), and calories (40.2 kcal/100g) when compared to commercial herbal tea products, such as Society Cleanse Green Tea Detox Kahwa Premix. The results revealed that the invented premix tea demonstrated a significant reduction in cholesterol levels. Moreover, the cost analysis showed our premix tea is over 25% cheaper than other marketed teas. These findings suggest that the invented instant premix tea offers a nutritionally enriched, cost-effective, and promising alternative for the prevention and management of hypercholesterolemia.

**Keywords:** Instant premix tea, hypercholesterolemia, preclinical study, cost-effective intervention

**PT-87**

## DESIGN AND DEVELOPMENT OF POLYHERBAL TABLET DOSAGE FORM FOR REGENERATION OF PANCREATIC BETA CELLS




ISBN: 978-81-980623-8-3

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The primary goal of this study was to design and develop a polyherbal antidiabetic tablet. Polyherbal antidiabetic formulation contains six herbs: Anacardium Occidentale (leaves), Cassia alata (leaves), Gymnema sylvestre (leaf), Pterocarpus Marsupium (bark), Tinospora cordifolia (stem), and Trigonella foenum-graceum (seed). A two-factor, three-level (32) factorial design was used. The amounts of croscarmellose sodium and microcrystalline cellulose in the polyherbal tablet were independent variables, while the disintegration time and hardness were dependent variables. The granules were made using the wet granulation process. Initially, the granules were examined for properties such as angle of repose, bulk density, tapped density, hausner's ratio, and compressibility index. Tablets were manufactured using an eight-station tablet punching machine and tested for weight variation, hardness, friability, thickness, disintegration test, stability, and in-vitro antidiabetic activity on the optimal formulation of polyherbal tablet is F9. The disintegration time is 10 minutes and the hardness is 3kg/mm2. The alpha amylase assay and beta-cell insulin secretion assay of polyherbal antidiabetic tablet show substantial results when compared to glibenclamide as a standard. As a result, the polyherbal anti-diabetic tablets generated increases insulin secretion, and beta cell regeneration is linked to insulin secretion in the treatment of type 2 diabetes. The stability of the formulations was assessed under accelerated temperature and humidity settings, which demonstrated that hardness and disintegration time remained unchanged within the limit for up to 1 month of testing. The polyherbal diabetes tablet is beneficial in the treatment of type 2 diabetes.

**Keywords:** Polyherbal, Antidiabetic tablet, Hardness, Disintegration, In-vitro antidiabetic assay.

**PT-88**

## COSMECEUTICAL PEEL-OFF MASK ENRICHED WITH TRACHYSPERMUM AMMI SEED OIL AS A NATURAL ANTIOXIDANT SOURCE

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Recently, cosmeceuticals have gained significant attention due to their therapeutic benefits in addition to aesthetic appeal. The present study aimed to formulate and evaluate an herbal cosmeceutical peel-off mask enriched with Trachyspermum ammi seed oil (TAO). Peel off mask was prepared by dissolving film forming agent, anti-foaming agent and stabilizer in hot water. Preservatives were added to the above mixture. Formulations were subjected to evaluations like drying time, peel off test, pH, viscosity and acute dermal irritation test. All the prepared formulations showed drying time between 7 minutes to 20 minutes, pH ranging from 5.4 - 5.8, viscosity ranging from 40 cps to 80 cps. Based on drying time and ease of application, F3 formulation was altered by addition of glycerine, honey and aloe vera gel (F13, F14 and F15 respectively). To the developed formulations, based on hydrogen peroxide scavenging activity, desired amount of TAO was added. F13, F14, F15 showed ease of application and good peelability. These formulations did not show any irritation, no development of oedema or rashes on rabbit. Formulations F13, F14, F15 were found to have 14, 17 and 20 minutes of drying time respectively. All the 3 formulations were equally good, however based on consistency on storage, F14 formulation containing honey was found to be more stable in comparison with F13 and F15. Hence F14 can be concluded as better cosmeceutical peel-off mask enriched with TAO

**Keywords:** Peel off mask, Antioxidant property, Trachyspermum ammi seed oil, honey, aleo vera

**PT-89**

## NATURAL ANTI-ACNE THERAPY: FORMULATION AND ASSESSMENT OF GEL USING NONI AND TULSI

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The formulation of an anti-acne gel using natural extracts from Noni fruit and Tulsi leaves, both known for their medicinal properties, to provide an alternative to synthetic acne treatments. Acne vulgaris, a common dermatological condition, often requires products with antibacterial and anti-inflammatory properties. The primary objective was to develop and evaluate a gel formulation containing these natural extracts. Nine different formulations (F1 to F9) were prepared and assessed for their physical and chemical characteristics, including color, appearance, consistency, viscosity, pH, spreadability, and antimicrobial activity. The antibacterial efficacy of the gel against Propionibacterium acnes was tested using the agar well diffusion method, while antioxidant activity was evaluated to determine its radical scavenging potential. The results demonstrated significant antibacterial activity, along with strong antioxidant properties. Additionally, the gel exhibited satisfactory physical and chemical attributes, making it suitable for topical application. Overall, the formulated gel, enriched with Noni fruit and Tulsi leaf extracts, presents a promising natural alternative for acne treatment, offering antibacterial, anti-inflammatory, and antioxidant benefits in a safer and more sustainable manner compared to conventional synthetic products.

**Keywords:** anti-acne, noni fruit, Tulsi, antibacterial, natural acne treatment.

**PT-90**

## PHYTOCHEMICAL SCREENING AND TOXICITY EVALUATION OF HIMALAYAN PENNYWORT LEAF EXTRACTS

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This study evaluates the phytochemical composition and toxicity of hydroalcoholic leaf extracts of Himalayan Pennywort (Hydrocotyle himalaica). Preliminary phytochemical screening revealed the presence of carbohydrates, saponins, and flavonoids, while alkaloids, tannins, proteins, and phenolic compounds were absent. The extract was obtained by maceration using 70% ethanol with an 8.8% yield. Toxicity was assessed using the brine shrimp lethality assay, a well-established preliminary test for bioactive compound cytotoxicity, which showed the extract to be safe up to a dose of 1.6 ml, with a 50% mortality rate only observed at higher doses. The therapeutic dose was selected as 500 mg/kg, approximately one-eighth of the lethal dose, to ensure safety. These results support the extract's safety profile and suggest further pharmacological studies on Himalayan Pennywort are warranted due to its traditional medicinal uses in heat clearance, detoxification, and dampness elimination.

**Keywords:** Himalayan Pennywort, Phytochemical screening, Hydroalcoholic leaf extract, Brine shrimp lethality assay, Toxicity evaluation.

**PT-91**

## EXPLORING ANTI-CANCER ACTIVITY OF THE EXTRACT OF THE LEAVES OF KINGIODENDRON PINNATUM

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The anti-cancer activity of the ethanolic extract of Kingiodendron pinnatum leaves was evaluated in this study. In vitro cytotoxicity analysis of the leaf extract, the effect was observed on DLA cells, EAC cells and the normal splenocytes were studied. On DLA cells the leaf extract showed an increase in cytotoxicity with increase in dose. The IC50 value of leaf extract was 77.07 µg/ml. On EAC cells the leaf extract had an IC50 value of 80.05 µg/ml and the effect on primary splenocytes of rats, the cytotoxicity was minimal found to be more than 100 µg/ml. Tumor bearing animals treated with lower dose of 200 mg/kg and higher dose of 400 mg/kg showed a significant increase in survival period of 28.83 and 29.80 days respectively when compared to control animals having a survival period of nearly 21.10 days. Animals treated with extract have more average life span and also the percentage increase in life span. The present study concluded that the ethanolic extract of Kingiodendron pinnatum leaf has significant potential anti-cancer activity. All these results clearly indicate that the crude leaf extract has a remarkable




ISBN: 978-81-980623-8-3

capacity to inhibit the growth of ascites tumor induced by EAC cell lines in a dose-dependent manner in experimental animals. Possibly the cytotoxic and antioxidant components of the extracts might be imparting antitumor efficacy. Further purification of this extract may yield a better nontoxic pharmacologically potent antineoplastic compound.

**PT-92**

**ANTI-GOUT ACTIVITY OF SOLANUM NIGRUM LEAVES USING IN VITRO AND IN SILICO APPROACHES**

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Gout is a chronic inflammatory arthritis caused by hyperuricemia and monosodium urate crystal deposition, leading to severe joint pain and disability. Current pharmacological interventions such as allopurinol and febuxostat. Solanum nigrum (Black Nightshade), a medicinal herb traditionally used in Ayurveda, possesses anti-inflammatory, antioxidant, and hepatoprotective properties that may contribute to its anti-gout potential.The present study investigates the anti-gout activity of Solanum nigrum leaves through in vitro and in silico methodologies. Ethanol and aqueous extracts of S. nigrum leaves were evaluated for xanthine oxidase inhibitory activity in vitro, revealing dose-dependent inhibition comparable to standard allopurinol. Phytochemical profiling indicated the presence of alkaloids, flavonoids, saponins, glycosides.phytosterols compounds, which may synergistically contribute to uric acid reduction.In silico docking studies were performed using major bioactive constituents such as solasodine, solamargine, and quercetin against the xanthine oxidase enzyme. Molecular docking analysis demonstrated strong binding affinities through various softwares. The combined in vitro and in silico findings support the anti-gout potential of Solanum nigrum leaves, highlighting their role as a promising natural source for novel xanthine oxidase inhibitors. These results highlight the therapeutic potential of S. nigrum as a natural alternative for gout management.

**Keywords:** Solanum nigrum, xanthine oxidase inhibition, in vitro, in silico, molecular docking.

**PT-93**

**EVALUATION OF ANTINOCICEPTIVE EFFECT AND CNS STIMULANT EFFECT OF HYDROALCOHOLIC LEAF EXTRACT OF DEBDARU**

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Pain and central nervous system (CNS) disorders pose major healthcare challenges, with many available drugs limited by side effects, dependency, and high cost. Medicinal plants have recently gained attention as safer and sustainable alternatives. Debdaru, a tree widely distributed in India, is traditionally valued in folk medicine, yet its role in pain modulation and CNS activity remains underexplored. The present study evaluated the antinociceptive and CNS stimulant potential of the hydroalcoholic leaf extract of Debdaru. Phytochemical screening confirmed the presence of flavonoids, alkaloids, tannins, saponins, glycosides, and steroids, many known for analgesic and neuroactive effects. Experimental evaluation was conducted using standard animal models, with graded doses of the extract compared to reference drugs. Antinociceptive activity, assessed by hot-plate and tail-flick methods, showed significant response times ranging from 4.95–9.63 seconds compared to 3.40–5.38 seconds in the control group, indicating notable pain-relieving potential. Similarly, CNS stimulant activity, assessed by locomotor and exploratory behavior using rota-rod apparatus, demonstrated enhanced motor coordination, with grip times of 19–45 seconds versus 3–25 seconds in the control and 5–16 seconds with standard drug caffeine. The findings suggest that Debdaru extract produces a dose-dependent reduction in pain perception along with increased motor activity. These results scientifically validate its traditional use and highlight its potential as a natural, plant-based candidate for managing pain and CNS-related disorders.

**Keywords:** Debdaru, Hydroalcoholic extract, Antinociceptive effect, CNS stimulant, Locomotor activity.

**PT-94**

**IN-VITRO ASSESSMENT OF ANTI-ARTHRITIC POTENTIAL OF HYDRO-ALCOHOLIC ROOT EXTRACT OF INDIAN JUJUBE**

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Rheumatoid arthritis is a chronic, progressive autoimmune disorder characterized by persistent joint inflammation, cartilage degradation, and bone erosion, leading to pain and functional disability. Conventional therapies provide symptomatic relief but are often associated with adverse effects and limited long-term efficacy. Hence, there is an increasing interest in the exploration of plant-based therapeutics with anti-arthritic potential. Indian jujube (Ziziphus mauritiana, family: Rhamnaceae), traditionally used in folk medicine for treating inflammatory conditions, was investigated in the present study for its possible anti-arthritic activity. The root of Indian jujube was extracted using hydro-alcoholic solvent (70:30) and subjected to in-vitro evaluation models including protein denaturation assay and membrane stabilization method, both of which mimic the pathogenic processes underlying arthritis. The extract demonstrated a concentration-dependent inhibition of protein denaturation and stabilization of red blood cell membranes, thereby indicating its potential to suppress inflammatory responses associated with arthritic progression. Results were compared with standard anti-arthritic drugs, showing that the extract exhibited significant activity, though slightly lower than the standard. The observed effects may be attributed to the presence of phytoconstituents such as flavonoids, saponins, and tannins, which are known to possess anti-inflammatory and antioxidant properties. These findings suggest that Indian jujube root extract could serve as a promising natural source for developing safer and effective anti-arthritic agents. However, further detailed studies including in-vivo models and phytochemical isolation are warranted to substantiate its therapeutic potential.

**Keywords:** Ziziphus mauritiana-hydro-alcoholic extract, anti-arthritic, protein denaturation assay, membrane stabilization method, phytochemicals

**PT-95**

**EVALUATION OF CARDIOTROPIC EFFECT OF HYDROALCOHOLIC FLOWER EXTRACT OF HUMMINGBIRD TREE**

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Herbal medicines continue to play an important role in modern therapeutics due to their natural origin, wide availability, and relatively safer profile compared to synthetic drugs. Hummingbird tree (Sesbania grandiflora), commonly known as Bakphool, has long been used in traditional medicine for its nutritional and medicinal properties. The present study aimed to evaluate the cardiotropic activity of the hydroalcoholic flower extract of Hummingbird tree on isolated rat heart preparations. Fresh flowers were collected, processed, and subjected to extraction using 70% ethanol through cold percolation. The extract was tested on isolated albino wistar rat hearts perfused with Krebs-Henseleit solution. The cardiac responses were compared with standard drugs such as adrenaline and acetylcholine, which exhibit positive and negative inotropic and chronotropic effects, respectively. The extract demonstrated a dose-dependent reduction in both the force and rate of contraction, indicating negative inotropic and chronotropic effects. These findings suggest the potential role of the Hummingbird tree in managing hypertension and tachycardia by reducing cardiac workload and regulating blood pressure. The results align with traditional claims and provide a scientific basis for its therapeutic application in cardiovascular disorders. However, further molecular and clinical investigations are required to elucidate the precise mechanism of action and to establish its safety and efficacy in humans.

**Keywords:** Hummingbird tree, Hydroalcoholic extract, Krebs-Henseleit solution, Cardiotropic activity, Isolated rat heart model.

**PT-96**




ISBN: 978-81-980623-8-3

**EVALUATION OF CARDIOTROPIC EFFECT OF HYDRO ALCOHOLIC EXTRACT OF MADAGASCAR PERIWINKLE LEAVES**

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The hydroalcoholic extract of Madagascar periwinkle (Catharanthus roseus) leaves and its tropic effects on the isolated heart of albino Wistar rats are examined in this study. Madagascar periwinkle has been widely utilized in traditional medicine because of its many pharmacological qualities. The WHO also acknowledges that medicinal plants are important sources for the creation of novel drugs. Fresh Madagascar periwinkle leaves were gathered for this experiment, extracted with 70% ethanol, and then screened for phytochemicals to confirm the presence of alkaloids and other secondary metabolites. The extract was compared to the common autonomic agents, acetylcholine and adrenaline, while the isolated rat heart model was kept in Krebs-Henseleit solution under carefully monitored conditions. The findings showed that acetylcholine had detrimental effects on both parameters, but adrenaline had a dose-dependent favourable inotropic and chronotropic effect. Curiously, the extract from Madagascar periwinkle displayed a unique profile, exhibiting dose-dependent positive chronotropic effects and negative inotropic effects. Additionally, the extract changed chronotropic activity when given with acetylcholine, but it had a synergistic impact with adrenaline, increasing cardiac activity dramatically but finally causing arrhythmia and cardiac arrest at greater concentrations. According to these results, the extract from Madagascar periwinkle shows significant cardiotropic effects, indicating that it may be useful in regulating heart function. To clarify its molecular mechanisms, establish appropriate therapeutic dosages, and assess long-term safety, more investigation is necessary.

**Keywords:** Madagascar periwinkle, Hydroalcoholic extract, Wistar rat heart, Inotropic and chronotropic effects, Cardiac arrhythmia

**PT-97**

**FORMULATION AND VALIDATION OF HERBAL TOOTHPASTE: A NATURAL APPROACH TO ORAL CARE**

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The growing demand for safe and eco-friendly oral hygiene products has prompted the development of herbal formulations as alternatives to synthetic toothpastes. This study focuses on the formulation and validation of an herbal toothpaste designed to deliver effective oral care without artificial flavours, fluoride, or harsh chemicals. Medicinal plant extracts with established antibacterial, anti-inflammatory, and antioxidant properties were incorporated into a standard toothpaste base and evaluated against key quality parameters. The optimised formulation demonstrated a pH value of 6.5 to 7.5, ensuring compatibility with the oral environment and reducing the risk of enamel erosion. Physical property evaluation revealed moderate foaming stability, providing adequate cleansing without excessive frothing, and excellent spreadability, ensuring smooth and uniform application on the toothbrush surface. Stability studies confirmed that the product retained its physicochemical characteristics over 30 days without phase separation, colour changes, or loss of performance. Sensory analysis indicated a pleasant taste and odour, supporting high consumer acceptability. Microbial testing confirmed the absence of pathogenic contamination, while in vitro assays demonstrated significant antimicrobial activity against common oral pathogens such as Streptococcus mutans and Lactobacillus acidophilus. These findings validate the herbal toothpaste as a safe, effective, and environmentally friendly oral hygiene solution. The combination of favourable physicochemical properties, stability, and therapeutic potential highlights its suitability as a natural alternative to conventional toothpaste formulations.

**Keywords:** Herbal toothpaste, Streptococcus mutans, Lactobacillus acidophilus, Oral hygiene, antimicrobial activity

**PT-98**

**IN-VITRO CYTOTOXICITY ASSAY OF AQUEOUS EXTRACT OF RAGS AND SEED COAT OF ARTOCARPUS HETEROPHYLLUS**

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Artocarpus heterophyllus commonly known as jackfruit, is a plant with a long history of use in traditional medicine. Various parts of the plant, including the leaves, fruit, and seeds, are rich in bioactive compounds such as phenols, flavonoids, and tannins associated with a range of therapeutic properties, including antioxidant, anti-inflammatory and anticancer activity. This research will seek to determine the in vitro cytotoxic activity of an aqueous extract of Artocarpus heterophyllus against defined cancer cell lines. An aqueous extract was obtained from [define plant part, e.g., dried mature leaves] of Artocarpus heterophyllus through cold maceration method. The extract was subsequently screened for its cytotoxic activity against two human cancer cell lines, [ e.g., MCF-7 (breast cancer) and HepG2 (liver cancer)]. The cytotoxicity was assessed by the MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay, which assesses cell viability and metabolic activity. The water extract of Artocarpus heterophyllus showed dose- and time-dependent cytotoxicity towards both cell lines. The extract showed significant inhibitory activity against the HepG2 cell line with IC_{50} values and against the MCF-7 cell line with IC_{50} values following treatment for 48 hours. These findings suggest that the extract is more effective against liver cancer cells compared to breast cancer cells. This study indicates that aqueous extract of rags and seed coat of Artocarpus heterophyllus is extremely active in vitro against human cancer cell lines. The dose- and cell-line-dependent activities indicate its promise as a source of new anticancer compounds. The report validates the traditional application of Artocarpus heterophyllus and presents the groundwork for future in vivo investigations and possible therapy.

**Keywords:** Maceration, aqueous extract, cytotoxicity, anticancer.

**PT-99**

**PRELIMINARY PHYTOCHEMICAL SCREENING AND ASSESSMENT OF THE ANXIOLYTIC AND ANTIDEPRESSANT POTENTIAL OF MARSILEA QUADRIFOLIA**

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CNS disorders are one of the most common ailments in the world. In that, Depression has major role as chronic disorder. Almost 10% of the population may become depressed throughout their life, according to recent survey. Various classes of Anti-depressant medications are being administered to patients for the treatment of depression. Other than this, the duration of treatment may extend for months and patients experiencing some known side effects like, decreased libido, loss of attentiveness, decreased body movements etc. Apart from this, some Herbal plant extracts like Marsilea quadrifolia are a promised treatment for Depression with rare occurrence of side effects. This article aims to assess the possible Anti-depressant and Anxiolytic potential of Marsilea quadrifolia by performing Pharmacological screening procedures on Rats that includes, Forced Swimming Test, Tail suspension test, Locomotor activity, Rotarod test (Motor Co-ordination), Elevated plus Maze, Hole board Test. Studies were performed for 21 days on both Control (Imipramine) and Test drug groups. This investigation provides evidence for the anxiolytic and antidepressant activities of Marsilea quadrifolia.

**Keywords:** Antidepressants screening methods, SSRI's, Marsilea quadrifolia, Herbal extract.

**PT-100**

**IN SILICO AND IN VITRO EVALUATION OF PHYTOCONSTITUENTS AS INHIBITORS OF NEW DELHI METALLO-B-LACTAMASE-1 (NDM-1)**

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ISBN: 978-81-980623-8-3

The emergence of New Delhi metallo-β-lactamase-1 (NDM-1) in Escherichia coli poses a major public health challenge due to its ability to hydrolyze a wide spectrum of β-lactam antibiotics, including carbapenems. In this study, phytoconstituents from medicinal plants were explored as potential natural inhibitors of NDM-1 through a combination of in silico and in vitro approaches. Among the screened plants, Curcuma longa L. extracts demonstrated notable antibacterial activity, with the acetone extract showing the highest inhibition zones (8-16 mm) against NDM-1-producing Escherichia coli. A database of 144 phytochemicals from Curcuma longa L. was evaluated for drug-likeness, resulting in 96 compounds that met the selection criteria. Molecular docking identified bis-desmethoxycurcumin as the most promising inhibitor with a binding energy of -6.5 kcal/mol. Subsequent in vitro assays revealed that bis-desmethoxycurcumin exhibited synergistic effects with amoxicillin, enhancing inhibition zones from 10.33 mm to 19.67 mm, with a minimum inhibitory concentration of 25-30 µg/ml. In silico predictions further supported its favorable safety and pharmacokinetic profile. These findings suggest that bis-desmethoxycurcumin holds strong potential as an adjuvant agent to conventional antibiotics, offering a promising strategy to counter NDM-1-mediated resistance and contributing to the development of novel approaches against antibiotic-resistant infections.

**Keywords:** New Delhi metallo-β-lactamase-1 (NDM-1), NDM-1 inhibitors, Escherichia coli, Antimicrobial Resistance, Natural compounds.

**PT-101**

## INVESTIGATING THE ANTI-ANAPHYLACTIC POTENTIAL OF ABUTILON INDICUM (L.) SWEET LEAVES USING MULTIPLE EXPERIMENTAL MODELS

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Anaphylaxis is a severe allergic reaction that poses a significant threat to life, marked by respiratory distress, bronchoconstriction, vascular collapse, shock, and potential fatality. The primary effector cells in anaphylaxis are mast cells, which contribute critically by releasing proinflammatory mediators. 5-lipoxygenase (5-LOX) catalyse arachidonic acid pathway producing leukotrienes. Abutilon indicum (L.) Sweet is traditionally recognized for treating bronchitis, piles and bladder inflammation. This study focused on evaluating the anti-anaphylactic potential of Abutilon indicum phytoconstituents (37 compounds) using in silico docking with target FcεRI and 5-lipoxygenase, in vitro 5-lipoxygenase inhibition assays, and in vivo horse serum and triple antigen-induced rat model of anaphylaxis. Molecular docking analyses was performed with AutoDock 4.2 and phytoconstituents revealed high binding energies (8.31 kcal/mol for Lupen-3-one with FcεRI and 8.28 kcal/mol for Lupen-3-one with 5-lipoxygenase), indicating strong interaction with these targets. The inhibitory potential of the ethanol fraction of leaf extract on 5-lipoxygenase was confirmed, with an IC50 of 13 µg/ml for leaf extract and 10.67 µg/ml for prednisolone. In vivo, administration of the extract to Wistar rats ameliorated anaphylactic symptoms induced by horse serum and triple antigen vaccine and this was demonstrated by improved respiratory rate, body weight, and reduction of immune markers such as IgE and CRP. These results suggest that Abutilon indicum exerts anti-anaphylactic effects possibly by suppressing inflammatory cells, reducing oxidative stress, and preventing airway inflammation, supporting its traditional use and therapeutic potential in alleviating allergic conditions.

**Keywords:** Anaphylaxis, Lupen-3-one, Lipoxygenase, Arachidonic acid

**PT-102**

## FORMULATION AND EVALUATION OF A HERBAL MOUTHWASH

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Oral health is a crucial component of overall well-being; however, it is frequently compromised by microbial infections, including dental caries, gingivitis, and candidiasis. Conventional mouthwashes, although effective, are often associated with side effects like tooth staining, altered taste, and mucosal irritation due to synthetic chemical agents. This study examines a novel plant-based mouthwash formulation that incorporates traditional medicinal herbs as a safer, natural alternative. The formulation consisted of hydroalcoholic extracts of Azadirachta indica (neem), Ocimum sanctum (tulsi), and Syzygium aromaticum (clove), which were selected for their well-documented antimicrobial properties. The mouthwash was evaluated for physicochemical parameters (pH, clarity, viscosity), organoleptic qualities, microbial load, and stability. Its antimicrobial activity was assessed in vitro using the agar well diffusion method against Streptococcus mutans, Lactobacillus acidophilus, and Candida albicans, and compared with a commercially available 0.2% chlorhexidine mouthwash. The polyherbal formulation was found to be physically stable, with acceptable sensory properties and no microbial contamination over 30 days. It exhibited significant antimicrobial activity, especially against S. mutans and C. albicans, with inhibition zones comparable to those of chlorhexidine. The plant-based mouthwash demonstrated promising potential as an effective and safer herbal alternative to conventional chemical oral rinses. These findings support further clinical evaluation and potential commercial development of the formulation for routine oral hygiene.

**Keywords:** Herbal Mouthwash, Antimicrobial Activity, Neem, Tulsi, Clove.

**PT-103**

## FORMULATION AND EVALUATION OF HERBAL LIPSTICK USING NATURAL COLORING PIGMENT FROM BRASSICA OLERACEAE

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Herbal Cosmetics have been a growing demand within the World Market and useful gift of nature especially for women. Herbal Cosmetics have achieved widespread popularity among the community due to its minimum side effects or no side effects. Synthetic coloring pigments may cause an allergic reaction and are found to be carcinogenic. Hence natural herbal extracts have become a great alternative to the synthetic substances. The incorporation of herbal extracts in cosmetics can minimize skin damage due to oxidative stress and thus delays aging. The intent of this study is to perform formulation and evaluation of herbal lipstick using natural coloring matter such as anthocyanins from Brassica oleracea variety capitata form rubra (purple cabbage) and many other ingredients were used in this preparation of lipstick. Different evaluation tests of herbal lipstick such as color, pH, softening point, aging, rancidity, microbiological tests and stability were evaluated and compared with the marketed standard formulation. The results indicate that a safe, stable and high-quality herbal lipstick with good force of application and breaking threshold can be formulated using plant-based ingredients This study offers a viable and eco-friendly replacement to synthetic cosmetics, paving the way for further development in the natural cosmeceuticals.

**Keywords:** Brassica olearaceae, Natural Lipstick, Anthocyanins, Beeswax, Castor oil.

**PT-104**

## EVALUATION OF DIURETIC ACTIVITY OF ETHANOLIC EXTRACT OF JATROPHA GOSSYPIFOLIA

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Traditionally, herbs stimulating kidney function have been utilized to alleviate edema. The present study was undertaken to investigate the diuretic activity of the leaves of Jatropha Gossypifolia in ethanolic extract aiming to elucidate its efficacy in reducing edema. Animals of either sex were divided into four groups (six animals in each group). The control group received normal saline (2 mL/kg), while the reference group received frusemide (20 mg/kg). Group III and Group IV received the ethanolic extract of Jatropha Gossypifolia at dose levels of 200 mg/kg and 400mg/kg orally, respectively. At the end of the 24 hours, urine was collected, and total volume excreted and PH of the urine by each animal was recorded. Concentrations of urinary Na+, K+ and Cl- were determined, and the Na+/K+ ratio was calculated to make comparison among the groups. The findings demonstrated that the crude ethanolic extract of Jatropha Gossypifolia at the dose of 400mg/kg showed




ISBN: 978-81-980623-8-3

significant diuretic (P<0.01) when compared to frusemide. Acute toxicity studies will also be conducted to ensure the safety of Jatropha Gossypifolia. Promising results demonstrating diuretic activity without toxicity could pave the way for further clinical investigations, establishing the clinical relevancy of Jatropha Gossypifolia in managing edema.

**Keywords:** Jatropha Gossypifolia, Diuretic, Ethanol, Acute Toxicity, Frusemide.

**PT-105**

## BIOWASTE TO BIOACTIVE: FORMULATING AND CHARACTERIZING A PRONIOSOMAL HAIR CARE PRODUCT FROM UPCYCLED CHICKEN FEATHERS AND REETHA FRUIT

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This research details the development and assessment of a proniosomal roll-on hair replenisher designed to repair damaged hair and stimulate healthy growth. The formulation uses natural compounds from the Sapindus mukorossi plant and keratin extracted from chicken feathers (Gallus gallus domesticus). Since chicken feathers are a plentiful and eco-friendly waste product rich in crude protein (keratin), their use in this cosmetic offers a sustainable and cost-effective solution. The product aims to address both hair damage and common scalp issues, such as dandruff and lice, by leveraging the natural properties of the ingredients.The saponins from Sapindus mukorossi provide natural cleansing along with antibacterial and antifungal effects for scalp protection. Keratin is delivered via a proniosomal gel, a delivery system that, while similar in structure to liposomes and niosomes, provides greater stability and absorption while minimizing skin irritation. The roll-on format enhances user experience through easier application and improved absorption of the active components.The hair replenisher's performance was systematically evaluated based on several criteria, including pH levels, viscosity, spreadability, stability, and its microbial safety profile.These tests confirmed its potential as a safe and effective cosmeceutical product for hair care.

**Keywords:** Cosmeceutical, Hair,Keratin,Liposome, Proniosomal Gel.

**PT-106**

## IN-VITRO ANTIMICROBIAL AND ANTI-INFLAMMATORY ACTIVITY OF HYDROALCOHOLIC LEAF EXTRACTS OF SYRINGODIUM ISOETIFOLIUM SEAGRASS

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This research explored the antimicrobial and anti-inflammatory activities of hydroalcoholic leaf extracts of Syringodium isoetifolium seagrass.In this work, leaves of seagrass were collected, dried and extracted with an ethanol and water mixture (70:30). The extract was enriched with bioactive substances such as polyphenol, phenol, glycoside, dicarboxylic acids, saponin, flavonoids, alkaloid and other constituents. Hence, the extract was performed for in-vitro microbicidal and anti-inflammatory by using disc diffusion technique, inhibition of egg protein denatured and membrane stabilizing activity techniques. The antimicrobial results indicated that the hydroalcoholic extract of Syringodium isoetifolium seagrass has considerable antimicrobial activity against E. coli, B. subtilis, A. flavus and A. niger. Whereas, the anti-inflammatory activity result suggested that the hydroalcoholic extract of Syringodium isoetifolium seagrass significantly controlled the inhibition of protein denatured and RBC haemolysis. The size of the zone, percentage of inhibition of protein denatured and RBC haemolysis are directly proportional to the concentration of the hydroalcoholic extract of Syringodium isoetifolium seagrass used in the invitro study.

**Keywords:** Hydroalcoholic extract of Syringodium isoetifolium seagrass; Anti-microbial activity; Anti-inflammatory activity.

**PT-107**

## IN SILICO AND NETWORK PHARMACOLOGY STUDIES OF PHYTOCHEMICALS FROM MITRAGYNA PARVIFOLIA AS ANTI-ALZHEIMER'S AGENTS

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Alzheimer's disease accounts for 60–80% of dementia cases, making it the most common type of dementia. Mitragyna parvifolia is a medicinal plant, which contains alkaloids, terpenoids, pteropodine, speciophylline and steroids. In this study, we investigated the efficiency of phytochemicals from Mitragyna parvifolia using a network pharmacology approach. The phytochemicals were obtained from Dr. Duke's Phytochemical and Ethnobotanical database, IMPPAT, the Coconut database, Phytohub version 1.4, the Medicinal Plants database, The Natural Products Atlas and the KNApSAcK Core system databases. SwissADME, ProTox 3.0, and CardioTOXCSM webservers were used to estimate the phytochemical's physicochemical, pharmacokinetic and toxicological profiles. OSIRIS Property Explorer was used to estimate the drug score and the results demonstrated the compound's druggable nature. The network pharmacology and enrichment analyses predicted the phytochemical's suitable targets, which indicated that they would be extremely active against Alzheimer's disease, including EGFR, JAK2, ERBB2, PIK3CA, PIK3RA, STAT3 and PTNPN11. Using the Gepia2 website, the correlation analysis was carried out. Molecular docking against the chosen targets was performed using Autodock tools and the results were compared with the co-crystallized ligand and standard. Owing to the various in silico studies and drug score, the compounds Isorotundifoline, Isorhynchophylline and 16,17-dihydro-17betahydroxyisomitraphylline were highly active against the tested targets with good binding energies and interaction profiles. Thus, these compounds can be used against Alzheimer's disease. However, further in vitro and in vivo studies are warranted.

**Keywords:** Alzheimer's disease, Mitragyna parvifolia, Computational studies, Network Pharmacology, Molecular docking

**PT-108**

## HERBAL-BASED NANOPHARMACEUTICALS FOR THE MANAGEMENT OF METABOLIC DISORDERS AND INFLAMMATION

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Metabolic disorders such as diabetes mellitus, obesity, and dyslipidemia, together with chronic inflammatory diseases, remain significant global health burdens due to their complex pathophysiology and the limited efficacy of conventional therapeutic approaches. Although synthetic drugs are available, their long-term use is often associated with adverse effects, suboptimal patient compliance, and restricted therapeutic outcomes. Herbal medicines, rich in bioactive constituents including flavonoids, alkaloids, terpenoids, and polyphenols, possess established antioxidant, anti-inflammatory, and immunomodulatory activities, thereby offering potential in the management of these conditions. Nevertheless, their clinical translation is hindered by challenges such as poor aqueous solubility, chemical instability, and limited systemic bioavailability. Nanotechnology-driven strategies provide innovative solutions by improving solubility, enhancing pharmacokinetic performance, and enabling site-specific delivery of herbal compounds. This review critically examines the development and application of herbal-based nanopharmaceuticals for the treatment of metabolic disorders and inflammatory conditions. Particular emphasis is placed on nanocarrier systems including polymeric nanoparticles, liposomes, solid lipid nanoparticles, and nanoemulsions, with reference to their formulation strategies, characterization parameters, and therapeutic efficacy. Mechanistic insights into their modulation of oxidative stress, cytokine expression, and metabolic signaling pathways are also discussed. Finally, the article addresses translational challenges and future perspectives in advancing herbal nanopharmaceuticals toward clinical practice.

**Keywords**: Herbal Nanopharmaceuticals; Metabolic Disorders; Inflammation; Nanocarriers; Liposomes; Solid Lipid Nanoparticles; Targeted Drug Delivery; Oxidative Stress; Cytokine Modulation.




ISBN: 978-81-980623-8-3

**PT-109**

**IMMUNOMODULATORY HERBAL FORMULATIONS: A POTENTIAL THERAPEUTIC APPROACH FOR POST-COVID-19 RECOVERY**

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Innate immunity serves as the first line of defense against invading pathogens and plays a pivotal role in viral infections such as SARS-CoV-2, the causative agent of coronavirus disease (COVID-19). The innate immune system triggers a biological cascade involving the complement system, which upregulates cytokines, natural killer cells, interferons, interleukins, and reactive oxygen species. COVID-19 has been shown to impair immune responses, creating the need for supportive strategies to restore immune balance. This study highlights the role of herbs and Rasayana therapy in mitigating post-COVID-19 complications. A comprehensive review of ethnopharmacological literature from major databases identifies key immunomodulatory species suitable for herbal drinks, including Ocimum sanctum Linn., Aloe vera Tourn. ex-Linn., Hibiscus rosa-sinensis Linn., Camellia sinensis L., and Calendula officinalis L. Bioactive phytoconstituents such as polysaccharides, polyphenols, and gallic acid have been reported to enhance cytokine production, improve macrophage phagocytic activity, suppress pro-inflammatory mediators including tumor necrosis factor (TNF)-α, interleukin-6, and nuclear factor kappa B, and stimulate antioxidant enzyme activity, nitric oxide, and prostaglandin E2 synthesis. These properties collectively support the modulation and enhancement of innate immunity. Future clinical research is warranted to establish the therapeutic efficacy of such herbal formulations in post-COVID-19 management.

**Keywords**: SARS-CoV-2, Immunomodulation, Innate immunity, Hibiscus rosa sinensis Linn., Camellia sinensis L., Calendula officinalis L.

**PT-110**

**FORMULATION AND EVALUATION OF POLY-HERBAL SOAP WITH ANTI-BACTERIAL ACTIVITY**

BHONGALE ASHISH SANJAY

The ultimate aim of present work was to prepare formulation of poly-herbal soap from extract of tulsi leaves, aloe-vera leaves, vitamin E capsules and honey using glycerin soap base by melt and pour method. The formulation was evaluated for physicochemical parameters like appearance, pH, sensitivity test, foaming test, stability test. All evaluation parameters results were positive and comply with standard values. Therefore, these plant materials can be used in the preparation of herbal soap on commercial scale for acne treatment.

**PT-111**

**BIOENZYMES FROM FRUIT PEELS AS NATURAL SANITIZERS: A PHARMACEUTICAL APPROACH TO VEGETABLE DECONTAMINATION AND SHELF-LIFE ENHANCEMENT**

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Vegetables are widely consumed for their nutritional and therapeutic benefits, yet their safety is compromised by pesticide residues and microbial contamination, which can lead to serious health hazards. The present study explores a pharmaceutical approach to food safety through the application of fruit peel-derived bioenzymes as natural sanitizers. Bioenzymes were prepared from grapes, orange, lemon, pomegranate, papaya, and foxtail fruit peels using a fermentation process. Their antimicrobial efficacy was tested against selected bacterial and fungal strains, revealing significant inhibitory effects. When applied to vegetables, the bioenzymes effectively reduced pesticide residues and microbial load compared to conventional washing. Moreover, treated vegetables exhibited extended shelf-life, attributed to reduced spoilage and delayed microbial growth.This dual action detoxification and antimicrobial activity highlights the potential of bioenzymes as eco-friendly, safe, and cost-effective alternatives to chemical sanitizers. The findings have direct implications for pharmacy in the domains of public health, toxicology, and nutraceutical safety, offering sustainable strategies for preventive healthcare. Bioenzymes from fruit peels thus emerge as promising natural sanitizers for household, clinical, and industrial applications, bridging pharmaceutical sciences with food safety and environmental sustainability.

**Keywords:** Bioenzymes, fruit peels, vegetable sanitization, pesticide reduction, antimicrobial activity, pharmacy in public health

**PT-112**

**PH INDICATING SMART PACKAGING MATERIALS USING PURPLE HEART PLANT LEAF EXTRACT**

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Tradescantia pallida is a tender evergreen perennial native to northeast Mexico. Tradescantia species contain high amounts of antioxidant substances, including phenolics, tannins, flavonoids, and secondary metabolites. The anthocyanins present in T. pallida are sensitive to pH changes and respond by generating different hues of colours. The study focused on extracting pH-sensitive pigments Tradescantia pallida. The extract was utilized for preparing films using polymers sodium alginate, glycerol, and sodium carboxymethyl cellulose and guar gum. Both extracts and films prepared were checked for their colorimetric pattern in various solutions ranging in pH from 2.0 to 12.0. The prepared films were evaluated for their thickness, folding endurance. The influence of factors such as temperature and light on the stability of anthocyanins in the plant extract was also studied. The extract as well as the films responded to changes in the pH by showing different colour patterns. The average thickness was found to be 0.46±0.02 mm and folding endurance was found to be 200. The observed colour changes in response to variations in pH levels indicate the extract's ability to serve as a reliable indicator of acidity or alkalinity. This finding holds significant implications for industries such as cosmetics and food packaging, where monitoring pH levels is crucial for ensuring product quality and safety. The detection accuracy and sensitivity of anthocyanin pigments can be improved, thus reducing the detection rate of false positive or false negative results. The colour stability of anthocyanin films as well as its barrier and mechanical properties can be improved

**PT-113**

**SYNERGISTIC ANTIDEPRESSANT EFFECT OF POLYHERBAL METHANOLIC EXTRACTS IN EXPERIMENTAL MODELS**

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The present study investigates the antidepressant potential of a polyherbal formulation comprising Ocimum tenuiflorum (Tulsi), Withania somnifera (Ashwagandha), and Spinacia oleracea (Spinach). Although these plants have individually demonstrated antidepressant activity, their combined effect has not been extensively studied. Methanolic extracts of the selected plants were prepared using Soxhlet extraction and administered orally to Swiss albino mice. The antidepressant effect was evaluated using the Forced Swim Test, with Amitriptyline (10 mg/kg) serving as the standard reference drug. Phytochemical analysis revealed the presence of phenols, alkaloids, flavonoids, tannins, triterpenoids, and steroids in all three plants, suggesting possible synergistic activity. The polyherbal extract (1:1:1 ratio) demonstrated a significant reduction in immobility time, showing results comparable to Amitriptyline. These findings indicate that the formulation possesses promising antidepressant activity, supporting its potential as a natural therapeutic alternative for depression. Further studies, including clinical trials, are recommended to validate these results.

**Keywords:** Polyherbal formulation, Antidepressant activity, Soxhlet extraction, Forced Swim Test, Amitriptyline, Synergistic activity, Natural therapeutic alternative

**PT-114**




ISBN: 978-81-980623-8-3

**FORMULATION AND EVALUATION OF DECOCTION OF NYCTANTHES ARBORTRISTIS LINN FOR MANAGEMENT OF JOINT PAIN**

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Nyctanthes arbortristis L., a member of the Oleaceae family, is commonly employed in the creation of herbal medicine and has a variety of biological functions. It is a mythological plant having extensive medical use in Ayurveda. It contains alkaloids, flavonoids, anthraquinones, glycosides, tannins, steroids, saponins, phlobatannins, terpenoids, and so on. Its leaves contain mostly benzoic acid, fructose, glucose, carotene, amorphous resins, ascorbic acid, methyl salicylate, tannic acid, oleanolic acid, and flavanol glycoside. To extract the bioactive chemical found in the leaves of Nyctanthes arbortristis Linn and test the extract's anti-arthritic effectiveness.The Anti-inflammatory decoction is a drug used to alleviate joint discomfort. In the process of preparing and evaluating anti-inflammatory activity, an inquiry attempt including extracts of leaves of Nyctanthes arbortristis L. derived from extract of parijat .The anti-inflammatory properties of decoction leaves. The extraction was carried out using the decoction procedure. Anti-inflammatory formulation was effectively produced and met the relevant medicinal parameters. The resulting mixture is subsequently analyzed for criteria such as pH, chemical test, and in-vitro decoction testing. Stability characteristics such as visual appearance, nature, and pH of the formulations revealed that there was no significant variation during the study period.

**Keywords:** Nyctanthes Arbortristis Linn, Decoction, Anti-inflammatory, Joint Pain

**PT-115**

**HERBAL-BASED SOLID SHAMPOO BARS: AN ECO-FRIENDLY ALTERNATIVE FOR SUSTAINABLE HAIRCARE**

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Solid shampoo bars are an eco-friendly innovation in the personal care industry, designed to replace conventional liquid shampoos with sustainable, biodegradable, and plastic-free alternatives. Unlike synthetic formulations, herbal-based shampoo bars utilize natural surfactants and plant-derived extracts to provide effective cleansing, conditioning, and therapeutic action. In our research, the solid shampoo bar formulation incorporates ingredients such as reetha and shikakai as natural surfactants, neem and hibiscus extracts for scalp health and dandruff control, aloe vera for hydration, and coconut oil for improved hair strength and shine. The prepared shampoo bars were evaluated for pH, hardness, foaming ability, cleansing efficiency, and stability. Results demonstrated that the optimized formulation maintained a hair-friendly pH (4.5–5.5), produced stable foam, showed good cleansing activity, and exhibited better consumer acceptability compared to synthetic counterparts. In addition, the use of herbal extracts minimized scalp irritation while enhancing hair texture. The eco-friendly nature of solid shampoo bars, combined with therapeutic herbal benefits, positions them as a sustainable alternative with potential for commercialization in the natural haircare industry.

**Keywords:** Solid shampoo bars, herbal extracts, eco-friendly, sustainable haircare, natural surfactants.

**PT-116**

**FORMULATION AND ASSESSMENT OF THE ANTIMICROBIAL ACTION OF CELERY HYDROALCOHOLIC EXTRACT ON CARIES-ASSOCIATED STREPTOCOCCUS SPECIES**

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Celery (Apium graveolens L.) is a herbal plant that possesses the chemical composition flavonoid, saponin and tannin. They have been studied for many years for their antimicrobial properties. Oral preparations have not, however, been tested for antimicrobial efficacy. The purpose of this study is to develop chewable lozenges using hydroalcoholic extract from celery leaves and assess its antimicrobial and physical characteristics. Using the molded process, chewable lozenges containing celery leaf hydroalcoholic extract are developed. This formulation had been assessed for pH determination, dissolving testing, viscosity testing, weight uniformity, chemical testing and organoleptic testing. Using Streptococcus mutans, the antibacterial activity of chewable lozenges was tested using the diffusion method. The antimicrobial activity test results indicated that the Streptococcus mutans bacteria in F1, F2, and F3 had zones of inhibition diameters of 8.8 mm, 9.0 mm, 9.33 mm respectively. When compared to its other formulations, Formulation F3 had superior antimicrobial properties.

**Keywords:** Celery, lozenges, hydroalcoholic, antimicrobial.

**PT-117**

**FORMULATION AND EVALUATION OF ANTI-DANDRUFF HERBAL SHAMPOO**

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Shampoo is a hair care product using surfactant as main compound and used for removal of oils, dirt, skin particles, dandruff, environmental pollutants, and other contaminant particles that gradually build up in hair. But this surfactant has side effects like scalp, skin irritation, hair dryness and damage. Hence Herbal antidandruff shampoos have gained significant attention as they use natural alternatives to synthetic hair care products due to their environmental sustainability and therapeutic benefits. The main objective of study is to formulate and evaluate herbal shampoos with plant derived ingredients rich in bioactive compound such as saponin, flavonoid, polyphenols etc. These phytoconstituents provide cleansing, anti-inflammatory, conditioning, antimicrobial and contributing to overall scalp health & hair strength. Here herbal shampoo of three different composition of the chosen ingredients were formulated using cold maceration method. Herbal ingredients include Aloe barbadense miller (Aloe vera) for hydration, Acacia concinna (Shikakai) and Sapindus mukorossi (Reetha) for natural cleansing, Phyllanthus emblica (Amla) for nourishment, Azadirachta indica (Neem) for antimicrobial action and Hibiscus rosa-sinensis, (Hibiscus) for hair growth stimulation. This formulated herbal shampoo (HSF1, HSF2 and HSF3) was evaluated for organoleptic character, pH, solid content percentage, foam stability test, skin irritation test, dirt dispersion and showed optimal results. By this study, we conclude that HSF 1 was effective, possessing good properties for herbal shampoo - not only clean scalp effectively but also minimize hair damage, reduce dandruff & improve hair texture without stripping oil. Further optimization study may establish the benefits of herbal shampoo for its commercial potential.

**Keywords:** Herbal Shampoo, Antidandruff, Hair Care

**PT-118**

**DEVELOPMENT AND STANDARDIZATION OF A POLYHERBAL NUTRACEUTICAL SPRINKLE**

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The global nutraceutical sector has grown rapidly due to the high demand for simple, safe, plant-based health products. This study looks to address that growth by designing and standardizing a new everyday-use polyherbal nutraceutical sprinkle aiming to boost compliance among various groups of people. The formula uses plants like Emblica officinalis (Amla), Tinospora cordifolia (Giloy), Glycyrrhiza glabra (Liquorice), and Ocimum sanctum (Tulsi) known for their roles in supporting digestion, enhancing immunity, and fighting oxidative stress. To make it more appealing, the team included mannitol, a natural sweetener, along with raspberry flavor.The team created the formulation using geometric dilution and dry mixing. Key elements like moisture levels, particle size, blend uniformity, flow abilities like bulk density and Carr's index, and taste-related qualities were checked. Results showed it had good sensory appeal, remained stable, and could be reproduced. To meet the needs of kids older adults, and those with swallowing difficulties, the sprinkle format allows simple use without requiring water. Along with its




ISBN: 978-81-980623-8-3

health benefits, the product also has market perks like being easy to carry working well with functional food offering single-serve packaging options, and being adaptable to location-specific health claims.It plays a key part in the growing global market of functional foods and preventive healthcare. People are asking more for plant-based and clean-label products because it is natural, gluten-free, and non-invasive.To sum up, this polyherbal nutraceutical sprinkle is a sensible option for global commercialisation and acceptability. It blends contemporary nutraceutical developments with herbal traditions in a scalable, user-friendly, and scientifically supported manner.

**Keywords:** Polyherbal nutraceutical, Sprinkle formulation, Immunomodulatory activity, Physicochemical Standardization, Functional Food Innovation

**PT-119**

**EVALUATION OF INVITRO ANTICANCER, HEPATOPROTECTIVE, ANTI-INFLAMMATORY ACTIVITY OF ETHANOLIC EXTRACTS OF PSEUDERANTHEMUM GRACILIFLORUM**

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Pseuderanthemum graciliflorum is also called as Pseuderanthemum andersonii or Blue twilight belonging to family Acanthaceae. The objective behind this was to evaluate anti-cancer, hepatoprotective and anti-inflammatory activity of Pseuderanthemum graciliflorum. Dried and powdered leaves are extracted and was studied using albumin denaturation, heat induced haemolysis and proteinase inhibition. This possesses significant anti-inflammatory activity. The studies with MTT assay method indicate hepatoprotective activity. The in-vitro anticancer activity in alcoholic extract of Pseuderanthemum graciliflorum was done in Daltons Lymphoma Ascites cell lines. The preliminary photochemical examination showed the presence of flavonoids, phytosterols, proteins and aminoacids. This shows significant anti-cancer, hepatoprotective and anti-inflammatory activity. The result obtained from study indicates that Pseuderanthemum graciliflorum leaves posses significant anti-cancer, hepatoprotective and anti-inflammatory activity.

**Keywords:** Dalton lymphoma ascites, MTT assay, Inhibition of albumin denaturation, Heat induced haemolysis assay, Proteinase inhibition.

**PT-120**

**PHYTOCHEMICAL PROFILING AND ANTHELMINTIC POTENTIAL OF JATROPHA GOSSYPIIFOLIA L. LEAVES: COMPARATIVE EVALUATION WITH ALBENDAZOLE**

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Helminthiasis is still a significant public health problem worldwide, especially in the tropics, with growing resistance to man-made anthelmintics. As such, seeking effective alternatives from plants has gained significant significance. The current study examined the phytochemical content and anthelmintic efficacy of Jatropha gossypiifolia L. leaves, a medicinal shrub used extensively in folk medicine against intestinal parasites. Leafy green parts were shade dried, ground, and stepwise extracted using solvents of rising polarity. Quantitative phytochemical investigation of the methanolic extract showed rich contents of phenolics (82.5 ± 2.3 mg GAE/g extract) and flavonoids (46.2 ± 1.7 mg QE/g extract), in addition to alkaloids, tannins, saponins, and glycosides. Anthelmintic activity against adult earthworms (Pheretima posthuma) was determined at 25, 50, and 100 mg/mL using albendazole (10 mg/mL) as control. The methanolic extract exhibited highest activity with paralysis at 7.8 ± 0.3 min and death at 14.6 ± 0.5 min (100 mg/mL), which was similar to albendazole (paralysis: 6.2 ± 0.2 min; death: 12.1 ± 0.4 min). In summary, this research can introduce Jatropha gossypiifolia as a promising natural source of anthelmintic compounds and can be used in the formulation of superior anthelmintic therapy.

**Keywords:** Jatropha gossypiifolia, phytochemicals, anthelmintic activity, methanolic extract, albendazole.

**PT-121**

**COMBINATION AND EVALUATION OF CARICA PAPAYA LEAF EXTRACT LOADED PHYTOSOMES - A NOVEL APPROACH TO TREAT DENGUE**

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The current research involves preparation and assessment of phytosomes of carica papaya leaf extract by solvent evaporation technique. Carica papaya leaf extract is utilized for the treatment of dengue fever. It also possesses characteristics such as anti-viral activities which can enhance the immunity in case of dengue fever. The flavonoids and the other phenolic compounds present in the leaf extract are accountable to avoid inner haemorrhage and can inhibit DEN-2 virus assembly. In the present research, the leaf extract is formulated as phytosomes which are employed for the treatment of dengue fever. The extract is formulated into phytosomes by using solvent evaporation method. The extract is standardized and FTIR studies revealed that there was no interaction between carica papaya leaf extract & soya lecithin. The formulated phytosomes were checked for particle size, zeta potential, entrapment efficiency and in vitro drug release. The research reveals that the release from phytosomes was superior to the pure leaf extract. Thus, we can conclude that carica papaya phytosomes are more useful and effective for the treatment of dengue fever as release is increased from the phytosomal drug delivery.

**Keywords:** Phytosomes, solvent evaporation, anti-viral, haemorrhage, FTIR studies,soya lecithin.

**PT-122**

**BANANA PEEL TO PULP: A VERSATILE RESOURCE FOR HUMAN WELLNESS**

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Banana peel and pulp have attracted the attention of researchers due to their abundance of bioactive compounds. Phenolic constituents in both peels and pulp parts of the fruit exhibit strong antioxidant and antimicrobial properties, making them valuable natural antioxidants with potential pharmaceutical applications. Traditionally, banana peels have been promoted for wound healing, particularly in burns, and addressing disease conditions, such as depression, underscoring their therapeutic significance. The chemical composition of banana peel and pulp is diverse, including phenolic compounds, alkaloids, flavonoids, tannins, saponins, glycosides, sterols, triterpenes, carotenoids, and catecholamines. This assorted composition supports a wide range of biological potential, including provitamin A supplementation, antioxidant activity by activation of endogenous enzymes, reduce lipid peroxidation, and modulate various signalling pathways involved in oxidative stress through phenolic/flavonoid constituents, and possible benefits in Parkinson's disease owed to their content of L-dopa and dopamine. With their richness of health-promoting bioactive molecules, banana peel and pulp represent promising raw materials for phytomedicine and even conventional drug development. By utilizing these resources, banana fruit residues, often overlooked as waste, could open up new avenues and become valuable resources for the food, pharmaceutical, and related industries. Finally, banana peel and pulp are versatile bio-resources with significant therapeutic and industrial potential, highlighting the importance of their systematic exploration and application in various fields.

**Keywords:** Antimicrobial, Antioxidant, Banana peel, Bioactive compounds, Therapeutic benefits

**PT-123**

**FORMULATION AND EVALUATION OF HERBAL SALVE FROM AYURVEDIC PLANTS FOR MULTIPURPOSE SKIN CARE.**

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The purpose of the work was to formulate and characterize the herbal salve containing ayurvedic herbs. Salve is formulated by using beeswax, coconut oil and eucalyptus oil by Fusion method. The Herbs-Nagarmotha, Manjista, Curcumin and Madhuyasthi are used as they contain ayurvedic importance for the preparation of herbal salve with




ISBN: 978-81-980623-8-3

suitable base such as beeswax, and vehicle-coconut oil for the purpose of skincare. The prepared salves are characterized for IR studies, production yield, DSC, SEM. The percentage yield of formulation was from 83.34 - 97.62%. The DSC studies are revealed that the drug and base are compatible with each other during preparation. The changes in the physical properties of the formulated salves are not observed. Herbal salves show good consistency and spreadability, non-greasy, homogeneity. No evidence of phase separation during study period is observed. The prepared salve is tested by applying an area (1sq.cm) on the left hand dorsal surface. The cream was applied to the specified area and time was noted. Irritancy, erythema, edema was checked for regular intervals up to 24 hours and reported. Furthermore, the formulation remained stable during short- term stability testing. In conclusion, the developed herbal salve promises overcoming the limitations associated with oral administration.

**Keywords:** Nagarmotha, Curcumin, Manjista, painrelief, Anti-inflammatory.

**PT-124**

## VITEX TRIFOLIA LINN : COMPARATIVE ANTI TUBERCULAR ACTIVITY OF ETHANOLIC EXTRACT VS. FREEZE DRIED CONCOCTION

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Tuberculosis (TB) continues to be a major global health challenge, with rising drug resistance highlighting the urgent need for novel therapeutic options from natural sources. Vitex trifolia Linn. A medicinal plant traditionally used in Ayurveda, has demonstrated promising anti-tubercular activity. The present study aimed to compare the chemical profile and anti-tubercular activity of ethanolic extract and freeze-dried concoction of Vitex trifolia Linn. Along with their formulations using different carriers. Plant material was authenticated and processed to prepare both extract types. Chemical profiling was carried out using High-Performance Thin-Layer Chromatography (HPTLC) and spectroscopic techniques. Anti-tubercular efficacy was evaluated by Microplate Alamar Blue Assay (MABA) against Mycobacterium tuberculosis, and toxicity was assessed using the Brine Shrimp Lethality Assay (BSLA).Results indicated that both preparations shared a comparable phytochemical profile, rich in alkaloids, flavonoids, terpenoids, and phenolic compounds. The freeze-drying process preserved phytoconstituents without significant alterations. Anti-tubercular activity studies revealed strong inhibition, with Minimum Inhibitory Concentration (MIC) values of 1.6 µg/mL for ethanolic extract, freeze-dried concoction, and milk-based formulation. However, the ghee formulation showed reduced potency with an MIC of 12.5 µg/mL.In conclusion, Vitex trifolia Linn. exhibits potential as a natural anti-tubercular agent, with both ethanolic extract and freeze-dried concoction demonstrating significant activity and consistent chemical composition. These findings provide scientific validation for its traditional medicinal use and suggest its applicability in the development of plant-based formulations for TB management.

**Keywords:** Vitex trifolia, tuberculosis, anti-tubercular activity, photochemistry, MABA assay.

**PT-125**

## DEVELOPMENT AND CHARACTERIZATION OF POLYHERBAL FORMULATION FOR THE TREATMENT OF HAEMORRHOIDS

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The purpose of the present investigation is to formulate and evaluate a polyherbal cream for the treatment of haemorrhoids using herbs, available locally and used traditionally and to deliver proper evidence for its pharmacological effect. Haemorrhoids, also known as piles, are swellings containing enlarged blood vessels that are found inside or around the bottom (the rectum and anus). In this project three plant extracts are used for the preparation of anti-haemorrhoidal polyherbal formulation. The three plants used are Holoptelea integrifolia, Mimosa pudica, Clerodendrum infortunatum. Due to various side effects, drug interactions, and the high costs of synthetic drugs, interest in herbal medicines is increasing day by day. Among the population, the variety of plants used against haemorrhoids is quite high. For example, 241 medicinal plants are used to treat haemorrhoids in various regions of the world. The polyherbal cream was formulated and physicochemical evaluation and pharmacological evaluation was done. In this study,the polyherbal cream were prepared at various concentrations and evaluations were done. After that the anti-haemorrhoidal property were proved by animal studies. All the formulations were found to be neutral pH and on physical evaluation the formulations were found to be optimum in terms of cream;consistency, viscosity, Spreadability and extrudability. Animal study is carried out which showed satisfactory result. Polyherbal cream containing Holoptelea integrifolia,Mimosa pudica,Clerodendrum infortunatum were successfully prepared and obtained cream showed acceptable pH, consistency,viscosity,spreadability and extrudability. The invitro and in vivo studies has given positive results for the ant haemorrhoidal property of the polyherbal cream.It showed that all the parameters of the polyherbal cream was within in the acceptable limit. A further experiment is required to isolate the possible bioactive compound from hydroalcoholic fraction of polyherbal extract and to evaluate the isolated compounds on haemorrhoid model.

**Keywords:** Polyherbal formulation, Haemorrhoids, Holoptelea integrifolia, Mimosa pudica, Clerodendrum infortunatum, Wistar Albino Rats.

**PT-126**

## EVALUATION OF ANTICONVULSANT EFFECT OF MYRISTICA FRAGRANCE BY THE FOKLORE OF VIDHARBHA REGION

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Convulsions are a form of neurological illness that is grouped together under the umbrella word "convulsions." An individual who is having a seizure may experience a loss of consciousness as a consequence of the sudden rise in the level of electrical activity that takes place in their brain during the seizure. This may be caused by the seizure itself. Significant unfavorable long-term repercussions, such as persistent visual field abnormalities brought on by vi GABA's trim and aberrant pigmentation of the retina brought on by retigabine, have resulted to a decline in the prescription of some antiepileptic medications that is not insignificant. These bad long-term implications include permanent visual field anomalies. These unfavorable aftereffects of prolonged exposure are being held responsible for the drop. Medications derived from plants that are used in the management of delusions have no side effect. Maximal Electroshock Convulsion (M.E.S) Test, Pentylenetetrezole (PTZ) Influence Convulsion Test are methods use for Analysis of Phytochemicals the aroma of myristica revealed that ethanolic extract of myristica fragrance has a variety of phytochemicals, including alkaloids, flavonoids, carbohydrate derivatives, steroidal glycosides, saponins, glycosides, tannins, and terpenoids. Phytochemical analysis proved the existence of various active chemical constituents in Myristica Fragrance ethanolic take out. These constituents, which include alkaloids, saponines, flavonoids, steroids, and carbohydrates, have shown evidence of antiepileptic activity against the influence of M.E.S. convulsions. There are a number of different molecular mechanisms that drugs may use to either stop the spread of convulsions or raise the threshold at which convulsions start.

**Keywords:** Epilepsy, Ethanolic, Myristica Fragrance, Convulsion.

**PT-127**

## DEVELOPMENT AND EVALUATION OF SOME NOVEL HERBAL FORMULATION

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In the current research, herbal capsule containing Trigonella foenum-graecum (Fenugreek) seeds and and Musa paradisiaca (Green Banana) fruits with peels was formulated. The objective of the research was to assess the antidiabetic activity by In -vitro and In- vivo model and Design and optimization of dosage form to achieve synergism. The selected herbal drugs were extracted subjected to phytochemical evaluation by




ISBN: 978-81-980623-8-3

HPTLC fingerprint analysis and LCMS. Pharmacological studies including In -vitro study and In -vivo antidiabetic study on animals were performed. The extracts were formulated to capsule by calculating HED, formulation was design and optimized. The HPTLC fingerprint and HR-LCMS analysis confirmed the presence of marker compounds: diosgenin in HETFS and quercetin in EMPF. In-vitro evaluation using α-amylase inhibitory assay, where the 1:2 and 2:1 ratios exhibited synergistic inhibitory effects. The diabetes was induced by streptozotocin and nicotinamide to evaluate antidiabetic activity. Among the tested ratios, the 1:2 ratio demonstrated potent synergistic antidiabetic effect. The dose determined from the In-vivo animal study was converted to the human equivalent dose (HED) following FDA guidelines. The 1:2 ratio of extracts was selected for optimization and formulation of capsules. Formulation showed optimal disintegration time, IC50 value, and % alpha-amylase activity, with stability and consistency confirmed by accelerated studies and HPTLC analysis. The simplified two-drug formulation offers a standardized and effective alternative to complex multi- drug antidiabetic therapies existing in the market. Additionally, the formulation provides the benefit of lesser side effects with economic viability.

**Keywords:** Trigonella foenum-graecum, Musa paradisiaca, Synergism, HED, Antidiabetic Capsule.

**PT-128**

## EVALUATION OF ANTIHELMINTIC AND ANTIFUNGAL ACTIVITY OF POLYPODIM VULGARE

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In the current research, attempts have been made to evaluate the antihelmintic and antifungal activity of Polypodium vulgare (PV). PV has been exploited in traditional herbal medicine as an expectorant and laxative. The objective behind this research is exploring the antihelmintic and antifungal properties of PV by using aqueous, ethanolic and ethyl acetate extracts in various concentrations. Extracts of PV were subjected to phytochemical analysis followed by antihelmintic assessment based on time of paralysis and death in Eisena foetida (adult earthworm). Eisena foetida was subjected to concentrations of 30mg/ml and 40mg/ml of the above mentioned respective solvents. Piperazine citrate (10mg/ml) was used for comparative analysis of antihelmintic activity. To assess the antifungal property, fungi selected were Aspergillus niger and Candida albicans. This study was performed as per NCCLS guidelines using Cup-Plate method. The extracts were subjected to standard antifungal screening procedure by agar gradient method. The standard drug for comparative analysis was flucanozole (2mg/10ml). The test concentrations of solvents used were 100mg/ml, 150mg/ml and 200mg/ml respectively. The Sabouraud's agar plates were incubated accordingly, followed by recording values of zone of inhibition. The alkaloids present in PV interfere with nerve transmission, leading to paralysis. Tannins and flavonoids present in PV binds to protein present on worm cuticle leading to cell damage and cell death. Saponins and tannins found in PV create pores on cell membrane of candida cells leading to leakage of cell contents. Thus, our results show potential in incorporating PV into drugs used as antihelmintic and antifungal.

**Keywords:** Polypodium vulgare, antihelmintic activity, antifungal activity, NCCLS guidlines, in-vitro

**PT-129**

## PHYTOPHARMACOLOGICAL SCREENING OF SYNEDRELLA NODIFLORA FOR BIOLOGICAL POTENTIAL

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Synedrella nodiflora (Linn.) Gaertn. an ethnomedicinally important subshrub, has been traditionally utilized by different ethnic communities for treating inflammation, liver disorders, asthma, and diabetes. This study aimed to examine its phytoconstituents, and evaluate its antioxidant, antidiabetic, antibacterial potential as well as cytotoxicity. Hydro-ethanolic extract was prepared using cold maceration and subsequently fractionated via liquid-liquid extraction of the aerial part of the plant. The crude extract exhibited IC50 values of 478.74 µg/mL and 370.20 µg/mL, respectively against Vero and HepG2 cells in MTT assay. The n-butanol fraction exhibited significant bioactivity with IC50 values of 59.37 µg/mL and 48.428 µg/mL for α-amylase and α-glucosidase, respectively, and 46.64 µg/mL in DPPH assay. Moderate antibacterial activity was observed with zones of inhibition ranging from 9-12 mm against P. aeruginosa, E. coli, B. subtilis and S. aureus. Phytochemical analysis revealed the presence of phenolics, flavonoids, glycosides, saponins, and tannins. Quantitative assays confirmed high levels of phenolics (42.16 mg GAE/g), flavonoids (28.06 mg QE/g), and glycosides (27.77 mg DE/g) in the n-butanol fraction. Subsequently, UPLC-QTOF-MS analysis of n-butanol fraction showed the presence of different secondary metabolites. Furthermore, molecular docking studies revealed that secondary metabolites 3-hydroxy-5-methyl phenol-1-O-β-D-(6'-galloyl) glucopyranoside and 2-(3,4-Dihydroxyphenyl)-3,4-dihydro-2H-chromene-3,5,7-triol possessed favorable interactions with the respective enzymes with docking scores of -8.434 kcal/mol (3A4A) and -7.346 kcal/mol (1B2Y), respectively.

**Keywords**: Synedrella nodiflora, antioxidant, antidiabetic, UPLC-QTOF-MS, molecular docking

**PT-130**

## COMPUTATIONAL AND EXPERIMENTAL EVALUATION OF PHYTO-CONSTITUENTS FOR THE DEVELOPMENT OF AN ANTI-ASTHMATIC FORMULATION

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Asthma, a chronic inflammatory airway disease and the 11th leading cause of death in India, poses a growing health burden with increasing prevalence among young and adult populations. Current therapies provide only symptomatic relief and are often associated with side effects, underscoring the urgent need for novel therapeutic strategies. This study integrates computational and experimental approaches to explore phytochemical-based alternatives for asthma management. A systematic literature survey was conducted to identify bioactive phytoconstituents, which were subsequently analyzed through network pharmacology to map their interactions with asthma-related molecular targets and signaling pathways. The network analysis revealed critical hubs and multi-target interactions suggestive of therapeutic relevance. To further validate these findings, molecular docking studies were performed, confirming strong binding affinities and stable interactions of selected phytochemicals with key asthma-associated targets, thereby reinforcing their potential efficacy. Based on these results, the most promising phytoconstituents were formulated into a novel preparation and subjected to preclinical evaluation using experimental animal models. The formulation will be demonstrated for anti-asthmatic activity, supporting the predictive accuracy of the computational analysis. This integrative strategy not only provided a comprehensive understanding of asthma pathophysiology but also identified promising phytoconstituents with multi-target actions, advancing the concept of phytochemical-based therapeutic development. The findings establish a robust foundation for future in vitro and in vivo investigations to optimize formulation, assess safety, and validate efficacy, ultimately contributing toward the development of a novel, effective, and safer treatment option for asthma.

**Keywords:** Chronic Airway Inflammation, Bioactive Compounds, Target Identification, computational Pharmacology, Preclinical Evaluation

**PT-131**

## FORMULATION AND EVALUATION OF BETEL LEAF HERBAL FACIAL SCRUB FOR SKIN HEALTH AND CLEANSING

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Herbal skincare products have gained popularity due to their natural, skin-friendly, and environmentally sustainable benefits. This study focuses on the formulation and evaluation of a betel leaf-based herbal facial scrub, utilizing natural exfoliants and therapeutic plant-derived ingredients. Betel leaf (Piper betel) is renowned for its antimicrobial, antioxidant, and anti-inflammatory properties, making it a valuable addition to skincare formulations. The scrub was prepared using natural exfoliating agents such as rice powder, along with other essential




ISBN: 978-81-980623-8-3

ingredients like Carbopol 934 (gelling agent), triethanolamine (pH adjuster), and rose water (fragrance). The optimized formulation (F3) was assessed according to a number of criteria, including organoleptic properties, pH, irritancy, washability, and formability. The results showed that F3 had a smooth and uniform texture, with a greenish colour and pleasant fragrance. The pH of 6.84 indicated skin compatibility, ensuring mildness for topical application. Irritancy testing confirmed that the scrub was non-irritating, as no signs of redness or oedema were observed. Washability tests demonstrated easy removal without leaving any residue, while formability tests indicated moderate foaming, enhancing the cleansing experience. Overall, the betel leaf herbal facial scrub exhibited excellent stability and effectiveness, offering an eco-friendly and skin-beneficial alternative to conventional exfoliating products. The study highlights the potential of herbal-based formulations in promoting sustainable skincare solutions. Further research can explore its long-term effects on skin health and its potential for commercialization in the natural cosmetics industry.

**Keywords:** Herbal skincare, betel leaf (Piper betel), facial scrub, natural exfoliant, skin health, eco-friendly, sustainable cosmetics, pH, irritancy, formability.

**PT-132**

## FROM NATURE, FOR NATURE: NATURE PROTECTOR INCENSE STICK

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In recent years, increasing awareness of the harmful effects of synthetic room fresheners and disinfectants has created a demand for natural and eco-friendly alternatives. The present study aimed to develop and evaluate a herbal dhoop (incense stick) formulated with natural ingredients such as Kapoor Tulasi, Bhimsen camphor, cow dung, cow milk, marigold flowers, and cow ghee. The need for this formulation arises from its potential to provide relaxation, mental clarity, health benefits, and mosquito-repellent activity while promoting sustainable and ethical practices. The objectives of the study were focused on environmental purification, aromatherapy, spiritual applications, and eco-friendly fumigation practices**.** Evaluation was carried out through various parameters**.** Sensory evaluation was conducted with 20 students, who assessed smell, smoke, and appearance**.** Physical evaluation indicated a dark brown color and a Havana-type odor. Phytochemical analysis revealed the presence of carbohydrates, alkaloids, glycosides, and flavonoids, while amino acids were absent. Mosquito repellency tests demonstrated significant positive activity. Microbiological tests further indicated its potential for air purification, whereas burning performance tests confirmed efficient combustion properties. Thus, the formulated herbal dhoop can serve as a safe, eco-friendly, and multifunctional alternative suitable for fumigation in hospital wards, microbiological laboratories, and households. It combines the benefits of air purification, aromatherapy, spiritual well-being, and mosquito repellency, making it a sustainable solution for modern needs.

**Keywords:** Herbal dhoop, Eco-friendly fumigation, Mosquito repellent, Air purification

**PT-133**

## UNVEILING THE MULTIFACETED BENEFITS OF HIPPOPHAE RHAMNOIDES (SEA BUCKTHORN): FROM TRADITIONAL MEDICINE TO MODERN THERAPEUTICS

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Sea buckthorn (Hippophae rhamnoides), a deciduous shrub native to Europe and Asia, has attracted growing scientific attention due to its remarkable nutritional and therapeutic potential. Its berries, seeds, and leaves are rich in bioactive compounds, including vitamins C, A, E, and K, flavonoids (quercetin, kaempferol), essential fatty acids (omega-3, -6, -7, -9), phenolic acids, carotenoids, phytosterols, and amino acids. This diverse phytochemical profile underlies its broad pharmacological actions—antioxidant, anti-inflammatory, anticancer, hepatoprotective, cardioprotective, neuroprotective, and dermatological. Traditionally valued in Tibetan, Chinese, and Greek medicine, sea buckthorn has found modern uses in nutraceuticals, cosmeceuticals, and functional foods. Its potent antioxidant activity, primarily due to high vitamin C and polyphenol content, helps neutralize free radicals and mitigate oxidative stress. Oil extracted from its seeds and pulp promotes skin regeneration, hydration, and anti-inflammatory effects. Additionally, it shows promise in managing metabolic disorders like diabetes and hyperlipidemia and supports cardiovascular health by improving lipid profiles and regulating blood pressure. Preclinical studies indicate anti-cancer potential through apoptosis induction and tumor growth suppression. While its health-promoting effects are well-documented, clinical validation is needed to determine standardized dosing, safety, and interactions. This review highlights sea buckthorn's phytochemistry and therapeutic promise, positioning it as a valuable agent in integrative medicine.

**Keywords**: Sea buckthorn, Hippophae rhamnoides, antioxidant, anti-inflammatory, phytochemicals, nutraceutical, medicinal plant.

**PT-134**

## EXPLORING BIOACTIVE METABOLITES FROM BACILLUS SUBTILIS ISOLATED FROM THE SEEDS OF ARGEMONE MEXICANA

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This study investigates the potential of endophytic bacteria, which reside in plant tissues without causing harm, as sources of bioactive compounds. We isolated Bacillus subtilis from the seeds of Argemone mexicana and identified it through 16S rRNA sequencing. The bacteria were cultivated using submerged fermentation; after incubation, the fermentation broth was centrifuged and extracted using ethyl acetate. The extract was further purified through column chromatography, yielding bioactive compounds, including para-hydroxy phenyl propionic acid **1** and three diketopiperazine derivatives: 2-cyclo(L-phe-L-pro) **2**, cyclo-(L-leucyl-trans-4-hydroxy-L-proline) **3**, and (3-(7-hydroxy-1,4-dioxooctahydropyrrolo[1,2-a]pyrazin-3-yl)propanoyl)-L-leucine **4**. Compounds **1**, **2**, **3**, and **4** were evaluated for their antibacterial and anti-TB properties, showing strong efficacy against both Gram-positive and Gram-negative bacteria, along with considerable anti-tuberculosis activity against the Mycobacterium tuberculosis H37Rv strain, with a Minimum Inhibitory Concentration (MIC) of 12.5 µg/mL. This research emphasizes the potential of Bacillus subtilis from Argemone mexicana as a promising source of bioactive compounds for developing antimicrobial and anti-tuberculosis drugs.

**Keywords:** Anti-tubercular drugs; Argemonemexicana; Bacillus subtilis; Bioactive compounds; Endophytic bacteria; Fermentation.

**PT-135**

## FLAVONOID-ENRICHED NANOGEL OF TERMINALIA ARJUNA BARK EXTRACT: A NOVEL PHYTOPHARMACEUTICAL APPROACH FOR HEMORRHOID TREATMENT

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Anorectal disorder which comprises of piles or hemorrhoids is characterized by the inflammation, vascular dysfunction and oxidative stress causing pain, swelling and bleeding from the rectum. Conventional treatments, including corticosteroids and surgical interventions, normally constitute limitations, which however frequently include recurrence and side effects. However due to their safety and efficacy, phytopharmaceuticals are being looked at as possibilities in hemorrhoidal management in recent years. In this study, a flavonoid enriched nanogel from Terminalia arjuna bark extract was formulated and is known to have potent antioxidant, anti inflammatory and venotonic properties among all well documented medicinal plants. Using a nanoemulsion based method for formulation, a biocompatible polymeric system was used to optimize the nanogel to improve flavonoid stability, biodegradability, controlled release and increased dermal penetration. The formulation was characterized and comprised measurement of particle size, zeta potential, viscosity, entrapment




ISBN: 978-81-980623-8-3

efficiency, and in-vitro release kinetics. A nanogel size of roughly 120 nm was obtained for the optimized nanogel, ensuring skin absorption and also providing sustained release. Under accelerated and real-time conditions, in vitro anti inflammatory assays and in vivo hemorrhoidal model the therapeutic efficacy was studied; The stability studies also showed high physicochemical stability with retention of flavonoid integrity greater than 6 months. In animal models, the nanogel substantially suppressed pro-inflammatory markers, improved microvascular circulation and accelerated wound healing, and much more than conventional anti-hemorrhoidal formulations. On patients with grade I and II hemorrhoids clinical studies showed substantial pain relief, less swelling and improved patient compliance when compared with available topical treatments. These findings indicate that use of flavonoid enriched Terminalia arjuna nanogel might be a promising phytopharmaceutical alternative for the hemeroid management due to high bioavailability, focused delivery and diminished recurrences.

**Keywords:** Terminalia arjuna, Flavonoid-Enriched Nanogel, Hemorrhoid Treatment, Phytopharmaceuticals, Nanoemulsion.

**PT-136**

## FORMULATION AND EVALUATION OF HERBAL LIP BALM USING NATURAL WAXES AND EXTRACTS

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The increasing popularity of herbal therapies and the use of plant-based ingredients have stimulated the development of herbal lip balms. This study focuses on the formulation and evaluation of a herbal lip balm using natural waxes and herbal extracts with emollient, healing, and antioxidant properties. Structural components of the formulation, consistency, and stability were achieved using beeswax and carnauba wax. Shea butter and coconut oil were incorporated for their excellent moisturising effects and were further enhanced with aloe vera, tulsi, and rose herbal extracts for their emollient, healing, and antioxidant properties.The formulation steps of the lip balm were the combination of melter oil and wax, and then herbal extracts were incorporated. The mixture was finally placed into a mould and allowed to set at room temperature. Further evaluation of the lip balm formulation included pH, melting point, spreadability, homogeneity, stability under a variety of storage conditions, and skin irritation tests.The results indicated that the herbal lip balm formulation retained ideal textural and spreadability properties while maintaining stability with no phase separation.

**Keywords:** Herbal lip balm, natural waxes, herbal extracts, cosmetic formulation, stability testing.

**PT-137**

## HERBAL DEPIGMENTATION CREAM USING LICORICE AND SAFFRON

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Hyperpigmentation of skin due to excessive production of melanin is caused due to various factors like UV exposure, hormonal changes, aging. Chemical based depigmenting agents like hydroquinone and kojic acid shows various long term adverse effects. In this study herbal depigmentation cream is formulated which consist two natural herbs Licorice (Glycirrhiza glabra) and Saffron (Crocus sativus) which is known for their skin lightning properties. Licorice root extract consist of glabridin which is tyrosinase inhibitor and reduces the melanin production. Saffron consist safranal which reduces the oxidative stress. The cream has been prepared using o/w emulsion base incorporating extracts of licorice and saffron. Evaluation such as pH, viscosity, spreadibility is conducted. In vitro tyrosinase inhibition assay was performed for assessing the depigmenting potential. The results show the acceptable physicochemical properties and tyrosinase inhibition, which causes melanin suppression. A skin irritation study on humans indicated that product is non-irritant. The herbal formulation is promising alternative for the depigmenting creams. Further clinical trials are recommended to evaluate long-term effects and consumer acceptability.

**Keywords:** Herbal depigmentation, Licorice, Saffron, Tyrosinase inhibition, Skin lightening.

**PT-138**

## AYURVEDIC DRUGS AND THEIR MODERN APPLICATIONS: BRIDGING TRADITION WITH CONTEMPORARY THERAPEUTICS

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Ayurveda, the ancient Indian system of medicine, has provided a comprehensive framework for health and healing for over 5,000 years. Rooted in holistic principles, Ayurvedic formulations use natural herbs, minerals, and plant-based compounds that promote balance among the body's physiological systems. In recent decades, there has been a resurgence of interest in Ayurvedic drugs, driven by the increasing demand for natural, safe, and sustainable alternatives to synthetic pharmaceuticals. This highlights the scientific validation and modern applications of key Ayurvedic formulations and bioactive compounds. Notable examples include Ashwagandha (Withania somnifera) for adaptogenic and neuroprotective effects, Guduchi (Tinospora cordifolia) for immunomodulation, and Boswellia serrata for anti-inflammatory action. These natural compounds are now being studied using advanced techniques such as pharmacognosy, molecular docking, clinical trials, and nanoformulation delivery systems. Modern pharmaceutical research has begun to decode the mechanisms behind these traditional remedies, allowing for the integration of Ayurvedic principles into evidence-based medicine. Additionally, the global nutraceutical and wellness industries are increasingly embracing Ayurvedic drugs in the development of herbal supplements, cosmeceuticals, and functional food. This paper underscores the importance of standardization, quality control, and regulatory frameworks in translating Ayurvedic drugs into modern healthcare solutions. By combining traditional wisdom with scientific innovation, Ayurveda holds significant potential to address chronic diseases, stress-related disorders, and lifestyle ailments in the 21st century.

**Keywords:** Ayurveda, Ayurvedic drugs, phytopharmacology, traditional medicine, herbal therapeutics, modern applications, Ashwagandha, Tinospora cordifolia, Boswellia, evidence-based Ayurveda, integrative medicine, Indian pharmacopeia.

**PT-139**

## DEVELOPMENT OF HERBAL DEWORMERS FROM INDIGENOUS PLANTS FOR LIVESTOCK

Hamza sayyed , Rajat sayyed

Parasitic infestations in farm animals have a great impact on animal well-being and productivity, particularly in rural and farming societies. Traditional anthelmintics are usually costly and resistant to development, necessitating the development of novelstrategies. This research is concerned with the development of a low-cost, environmentallyfriendly herbal dewormer based on local plant materials like Carica papaya (papaya seeds), Azadirachta indica (neem leaves), and Areca catechu (betel nut).The chosen plants are classically recognized for their anthelmintic property and were prepared in powdered and aqueous extract forms. Phytochemical screening revealed the presence of active principles such as tannins, alkaloids, and flavonoids, which are said to disrupt the energy metabolism and neuromuscular activity of gastrointestinal parasites.The herbal preparation was orally administered to infected animals (under veterinary guidance), and efficacy was determined in terms of fecal egg count reduction (FECR) for 14days. Results indicated a dramatic reduction in parasitic load, with papaya seed and neem extract combination being the most effective. No side effects were noted, pointing out the safety of the herbal drug. This method provides a promising, low-cost alternative to the chemical dewormers, particularly in resource-constrained rural settings. The role of pharmacists in the standardization, quality control, and awareness of such veterinary herbal formulations is crucial. Future work includes optimizing dosage formsand conducting controlled field trials to validate efficacy across species.

**PT-140**

## FORMULATION AND EVALUATION OF HERBAL FACE WASH

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ISBN: 978-81-980623-8-3

The increasing awareness of natural skincare has led to the demand for herbal-based cosmetics. This study focuses on the formulation and evaluation of an effective herbal face wash using natural ingredients such as neem (Azadirachta indica), tulsi (Ocimum sanctum), aloe vera (Aloe barbadensis), and orange peel extract. These herbs were selected for their proven antimicrobial, anti-inflammatory, antioxidant, and skin-soothing properties. The face wash was formulated using a gel base and evaluated for key parameters including pH, viscosity, spreadability, foaming ability, stability, and microbial load. The final formulation showed desirable cosmetic properties and was well-tolerated on human skin during preliminary trials. The study concludes that herbal face wash formulations offer a safe and effective alternative to synthetic products and hold promising potential for commercial development with minimal side effects.

**Keywords:** Herbal cosmetics, Face wash, Natural ingredients, Evaluation, Skin care

**PT-141**

**FORMULATION AND EVALUATION OF HERBAL FACE CREAM**

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The present study was point out with the object of preparing the Herbal face cream that reduces acne, pimples and improves the skin moisture, and nourishment for the skin. Herbal face cream was formulated with the aqueous extract of Myristica fragrans and Zingiber officinale that are commonly used for the acne, pimples, skin nourishment. The main challenge lies in the selection of natural material which can be rationally justified and comparable to that of synthetic material. In present study our aim is to develop an Herbal face cream which would be natural. The Herbal face cream was prepared by Tituration method and further Evaluated for various evaluation parameters such as Physical properties, Determination of pH, Spreadability, Viscosity, Washability, after feel test, Greasiness, Irritancy test, Stability test. The Herbal face creams show the good physical appearance with faint yellow Color, Smooth consistency, pleasant odor, and Semi-solid state. The pH of theF3 was found to be 5.9. The Viscosity and Spreadability of the F3 was found to be 3489Cps and15.0g.cm/s. The F3 was not observed of any phase separation and easily washable with tap water. After feel test for the F3 was found to be good, not shown any irritation, greasiness and no separation.

**Keywords:** Herbal face cream, Myristica fragrans, Zingiber officinale.

**PT-142**

**FORMULATION AND EVALUATION OF HERBAL MOUTHWASH FOR ORAL HYGIENE**

SAMIYA MUSTAFA SHAIKH

Oral hygiene is an essential part of overall health, and mouthwashes are commonly used assupportive agents to control oral bacteria, reduce bad breath, and maintain freshness. However,most commercially available mouthwashes contain chemical ingredients such as chlorhexidine and alcohol, which may cause side effects like burning sensation, staining of teeth, altered taste, and mucosal irritation with long-term use. Due to these drawbacks, herbal alternatives aregaining popularity for being safer and more compatible with the body. This study aims toformulate and evaluate a herbal mouthwash using natural ingredients such as Ocimum sanctum(Tulsi), Azadirachta indica (Neem), Syzygium aromaticum (Clove), and Mentha piperita(Peppermint). These plants are well-known for their antimicrobial, anti-inflammatory, and antioxidant properties. The formulation process involved aqueous extraction of the plant materials followed by filtration and blending in suitable proportions. The final product wasevaluated for pH, appearance, taste, stability, and antimicrobial activity. Results showed that the herbal mouthwash effectively reduced oral microbial load and had good taste acceptability with no side effects. Therefore, this herbal formulation offers a promising, cost- effective, and safe alternative to synthetic mouthwashes, especially for long-term use in maintaining oral health andhygiene.The results of the evaluation showed that the herbal mouthwash exhibited significant antimicrobial activity, acceptable organoleptic properties (taste, color, smell), and was stable over a period of time without the need for synthetic preservatives. No signs of irritation or discomfort were reported by volunteers during trial use.In conclusion, the developed herbal mouthwash offers a safe, effective, and economical alternative to chemical-based formulations. It not only supports oral hygiene but also minimizesside effects, making it suitable for long-term daily use.

**Keywords:** Herbal mouthwash, Oral hygiene, Natural ingredients, Osmium sanctum (Tulsi), Azadirachta indica (Neem), Syzygium aromaticum (Clove), Mentha piperita (Peppermint)

**PT-143**

**FORMULATION AND EVALUATION OF HERBAL LIP BALM USING NATURAL WAXES AND EXTRACTS**

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The increasing popularity of herbal therapies and the use of plant-based ingredients have stimulated the development of herbal lip balms. This study focuses on the formulation and evaluation of a herbal lip balm using natural waxes and herbal extracts with emollient, healing, and antioxidant properties. Structural components of the formulation, consistency, and stability were achieved using beeswax and carnauba wax. Shea butter and coconut oil were incorporated for their excellent moisturising effects and were further enhanced with aloe vera, tulsi, and rose herbal extracts for their emollient, healing, and antioxidant properties. The formulation steps of the lip balm were the combination of melter oil and wax, and then herbal extracts were incorporated. The mixture was finally placed into a mould and allowed to set at room temperature. Further evaluation of the lip balm formulation included pH, melting point, spreadability, homogeneity, stability under a variety of storage conditions, and skin irritation tests. The results indicated that the herbal lip balm formulation retained ideal textural and spreadability properties while maintaining stability with no phase separation.

**Keywords:** Herbal lip balm, natural waxes, herbal extracts, cosmetic formulation, stability testing.

**PT-144**

**FORMULATION AND EVALUATION OF A HERBAL LIP BALM ENRICHED WITH BEETROOT/HIBISCUS EXTRACTS**

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With increasing interest in natural and sustainable skincare, this project focuses on creating a herbal lip balm using beetroot (Beta vulgaris) and hibiscus (Hibiscus rosa-sinensis) extracts. Both ingredients offer natural pigmentation and are rich in antioxidants and skin-nourishing compounds like flavonoids and organic acids. Combined with a moisturizing base of beeswax, coconut oil, and shea butter, the formulation helps hydrate lips, improve texture, and add a natural tint. Essential oils enhance aroma and antimicrobial properties. The balm's effectiveness is evaluated through tests for texture, pH, melting point, spreadability, and stability. Patch testing ensures skin compatibility, while antioxidant activity may be analyzed using DPPH assay. This student-led research promotes "green cosmetics" by blending Ayurvedic wisdom with eco-conscious formulation. The result is a safe, biodegradable lip balm that not only looks good but also supports lip health—meeting consumer demand for clean, functional, and sustainable personal care products.

**Keywords:** Herbal lip balm, Beetroot, Hibiscus, Antioxidants, Natural skincare.

**PT-145**

**NATURAL SUNSCREEN**

Aliya Ansari, Swapnil Dounde

Excessive exposure to ultraviolet (UV) radiation from the sun can lead to various skin problem, including sunburn, premature aging and increased risk of skin cancer. While synthetic sunscreens are widely available, they often contain chemical ingredients that may cause skin irritation or environmental harm. As a result, the demand for natural, plant- based sunscreens is increasing due to their safety, biocompatibility, and eco-friendliness. This study focuses on the formulation and evaluation of a herbal ingredients such as Aloe vera, Turmeric (Curcuma longa), Green tea extract (camellia sinensis), and Coconut oil, which are known for their UV-protective, antioxidant, and skin-soothing properties. The formulation was tested for Sun Protection Factor (SPF) value using spectrophotometric analysis, along with physical stability, spreadability, and skin compatibility. The results revealed that the natural sunscreen




ISBN: 978-81-980623-8-3

exhibited significant SPF value and was well-tolerated on the skin indicating its effectiveness as a safe and eco-friendly alternative to commercial sunscreens.

**Keywords:** Natural sunscreen, UV protection, Herbal formulation, SPF, Skincare

**PT-146**

**HERBAL MOUTH WASH**

Rehan Shaikh and Swapnil Dounde

Oral hygiene is essential for maintaining general health and preventing dental problems such as plaque, gingivitis, and bad breath. While chemical-based mouthwashes are widely used, they may cause side effects like staining, altered taste, and mucosal irritation with prolonged use. Herbal alternatives offer a safer and more natural option, utilizing the therapeutic properties of medicinal plants. This study aimed to extract active compounds from selected herbs- Neem (Azadirachta indica), Tulsi (Ocimum sanctum), Clove (Syzygium aromaticum), and Guava leaves (Psidium guajava)-and formulate an effective herbal mouthwash. Extraction was carried out using aqueous and hydroalcoholic methods. The mouthwash was evaluated for physical characteristics (pH, taste, clarity), stability, and antimicrobial activity against common oral pathogens. Results showed that the herbal formulation was stable, palatable, and demonstrated strong antimicrobial effects, indicating its potential as a natural and safe alternative for oral hygiene MAINTENANCE

**Keywords:** Herbal mouthwash, Oral hygiene, Medicinal plants, Antimicrobial activity, Plant extraction

**PT-147**

**FORMULATION AND EVALUATION OF HERBAL FACE CREAM FOR SKIN NOURISHMENT**

Zuhair Patel And Dr. Rajat Sayyed

The increasing awareness of side effects associated with synthetic cosmetic ingredients has led to a growing interest in herbal cosmetic formulations. This study focuses on the formulation and evaluation of a herbal face cream using natural ingredients known for their skin-nourishing properties. The cream was prepared using aloe vera, turmeric extract, neem oil, rose water, and beeswax. These ingredients were selected for their anti-inflammatory, antibacterial, antioxidant, and moisturizing properties. The formulation process involved emulsion preparation techniques, and the final product was subjected to various evaluation parameters including pH, viscosity, spreadability, stability, and skin irritation tests. Results indicated that the cream was physically stable, had a pleasant appearance and fragrance, and caused no irritation on the skin. The herbal ingredients provided hydration and improved skin texture upon regular use. This project supports the concept that herbal cosmetics can be a safer alternative to chemical-based products. It also opens new avenues for further research into plant-based ingredients in skincare formulations, especially for sensitive or acne-prone skin types.

**Keywords:** Herbal cosmetics, Face cream, Aloe vera, Neem, Turmeric, Skin care, Natural ingredient

**PT-148**

**EXPLORING THE THERAPEUTIC PROPERTIES OF HOPEA PARVIFLORA: A PROMISING HERBAL RESOURCE**

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Hopea parviflora, a lesser-known plant from the Dipterocarpaceae family, has been traditionally utilized in Indian folk medicine. Modern pharmacological investigations have highlighted its rich phytochemical profile, including flavonoids, phenolics, terpenoids, and resveratrol-like stilbenoids. These compounds contribute to a broad range of therapeutic activities such as antioxidant, antidiabetic, anti-inflammatory, and antimicrobial effects. Hydroalcoholic extracts of H. parviflora leaves have shown dose-dependent inhibition of carbohydrate-digesting enzymes (α-amylase and α-glucosidase), similar to acarbose. In vivo studies in diabetic rats demonstrated significant reductions in fasting blood glucose levels [Sathishkumar et al., 2020].The plant extract has demonstrated strong free radical scavenging activity in DPPH and FRAP assays. It also significantly reduced paw edema in rat models, suggesting an anti-inflammatory effect [Priya et al., 2018].

**Keywords:** Antidiabetic, antioxidant, Hopea parviflora.

**PT-149**

**PREPARATION & EVALUATION OF BLUE BOOM TEA: NATURAL'S COLOURFUL ELIXIR**

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Diabetes mellitus is a chronic metabolic disorder characterized by elevated blood glucose levels and associated complications. Natural plant-based therapies are gaining attention as supportive treatments due to their safety and therapeutic potential. Clitoria ternatea, commonly known as butterfly pea, has been traditionally used for its antioxidant and anti-inflammatory properties. Currently, the development of Butterfly pea flower has not been widely carried out because many people do not know the benefits of the Butterfly pea flower. The utilization of the Butterfly pea flower in the food sector has been carried out in several countries. Synthetic antidiabetic medications, though effective, often produce undesirable side effects. The preparation of blue tea using Clitoria ternatea offers a natural, palatable, and functional beverage alternative with potential anti-diabetic effects. Rich in anthocyanins and flavonoids.The objective of this study is to formulate and evaluate a herbal blue tea using Clitoria ternatea with the aim of exploring its potential anti-diabetic properties. Herbal tea is prepared using dried petals of Clitoria ternatea, which are dried in a tray dryer at 60°C for 2 hours. To enhance the flavor and quality of the tea, 1% ginger powder is added to a total weight of 1 gram. So, in the present study the analysis carried out is in the form of organoleptic test such as the colour, taste, texture, aroma, and overall acceptability of herbal blue tea. Blue tea prepared from Clitoria ternatea exhibits promising anti-diabetic potential based on in vitro assays. It offers a safe, herbal alternative for adjunct diabetes management. Further in vivo and clinical validation is recommended.

**Keyword**: Clitoria ternatea, Blue tea, Anti-diabetic, Herbal formulation, Phytochemicals.

**PT-150**

**FORMULATION AND EVALUATION OF HERBAL BASED ANTI PIGMENTATION CREAM**

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A common dermatological issue called hyperpigmentation is defined by the darkening of specific skin regions brought on by an excess of melanin synthesis. Numerous factors, including extended sun exposure, hormone abnormalities, post-inflammatory reactions, and specific drugs, can cause it. Synthetic drugs like hydroquinone, corticosteroids, or retinoids are frequently used in conventional therapies; while they may have short-term advantages, they can also have long-term negative effects such skin irritation and sensitivity. As a result, there is growing interest in plant-based herbal formulations as safer and more environment friendly substitutes for cosmetic and dermatological purposes.Using extracts of four medicinal plants—turmeric (Curcuma longa), mulberry (Morus alba), aloe vera (Aloe barbadensis miller), and liquorice (Glycyrrhiza glabra)—this study investigates the conceptual creation of a natural topical cream designed to help diminish hyperpigmentation. These components were chosen because of their historical use and documented qualities that may aid in melanin management and skin lightening. Glabridin, a well-known tyrosinase inhibitor found in liquorice, may aid in lowering the synthesis of melanin. Aloevera helps to hydrate, regenerate, and reduce inflammation in the skin. The anti-inflammatory and antioxidant properties of turmeric, which are abundant in curcumin, are helpful in halting oxidative stress-induced pigmentation. By disrupting tyrosinase activity, mulberry extract is also known to have the ability to decrease melanin formation. These components are intended to be combined in the formulation to create a well-balanced, skin-friendly cream base that satisfies consumer demand for herbal, chemical-free skincare products. Formulation was evaluated




ISBN: 978-81-980623-8-3

for spreadability, organoleptic properties, stability etc.Future perspectives are needed to claim safety and efficacy of the product. This formulation's basic aim was in creating safe, all-natural, and efficient hyperpigmentation treatments with herbal components.

**Keywords**: Hyperpigmentation, turmeric, mulberry, aloevera, liquorice

**PT-151**

## ETHNOLOGICAL VALIDATION OF ASHWAGANDHA GHRITA WITH REFERENCE TO MURCCHANA SAMSKARA AND ITS POTENTIAL IN DIABETIC COMPLICATIONS

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Ashwagandha Ghrita (AG) is a traditional Ayurvedic preparation of cow ghee and Withania somnifera, which is traditionally recognised for general debility, hyperglycemia, and fertility issues. This research aimed to establish the significance of the murcchana process for improving ghrita's therapeutic efficacy in preventing diabetic retinopathy and nephropathy, which was demonstrated through its superior ability to modulate glycemic and lipid parameters, boost cytoprotection, and inhibit key enzymatic pathways.The preparation of AG was based on the traditional Sarasangraha text, while Ashwagandha Murcchana Ghrita (AGM) was a modified, optimized formulation that incorporated the murcchana samskara for enhanced properties.Comprehensive analysis of AG and AGM included HPTLC to confirm Withaferin A, a bioactive marker for standardization and GC-MS for profiling. The antidiabetic effects and impact on retinopathy and nephropathy were then assessed using established in-vitro and in-vivo methods. In diabetic rats, both AG and AGM significantly mitigated diabetes by maintaining body weight ($p<0.01$) and reducing blood sugar ($p<0.001$) and HbA1c levels ($p<0.001$), with AGM being more potent.AGM uniquely improved the dyslipidemic profile ($p<0.001$), provided a stronger defense against oxidative stress ($p<0.001$), and inhibited key enzymes ($p<0.05$-aldose reductase, $p<0.01$-sorbitol dehydrogenase), suggesting a more comprehensive therapeutic effect. The murcchana samskara serves as a critical process for augmenting the therapeutic potential of ghritas, leading to superior outcomes in glycemic control and dyslipidemia. The technique enhances the formulation's cytoprotective and antioxidative actions, offering a more effective strategy for preventing diabetic retinopathy and nephropathy, which validates its ethnopharmacological use in managing diabetic complications.

**Keywords:** Ghrita, Murcchana, Withaferin A, Diabetic retinopathy, Diabetic Nephropathy

**PT-152**

## PHYTOCHEMICAL SCREENING AND PHARMACOLOGICAL EVALUATION OF MAMMEA SURIGA KOSTERM. BARK FOR ANTI-ULCER ACTIVITY

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Gastric ulcer is a prevalent gastrointestinal disorder that can lead to serious complications such as perforation, hemorrhage, and an elevated risk of gastric cancer. Helicobacter pylori infection is a primary causative factor, while additional contributors include smoking, alcohol consumption, NSAID use, ischemia, hypoxia, and oxidative stress, all of which impair the gastric mucosal barrier and promote ulcer development. This study aimed to carry out a pharmacognostical evaluation, in vitro antioxidant and in vivo antiulcer activities of the hydroalcoholic bark extract of Mammea suriga Kosterm (HBMS). Bark samples were subjected to pharmacognostic analysis and Soxhlet extraction. Antioxidant activity was assessed using DPPH radical scavenging, hydroxyl radical scavenging, and reducing power assays. Antiulcer effects were evaluated in an ethanol-induced gastric ulcer rat model, with sucralfate as the standard drug. Phytochemical screening confirmed the presence of glycosides, flavonoids, tannins, steroids, and coumarins. Total phenolic and flavonoid contents exhibited 78.87 mg/g (gallic acid equivalent) and 93.18 mg/g (quercetin equivalent), respectively. HBMS displayed a concentration-dependent antioxidant effect. In vivo studies showed HBMS markedly decreased the ulcer index from 5.26 ± 0.55 in the control group to 2.39 ± 0.38** at 200 mg/kg ($p< 0.01$) and 1.98 ± 0.82*** at 400 mg/kg ($p<0.001$), corresponding to ulcer inhibition rates of 49.24% and 57.47%, respectively, compared to 59.83% inhibition with sucralfate. These findings indicate that HBMS possesses strong antioxidant and gastroprotective properties, likely attributed to its phenolic and flavonoid constituents, highlighting its promise as a natural antiulcer therapeutic candidate.

**Keywords:** Mammea suriga, antioxidant, antiulcer, ethanol-induced ulcer

**PT-153**

## SOLVENT-DEPENDENT PHYTOCHEMICAL AND ANTIDIABETIC ACTIVITY OF MORINGA OLEIFERA LEAF EXTRACTS

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This study investigates the effect of solvent polarity on the extraction efficiency, phytochemical composition, and biological activities of Moringa oleifera leaf extracts, with a focus on their potential role in diabetes management. Successive maceration was conducted using solvents of increasing polarity—hexane, ethyl acetate, ethanol, and water. Phytochemical analysis revealed that each solvent selectively extracted different classes of bioactive compounds. The ethyl acetate extract (MOLEaE) was particularly rich in flavonoids, phenolic compounds, tannins, and saponins—phytoconstituents widely known for their antioxidant and antidiabetic effects. Biological assays showed that MOLEaE exhibited the strongest antioxidant activity ($IC_{50}$= 123.28 µg/ml), potent anti-inflammatory action ($IC_{50}$ = 122.01 µg/ml), and significant α- amylase inhibition (64.09%), supporting its potential to reduce oxidative stress, inflammation, and hyperglycemia—critical parameters in diabetes pathophysiology. In comparison, the hexane extract (MOLHE), containing primarily non-polar steroids, showed limited antioxidant but moderate anti-inflammatory activity. The study highlights the importance of solvent choice in maximizing the yield of therapeutically relevant phytochemicals. Ethyl acetate, a moderately polar solvent and Generally Recognized as Safe (GRAS) by the US FDA, was found to be the most effective for isolating pharmacologically active compounds.

**Keywords:** Moringa oleifera, Solvent polarity, Phytochemicals, Antioxidant activity, Anti-inflammatory activity, α-Amylase inhibition, Diabetes management.

**PT-154**

## EVALUATION OF IN-VITRO ANTI-ASTHMATIC ACTIVITY OF IPOMOEA SAGITTIFOLIA BURM.FIL.

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Plants have been a cornerstone of traditional medicine for centuries. Many modern medicines have been developed from plant-based compounds. It contains phytoconstituents like alkaloids, glycosides, flavonoids and terpenes, etc. They are playing a vital role in prevention and treatment of illness. Asthma is a chronic inflammatory disease affecting million peoples in worldwide. Traditional medicine plants have been a vital source of anti-asthmatic activity. In this research actually based on leaves of ipomoea sagittifolia. Burm. in this plant belonging to the, Family:convolvulaceae, Common name:Purple heart glory, Synonym: Ipomoea hastata, Geographical source: Australia, Africa, India. This leaf contains alkaloids (like indole, ipobscurine(A&B), phenolicglycolipids, flavonoids, tannins, sterols, terpenoids, saponins, reducing sugar and coumarins. Evaluate the phytoconstituents of Ipomoea sagittifolia contains phenolic terpenoids and sterols have anti-asthmatic activity. These plants also possess the anti-inflammation, bronchodilator action, anti-oxidant, anti-arrhythmic activity. Extraction of phytoconstituent from Ipomoea sagittifolia is done by soxhlet apparatus method. Investigation of Ipomoea sagittifolia is anti-asthmatic




ISBN: 978-81-980623-8-3

activity may leads to development of novel therapeutic agent for asthma management, providing a natural and potentially safer alternative to existing treatments. Finally this study will be focusing on the isolating and characterizing the bioactive compounds responsible for the therapeutic effects, having the way for development of novel plant based treatment for asthma.

**Keywords**: Ipomoea sagittifolia, phytoconstituent, anti-asthmatic activity, evaluation and soxhlet apparatus

**PT-155**

**PHYTOCHEMICAL AND PHARMACOLOGICAL INSIGHTS INTO GINKGO BILOBA L: BRIDGING TRADITIONAL MEDICINE AND MODERN RESEARCH**

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Ginkgo biloba L. (Ginkgoaceae), commonly known as a "living fossil," is one of the oldest living tree species and has been utilized for centuries in traditional medicine. Both its leaves and nuts have been prescribed for the treatment of a wide range of ailments, including pulmonary diseases, alcohol abuse, bladder inflammation, heart and lung dysfunction, and skin infections. G. biloba has transitioned from traditional herbal preparations to modern standardized formulations. Currently, the plant is available in various forms on the market, including concentrated extracts and isolated bioactive compounds such as terpenoids, flavonoids, bioflavonoids, and organic acids. These constituents are associated with diverse pharmacological activities, including antioxidant, anti-inflammatory, neuroprotective, and circulatory-enhancing effects. Despite its significant medicinal potential and widespread commercial use, there is a notable lack of updated, comprehensive reviews integrating its phytochemistry, ethnobotany, and pharmacology. Existing studies are often fragmented, focusing on isolated aspects rather than providing a holistic understanding of the plant's therapeutic scope. This review aims to fill that gap by compiling and critically analyzing current literature on the phytochemical composition, traditional uses, and Pharmacological properties of G. biloba. Special Emphasis is placed on the role of its bioactive Constituents in disease prevention and Management, as well as safety considerations associated with its use. In the future, biloba could evolve into high-tech, personalized brain and vascular health solutions using nano-formulations, patches, and AI-linked dosing. It may also expand into sustainable consumer products, such as focus drinks, skincare, and zero-waste farming innovations.

**Keywords:** Ginkgo biloba, ethnobotany, medicinal plants, antioxidant, herbal protection.

**PT-156**

**PHYTOCHEMICAL SCREENING, ANTIOXIDANT POTENTIAL AND ANTIMICROBIAL ACTIVITY OF EUONYMUS TINGENS**

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Euonymus tingens Wall. (family: Celastraceae) is a traditionally important Himalayan medicinal plant known for its ethnopharmacological uses. The present study was undertaken to compare and evaluate the phytochemical composition, antioxidant potential, and antimicrobial activity of ethyl acetate and 95% ethanolic extracts of E. tingens. Total Phenolic Content (TPC) and Total Flavonoid Content (TFC) were estimated by Folin–Ciocalteu and aluminum chloride methods, respectively. The 95% ethanolic extract found to be higher TPC (6.20±0.04 GAE/g) and TFC (8.24±0.10 mgQE/g) compared to the ethyl acetate extract (5.82±1.2 mg GAE/g and 6.92±0.06 mg QE/g, respectively). The in-vitro antioxidant activity was assessed using DPPH, H2O2, NO, and FRAP assays. The ethanolic extract exhibited stronger free radical scavenging potential with $IC_{50}$ values of 52.12 µg/mL (DPPH), 60.47 µg/mL (H2O2), 64.03 µg/mL (NO), and FRAP 72.02 µg/mL, while the ethyl acetate extract showed comparatively moderate antioxidant activity ($IC_{50}$: 58.06 µg/mL (DPPH) and 68.21 µg/mL (H2O2), 78.05 µg/mL and FRAP 86.04 µg/mL. Antimicrobial activity was evaluated against Gram-positive and Gram-negative bacteria, and fungal strains using the Agar disk diffusion method. The ethanolic extract demonstrated maximum inhibition, with zones of 26 mm against Staphylococcus aureus and 12 mm against pseudomonas aeruginosa whereas the ethyl acetate extract showed moderate activity (20 mm and 10 mm, respectively). Both extracts exhibited mild antifungal effects against Candida albicans. The study concludes that 95% ethanolic extract of Euonymus tingens possesses higher phenolic and flavonoid content, antioxidant capacity, and antimicrobial efficacy compared to the ethyl acetate extract, supporting its potential for phyto-pharmaceutical applications.

**Keywords:** Euonymus tingens, Total phenolic content, Flavonoids, Antioxidant activity, Antimicrobial activity.

**PT-157**

**COMPUTATIONAL PHARMACOKINETIC PROFILING OF PLANT-DERIVED COMPOUNDS FROM COCCINIA GRANDIS FOR ULCERATIVE COLITIS MANAGEMENT**

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Ulcerative colitis (UC) is a chronic inflammatory bowel disease characterized by recurrent inflammation and mucosal injury, for which current therapeutic options often present limited efficacy and adverse effects. Natural phytochemicals represent a promising alternative due to their multitarget therapeutic potential and favorable safety profiles. In this study, an in silico ADMET screening was performed on five bioactive phytochemicals from Coccinia grandis—β-Amyrin, Lupeol, Isomultiflorenol, β-Sitosterol, and Taraxerol—to evaluate their pharmacokinetic and drug-likeness properties in the context of UC therapy. Using the SwissADME platform, absorption, distribution, metabolism, and excretion parameters were systematically assessed, alongside Lipinski's rule of five and gastrointestinal (GI) absorption profiles. All selected phytochemicals demonstrated favorable ADME characteristics, including high GI absorption, optimal molecular weight, and compliance with major drug-likeness rules, indicating good oral bioavailability and systemic accessibility. Furthermore, predicted cytochrome P450 interactions and lipophilicity values suggested acceptable metabolic stability with minimal pharmacokinetic limitations. The findings underscore that Coccinia grandis phytochemicals possess promising pharmacological potential, supporting their candidature as orally active agents for ulcerative colitis. These results provide a computational basis for subsequent experimental validation and contribute to the rational design of phytochemical-based therapeutics for inflammatory bowel disorders.

**Keywords:** ADMET screening, Coccinia grandis, phytochemicals, ulcerative colitis, SwissADME, pharmacokinetics, drug-likeness

**PT-158**

**SYNERGISTIC HERBAL EXTRACT FROM THE MUCILAGE OF CHIA SEEDS, BASIL SEEDS, FLAX SEEDS.**

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The present study aimed at developing a combined extract from mucilage of chia(Salvia hispanica), basil(Ocimum basilicum), and flax(Linum usitatissimum) seeds. It studied the anti-inflammation and antioxidant activities of the formulated herbal extracts. Chia, basil, and flax seeds have a complex phytochemical profile, confirmed with FTIR, TLC, and solubility studies. It includes functional groups of alkaloid, carbohydrates, esters, and phenolic compounds.Best solubility in acidic media was demonstrated by the herbal mixture through pharmacognostic and phytochemical analyses.This establishes its probable bioavailability and effectiveness via the oral route. It was confirmed by paper chromatography that the presence of alkaloids was detected.The in vitro experiments showed a high degree of biological activity at different parameters. Antioxidant activity inhibition was at its maximum, at 300 mg/mL,with scavenge activity against 84.92% hydrogen peroxide,which indicates a strong potential in fighting oxidative stress. The presence of alkaloids was confirmed by paper chromatography. FTIR and UV spectroscopy data confirmed the presence of functional groups characteristic of pharmacologically active




ISBN: 978-81-980623-8-3

phytochemicals such as alcohols, esters, aromatic rings, and amides.HRBC membrane stabilization method serves as a reliable in vitro model for anti-inflammatory potential assessment. This structural insight underpinned the medicinal potential of this formulation, particularly in the oxidative and inflammatory condition. In vitro studies also indicated very significant biological activity against some parameters.

**Keywords:** Synergistic, Anti-inflammatory, Anti-oxidant, UV Spectroscopy, FTIR.

**PT-159**

## FORMULATION AND VALIDATION OF CURCUMIN-FORTIFIED GROUNDNUT MILK FOR FATTY LIVER MANAGEMENT

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Curcumin-Fortified Groundnut Milk (CFG-Milk) was developed and validated as a novel functional formulation for the dietary management of non-alcoholic fatty liver disease (NAFLD). Each 200 mL serving was standardized to contain groundnut extract (10 g), soy protein (8 g), microencapsulated curcumin (200 mg), piperine (5 mg) to enhance bioavailability, and soluble fiber (1 g psyllium husk). The formulation was processed by homogenization and pasteurization, with microencapsulation ensuring curcumin stability and palatability. Quality validation confirmed high monounsaturated fatty acid content, retention of bioactive curcumin, low peroxide values, and microbial safety, with aflatoxin screening of peanut raw materials ensuring compliance. Sensory evaluation indicated good acceptability, while stability testing demonstrated minimal phase separation over 14 days under refrigeration. A 12-week pilot clinical validation in adults with imaging-confirmed NAFLD showed that daily consumption of CFG-Milk produced greater reductions in hepatic fat (MRI-PDFF) and significant improvements in liver enzymes (ALT, AST), insulin resistance (HOMA-IR), and lipid profile compared to placebo, without adverse effects. Mechanistically, the formulation integrates hepatoprotective and anti-inflammatory properties of curcumin, bioavailability enhancement by piperine, lipid-modulating effects of groundnut MUFA, and metabolic benefits of soy protein and soluble fiber. These findings suggest that CFG-Milk is a safe, palatable, and effective nutraceutical adjunct for fatty liver management.

**Keywords:** Groundnut milk, Curcumin, Piperine, Non-alcoholic fatty liver disease (NAFLD).

**PT-160**

## PHYTOCHEMICAL PROFILING AND QUANTITATIVE ANALYSIS OF ALKALOIDS IN METHANOLIC EXTRACTS OF ZINGIBER OFFICINALE RHIZOMES

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Ginger (Zingiber officinale) is a widely studied medicinal plant, recognized for its diverse bioactive compounds, particularly alkaloids, which exhibit significant pharmacological activities. The present study aimed to characterize and quantify the major alkaloids present in ginger rhizomes using phytochemical screening, spectrophotometric analysis, and high-performance liquid chromatography (HPLC). Freshly authenticated rhizomes were subjected to methanol maceration, yielding 0.704% (w/w) crude extract. Qualitative tests with Mayer's, Wagner's, and Dragendorff's reagents confirmed the presence of alkaloids, while spectrophotometric analysis estimated the total alkaloid content at 18.45 ± 1.27 mg atropine equivalents/g extract. HPLC profiling identified four principal alkaloids: 6-gingerol (10.73 ± 0.85 mg/g), 6-shogaol (10.42 ± 0.47 mg/g), 8-gingerol (3.81 ± 0.32 mg/g), and 10-gingerol (3.45 ± 0.43 mg/g), with calibration curves showing excellent linearity ($r^2 > 0.95$). The predominance of 6-gingerol and 6-shogaol supports their well-documented anti-inflammatory, antioxidant, and anticancer properties, while 8- and 10-gingerol contribute antimicrobial and metabolic regulatory effects. These findings not only validate the extraction and analytical methodologies employed but also provide a comprehensive alkaloid profile of ginger, reinforcing its traditional medicinal value and potential therapeutic applications.

**Keywords**: Zingiber officinale, Alkaloids, Methanol extraction, HPLC, 6-gingerol, 6- shogaol

**PT-161**

## DEVELOPMENT AND IN-VITRO EVALUATION OF A POLYHERBAL FORMULATION FOR THE MANAGEMENT OF OSTEOMYELITIS

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Osteomyelitis, a severe bone infection predominantly caused by Staphylococcus aureus and Pseudomonas aeruginosa, is difficult to treat due to poor vascularization, biofilm formation, and rising antibiotic resistance. Polyherbal formulations, combining the synergistic action of multiple medicinal plants, provide a promising alternative by integrating antimicrobial, anti-inflammatory, and osteogenic effects. In this study, a polyherbal formulation comprising Curcuma longa (curcumin), Azadirachta indica (neem), Tinospora cordifolia (guduchi), and Withania somnifera (ashwagandha) was developed and evaluated for antimicrobial, anti-biofilm, and bone-regenerative potential. Phytochemical analysis confirmed the presence of alkaloids, flavonoids, terpenoids, and phenolics. In-vitro antimicrobial assays revealed significant inhibitory activity against S. aureus (23.6 ± 0.7 mm) and P. aeruginosa (21.4 ± 0.5 mm), with minimum inhibitory concentrations ranging from 62.5–125 µg/mL. The polyherbal formulation demonstrated 78.2% biofilm inhibition at sub-MIC levels, surpassing individual extracts. Osteoblast-like MG-63 cell assays indicated enhanced proliferation (1.6-fold increase) and alkaline phosphatase activity, suggesting stimulation of bone formation. Collectively, the results highlight that the polyherbal formulation possesses dual antimicrobial and osteogenic properties, making it a strong candidate for the management of osteomyelitis. Further studies involving nanoformulation and in-vivo validation are warranted to optimize bone-targeted delivery and therapeutic outcomes.

**Keywords:** Polyherbal formulation, Osteomyelitis, Antimicrobial activity, Biofilm inhibition, Bone regeneration.

**PT-162**

## PHYTOCHEMICAL PROFILING AND THERAPEUTIC EVALUATION OF SAPONINS FROM DECALEPIS HAMILTONII ROOTS

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Decalepis hamiltonii, a medicinal plant traditionally used in ayurvedha and siddha exhibits potent antioxidant activity primarily due to polyphenolic compounds present in its roots. The goal of this study was to extract saponins from the tuberous root of D.hamiltonii and assess their potential clinical applications, which included anti-oxidant, anti-bacterial, anti-thrombotic and anti-cancer properties. Surprisingly the results of this study revealed that the extracted saponins have excellent anti-oxidant activities, as demonstrated by 2, 2-diphenylpicrylhydrazyl (DPPH), hydrogen peroxide (H2O2) and nitric oxide (NO) scavenging assays. The anti-oxidant potential of the roots was measured using various in vitro assays. Among the extracts, the methanolic and aqueous extract showed high anti-oxidant activity measured as scavenging of DPPH, superoxide hydroxyl radicals and ellagic acid. Nonethless, at a concentration of 100g/ml, crude saponin had excellent anti-bacterial activity particularly against gram (+ve) bacteria (staphylococcus aureus, bacillus subtilis) and gram (-ve) bacteria (Escherichia coli, Salmonella typhi).The crude saponin also possess an outstanding anticancer activity. Overall the findings conclude that crude saponin derived from D.hamiltonii tuberous root could be used in pharmaceutical formulations. Future research will focus on isolation active compounds, testing, safety and effectiveness, clinical trials for safety and efficacy and exploration of its interaction with conventional drugs to maximize its therapeutic benefits.

**Keywords:** Scavenging, Phytochemical extraction, saponins, anti-oxidant, Diphenylpicrylhydrazyl (DPPH).

**PT-163**




ISBN: 978-81-980623-8-3

**HPTLC-BASED QUALITATIVE PROFILING OF ESSENTIAL OILS AND TANNINS IN IPOMOEA SAGITTIFOLIA LEAF EXTRACT**

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HPTLC fingerprinting is also a very efficient and easy to interpret method than HPLC for the identification of qualitative phytochemicals exist in extract samples. Ipomoea sagittifolia (Burn. f.), which was earlier employed by ancients in their medicine parlance due to its many reported curative properties harbour essential oils as well as tannins that may propel its medical value. Hence the authentication or identification of phytoconstituent is imperative for the quality checks in compliance with Current Good Manufacturing Practices (cGMP). The overall research agenda of this study is to establish HPTLC finger printing of the bioactive compounds containing secondary metabolites such as essential oils and tannins of the methanolic leaf extract of I. sagittifolia. The running of the plates and development, documentation, densitometry, and documentation were done with help of CAMAG HPTLC system that included a Linomat 5, TLC visualizer, and a Scanner 4. UV analysis at 254 and 366 nm showed several peaks in the chromogram hence, the existence of various phytochemicals. The results were therefore analyzed in terms of height of peaks, areas under the peaks, and relative retention factors with regard to the extraction of essential oils and tannins.

**Keywords**: Phytoconstituents, Essential oils, HPTLC-fingerprints, Chromatogram.

**PT-164**

**ANTIMICROBIAL ACTIVITY OF ASPARAGUS RACEMOSUS WILLD FROM ROOT EXTRACT – A MEDICINAL PLANT**

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Asparagus racemosus Willd, commonly known as Shatavari, it means " who possesses a hundred husbands or acceptable to many"has been used as amedicine. It is a widely recognized medicinal plant in traditional Ayurvedic medicine, valued for its diverse therapeutic properties. This study investigates the antimicrobial potential of root extracts of A. racemosus against selected bacterial and fungal strains. Various solvent extracts including methanol, chloroform, acetone, and aqueous preparations were evaluated using the agar well diffusion method. The methanolic extract exhibited the most significant antimicrobial activity, particularly against Escherichia coli, Staphylococcus aureus, and Candida utilis, with notable zones of inhibition and low minimum inhibitory concentrations (MICs). Phytochemical screening revealed presence of bioactive compounds such as alkaloids, flavonoids, tannins, saponins, and phenols, which are known to contribute to antimicrobial efficacy. These findings support traditional use of A. racemosus in treating infections and highlight its potential as a natural source for developing plant-based antimicrobial agents. Further studies on isolation and characterization of active constituents may pave the way for novel therapeutic applications in combating microbial resistance. Some different solvents like petroleum ether, methanol, chloroform, Acetone, and water against positive bacteria like bacillus subtilis, E coli, Pseudomonas. The experiment carried out in the selected medicinal plant root. The results are discussed with the available literature.

**Keywords:** Asparagus racemosus, Antimicrobial activity, Solvent extraction, Antifungal, Bacterial infection.

**PT-165**

**PHYTOCHEMICAL-CD81 INTERACTION STUDIES FOR HIV REGULATION USING MOLECULAR DOCKING**

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This study investigates the potential of Masilinic Acid, a natural compound derived from the clove plant (Syzygium aromaticum), as an inhibitor of HIV regulation through its interaction with the CD81 antigen, a protein involved in viral entry. The research was conducted in silico using computational tools including PyMOL, PyRx, and Protein Plus to evaluate the binding interactions between Masilinic Acid and CD81.Molecular docking studies revealed binding affinities of -6.4, -6.2, and -5.7 kcal/mol, indicating strong and stable interactions between the compound and the target protein. Additionally, Root Mean Square Deviation (RMSD)values of 0, 1.885, and 1.952 Å suggest that the docked conformations were accurate and reliable. These results point to a consistent and meaningful interaction between Masilinic Acid and CD81.Further interaction analysis conducted with Protein Plus confirmed the presence of significant molecular interactions, such as hydrogen bonding and hydrophobic contacts, reinforcing the hypothesis that Masilinic Acid can effectively bind to CD81 and potentially interfere with HIV's mechanism of entry or regulation. To assess its suitability as a drug candidate, Lipinski's Rule of Five was applied. Masilinic Acid was found to have a molecular mass of 472 g/mol, three hydrogen bond donors, four hydrogen bond acceptors, a log P value of 6.2, and molar refractivity of 134. While the log P slightly exceeds the typical threshold (indicating higher lipophilicity), the compound largely complies with drug-likeness criteria.Overall, the results suggest that Masilinic Acid holds promise as a potential antiviral agent by targeting CD81 to disrupt HIV activity. These findings support further investigation through experimental validation and may contribute to the development of alternative strategies in HIV treatment.

**Keywords:** Masilinic Acid, Clove plant, CD81 antigen, HIV virus.

**PT-166**

**DEVELOPMENT AND EVALUATION OF FENUGREEK-TULASI LOADED HERBAL MICROBEADS FOR SUSTAINED ANTI-DIABETIC EFFECT**

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Diabetes mellitus is a chronic metabolic disorder marked by persistent hyperglycemia due to impaired insulin secretion or action. Herbal therapies are increasingly explored for their safety, affordability, and multi-targeted mechanisms. This study reports the development of sustained release herbal microbeads containing fenugreek (Trigonella foenum-graecum) and tulasi (Ocimum sanctum) extracts to overcome drawbacks of conventional dosage forms such as rapid release and low bioavailability. Microbeads were prepared using ionotropic gelation with sodium alginate and calcium chloride, and selected batches were coated with chitosan to enhance mucoadhesion and prolong release. The formulations were evaluated for morphology, particle size, entrapment efficiency, swelling behavior, in-vitro release, and anti-diabetic activity via α-amylase and α-glucosidase inhibition assays. Results indicated spherical beads with satisfactory entrapment efficiency and uniform size distribution. In-vitro studies demonstrated sustained release of herbal actives over 8–12 hours, with chitosan-coated beads exhibiting slower release and stronger mucoadhesion compared to uncoated beads. Enzyme inhibition assays confirmed notable anti-diabetic activity, highlighting the synergistic potential of fenugreek and tulsi extracts. Stability testing revealed that the formulations retained integrity under standard storage conditions. Overall, fenugreek-tulasi microbeads represent a promising sustained release herbal delivery system that may enhance therapeutic efficacy, reduce dosing frequency, and improve patient compliance in diabetes management.

**Keywords:** Fenugreek, tulsi, sustained release, anti-diabetic, microbeads

**PT-167**

**ISOLATION OF ANTIBIOTIC PRODUCING BACTERIA FROM POND SOIL**

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Soil being a major reservoir for microorganisms it is a source of interest for isolation of antibiotic producing organisms. The emergence of




ISBN: 978-81-980623-8-3

antibiotic resistance and need for better, broad Spectrum antibiotics is always in high demand. In the present study, antibiotic producing bacteria were isolated from a local soil sample. Total ten soil samples were collected from local pond aseptically and subjected to serial dilution. Crowded plate technique was employed for the isolation of the colony. Total five isolated were isolated which exhibited zone of inhibition around the colony. The isolated colonies were subjected to morphological, microscopical and biochemical characterization. All five colonies were found to be gram positive, non-sporulating organisms and found they belong to the Actinobacteria class. The isolated colonies were subjected to screening for antimicrobial activity against Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus, Bacillus subtilis and Yeast by perpendicular streak method. The primary screening results conclude that except one colony all have good antimicrobial activity. One colony found to be highly potential activity which had inhibition towards gram positive, gram negative, sporulating and fungal activity. This study may contribute in providing information on the antibiotic producing microorganisms in soil. Further characterization, purification, and structural Elucidation are recommended to know the novelty, quality and commercial value of these antibiotics.

**Keywords:** Crowded, plate technique, Actinobacteria, primary screening, antimicrobial activity.

**PT-168**

## IN SILICO EVALUATION OF PHYTOCONSTITUENTS FROM MYXOPYRUM SMILACIFOLIUM BLUME AGAINST THE INFLAMMATORY MEDIATOR TNF-A

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Secondary metabolites in plants have been used in health care for the treatment of various ailments since ancient times. The current study was carried out to investigate on phyto constituents in Myxopyrum smilacifolium against an inflammatory mediator TNF-α. Ligand and protein pdbqt files were prepared and docking was done by using Autodock 4.0 and Biovia Studio Visualizer. The docking finding revealed that Myxopyroside shown -5.1 kcal/mol which is high and mere significant docking score of natural immunosuppressive capsaicin and standard drug Methylprednisolone of -4.8 kcal/mol and -5.4 kcal/mol respectively. The obtained results were proven to posses the inhibition activity against TNF-α. The evaluated pharmacokinetic parameters of the only 3 phytoconstituents obeyed Lipinski's rule of 5. Exploration of simulation studies on Myxopyroside are in need to ensure inhibition of inflammatory mediator TNF-α. rewrite this paragraph

**Keywords:** Autodock 4.0; Smilacifolium; Myxopyroside; TNF-α; Lipinski's

**PT-169**

## EXPLORATORY DEVELOPMENT OF COSTUS IGNEUS NEUTRACEUTICAL CONFECTIONS FOR ANTIDIABETIC BENEFITS

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This study aims to develop and evaluate the efficacy of herbal lollipops incorporating Costus igneus extract for diabetes management. The powdered Costus igneus material was subjected to extraction using ethanol by Soxhlet extraction method. The extract was filtered and concentrated under reduced pressure to obtain a concentrated extract. Various formulations of herbal lollipops were prepared using different concentrations of Costus igneus extract, along with suitable excipients like stevia, binder and colors. The formulated lollipops showed the uniformity in weight and thickness. The hardness of all formulated lollipops was found within the standard range up to 9.65 to 10.50 kg/cm2.From the in-vitro drug release study, it was found that the formulations of lollipops containing corn syrup in the concentrations of 100, 90 and 80 mg showed the maximum drug release at 30 minutes. Among those formulations' formulation F9 showed 100.6% of drug release. The in-vitro release kinetic study of the optimized formulation (F9) was found to be first order. The release of the dosage form follows the diffusion and dissolution mechanism and Non-Fickian diffusion mechanism. These findings suggest that herbal lollipops containing Costus igneus hold promise as a novel and effective alternative for managing diabetes.

**Key words-:** Costus igneus, Diabetes, Soxhlet extraction, herbal lollipops.

**PT-170**

## PRECLINICAL EVALUATION OF A NUTMEG FORMULATION AS A SLEEP-AID AND PAIN-RELIEF AGENT

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Preclinical evaluation was conducted to assess the analgesic, sedative, and anxiolytic effects of a nutmeg formulation developed by Durmeric Naturaceuticasl Pvt, Ltd., Madhurai, using adult male swiss albino mice. Acute oral toxicity studies, performed in accordance with OECD 425 guidelines using rats, demonstrated that the formulation was well tolerated at a limit dose of 2000 mg/kg, with no observed adverse effects or mortality. Hematological, biochemical, and histopathological analyses of vital organs confirmed the formulation's safety profile, with all values remaining within established physiological norms. The analgesic potential of the nutmeg formulation was evaluated by both the acetic acid-induced writhing and Eddy's hot plate methods. Dose-dependent inhibition of writhing responses was observed, with inhibition rates ranging from 49% to 77%, comparable to standard analgesics like diclofenac sodium and pentazocin. In the hot plate assay, a significant increase in pain threshold was detected, with the peak response seen at 1.5 hours post-administration, confirming both peripheral and central analgesic actions. For sedative and anxiolytic evaluation, the hole board and traction tests were employed. The nutmeg formulation elicited a dose-dependent decrease in anxiety markers, with minimal impact on skeletal muscle relaxation, making it a promising candidate. The findings highlight the formulation's potential as a multi-target natural therapy for pain and anxiety without central motor impairment. These results encourage further clinical exploration of nutmeg-based interventions in pharmaceutical applications.

**Keywords:** Nutmeg formulation, writhing, pain, anxiety

**PT-171**

## NOVEL BAMBOO FIBER PATCH FOR TOPICAL BACTERIAL WOUND HEALING

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A novel bamboo fiber-based patch for wound healing was developed in this study by incorporating silver nanoparticles (AgNPs) and self-propelled tranexamic acid (sp-TXA). The aim was to develop a multifunctional patch that possesses antimicrobial and hemostatic properties and can overcome the demerits associated with conventional wound dressings. Alkali treatment was used to extract bamboo fibers, which were characterized with an average diameter of 76 µm, well-suited for wound dressing. $CaCO_3$ microparticles were synthesized for sp-TXA delivery, with a Z-average size of 416.4 nm and zeta potential of –19.7 mV. Green synthesis of AgNPs with Bacillus subtilis was established by UV–Vis spectroscopy, showing an absorption peak at 420 nm, and particle size distribution of 225 nm (85%) and 48 nm (15%). A PVA-based dual-component patch with an average thickness of ~1 mm and folding endurance >50, indicating good mechanical stability, was prepared. The antibacterial activity of the patch was further evaluated against E. coli, P. aeruginosa, and S. aureus. In conclusion, a novel, biodegradable patch that combines bamboo fibers, AgNPs, and sp-TXA was formulated successfully, indicating significant potential in enhancing the healing of wounds along with antibacterial and hemostatic assistance.

**Keywords:** Bamboo fiber, nanoparticles, tranexamic acid, wound healing, transdermal patch.

**PT-172**

## TOXICITY PROFILING BASED ON ADME AND STRUCTURAL PROPERTY OF ZIZIPHUS OENOPOLIA

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ISBN: 978-81-980623-8-3

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Ziziphus oenopolia (L.) Mill., a medicinal plant widely used in traditional systems for treating gastrointestinal, febrile, and inflammatory conditions, possesses a rich array of phytoconstituents with potential therapeutic relevance. However, limited data exist on the pharmacokinetic and toxicological profiles of its bioactive compounds. This study aimed to evaluate the drug-likeness, ADME (absorption, distribution, metabolism, and excretion) characteristics, and toxicity risks of three major cyclopeptide alkaloids—Zizyphine A, Zizyphine C, and Zizyphine F—using in silico tools. Phytoconstituents were identified through the IMPPAT database, and their structural data were analyzed via SwissADME, pkCSM, and ProTox-II platforms. All compounds exhibited favorable lipophilicity (Log Po/w: 2.21–2.82), acceptable hydrogen bonding parameters, and one Lipinski rule violation due to high molecular weight (>500 g/mol). ADME analysis indicated good intestinal absorption (69–74%), limited blood-brain barrier permeability, and selective CYP3A4 metabolism without major CYP inhibition. Toxicity screening predicted low hepatotoxic, nephrotoxic, and carcinogenic risk; however, respiratory toxicity and immunotoxicity were observed in all three compounds, with mutagenicity predicted for Zizyphine C and F. This study supports the utility of in silico approaches in prioritizing phytochemicals for drug development and offers a scientific basis for the continued pharmacological exploration of Z. oenopolia.

**Keyword:** Cyclopeptide alkaloids, ADME, Tox prediction, Drug-likeness

**PT-173**

## PHYTOCHEMICAL SCREENING AND IN-VITRO ANTI- INFLAMMATORY ACTIVITY OF AQUEOUS ETHANOLIC EXTRACT OF DRIED LEAVES OF CROTALARIA VERRUCOSA

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The main aim of this study was to determine the pharmacognostic, phytochemical parameters and to determine the anti-inflammatory activity of the aqueous extract of Crotalaria verrucosa leaves. The aq. ethanolic plant extracts of leaves of Crotalaria verrucosa were prepared using the standard maceration method. Then conducted phytochemical screening by various pharmacognostic tests and in-vitro anti-inflammatory activity by protein denaturation method. The preliminary phytochemical analysis revealed that the aq. ethanolic leaf extract of Crotalaria verrucosa were shown positive results towards to carbohydrates, glycosides, phenols, flavonoids, proteins and amino acids and revealed the ethanolic extract showed the positive results towards carbohydrates, glycosides, phenols, proteins and amino acids. We conducted and reported the Inhibitory concentration (IC50) of anti-inflammatory activity was found at concentration of 240 mg/mL

**Key Words:** Crotalaria verrucosa, Pharmacognosy, Phytochemistry, Anti-inflammatory activity, denaturation

**PT-174**

## FORMULATION AND EVALUATION OF A POLYHERBAL HAIR EMULGEL FOR HAIR GROWTH

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The study aimed to formulate and evaluate a polyherbal hair emulgel that combines the therapeutic efficacy of medicinal plants with the formulation advantages of an emulgel system. The formulation incorporated guava leaf extract, lavender oil, virgin coconut oil, aloe vera juice, and banana powder, each selected for hair growth–promoting, conditioning, and scalp-nourishing properties. Guava leaves were extracted using a hydroalcoholic method and evaluated for vitamin C, alkaloids, and saponins. Lavender and virgin coconut oils were tested for refractive index and peroxide value, while aloe vera and banana powder underwent phytochemical identification. An oil-in-water emulsion was prepared by the dry gum method using virgin coconut oil as the base and then incorporated into a Carbopol 934 gel matrix to form the emulgel. The product was evaluated for pH, viscosity, spreadability, washability, homogeneity, and stability. The optimized formulation showed a pH of 4.12 (suitable for scalp application), viscosity of 8250 cps (ensuring easy spreadability), and spreadability of 4.761 g.cm/s. It exhibited excellent washability and uniform texture. Stability studies were carried out for one month, shorter than ICH-recommended periods, due to academic time constraints, revealed no significant changes in appearance, pH, or viscosity. The results indicate that the developed polyherbal hair emulgel is stable, safe, and potentially effective in promoting hair growth, offering a natural alternative to synthetic hair care products with improved patient compliance.

**Keywords:** Polyherbal formulation, Hair emulgel, Hair growth, Herbal cosmetics, Emulsion

**PT-175**

## COMPARATIVE PHYTOCHEMICAL PROFILING AND CARDIOPROTECTIVE EVALUATION OF HYDRO ETHANOLIC FLOWER EXTRACTS OF AVERRHOA BILIMBI AND CAJANUS CAJAN: IN VITRO, IN SILICO AND ANALYTICAL APPROACHES.

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The study aimed to analyze the chemical constituents of Cajanus cajan and Averrhoa bilimbi hydro ethanolic(50:50) flower extracts, particularly flavonoids and phenolic compounds and evaluate their Cardioprotective potential through analytical, in vitro, and in silico approaches. Preliminary phytochemical screening of the ethanolic flower extracts of Cajanus cajan and Averrhoa bilimbi revealed the presence of major secondary metabolites such as flavonoids, phenolics, tannins, saponins, terpenoids and alkaloids indicating their rich phytochemical composition. The extracts were subjected to TLC, HPTLC and LC-MS analysis using TLC plate, CAMAG TLC SCANNER-3 and Q-TOF, which revealed diverse bioactive compounds including luteolin, apigenin, quercetin, genistein, cajanin, vitexin, isovitexin, longistylin A and longistylin C from Cajanus cajan and Averrhoa bilimbi. Total phenolic content (TPC) and total flavonoid content (TFC) were determined, with Cajanus cajan showing 76.45 mg GAE/g and 47.18 mg QE/g, while Averrhoa bilimbi exhibited 87.62 mg GAE/g and 52.34 mg QE/g respectively. In vitro studies demonstrated significant antioxidant activity by DPPH, ABTS and lipid peroxidation inhibition assay. In silico molecular docking and interaction studies were performed using Schrodinger software against key cardiovascular targets such as Angiotensin Converting Enzyme (ACE), HMG-CoA reductase and MAPK which showed strong binding affinities for compounds like luteolin, cajanin, myrcetin, longistylin A and longistylin C supported by favorable binding energy profiles. These findings confirm that both extract rich in phenolics and flavonoids, exhibit potent cardioprotective properties validated by chemical profiling.

**Keywords:** flower extracts, phytoconstituents, antioxidant, cardioprotective.

**PT-176**

## BLACK SEED OIL AND ROSE HIP OIL- BASED NANOEMULGEL FOR EFFECTIVE TREATMENT OF ACNE INCLUDING SCARS

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Acne is a common inflammatory skin condition caused by hormonal imbalance, environmental factors, or bacterial infection by P. acnes in the presence of excess sebum. Although not life-threatening, acne significantly affects psychological and social well-being, and conventional treatments often result in scarring and hyperpigmentation. The present study explores a novel lipid-based nanoemulsion gel containing retinoid, black seed oil and rose hip oil for the effective management of acne and related scars. Preformulation studies, including calibration curve estimation, stability testing, and FTIR compatibility analysis, were conducted, followed by preparation of the nanoemulsion using spontaneous emulsification. The formulation was




ISBN: 978-81-980623-8-3

characterized for thermodynamic stability, particle size, and other relevant parameters. Carbopol as gelling agent was selected to incorporate the nanoemulsion, and the resulting gel was evaluated for viscosity, extrudability, and in-vivo skin irritation. Efficacy was assessed by treating pustules in comparison with a marketed formulation. The nanoemulsion gel demonstrated stability, compatibility, and was non-irritating, while its nanoscale size and zeta potential (-30 to +30) facilitated enhanced penetration into the stratum corneum, resulting in superior efficacy in reducing acne and scars. The study confirms that the developed nanoemulsion gel is safe, stable, and effective, highlighting the potential of nanotechnology-based topical formulations in dermatological therapy.

**Keywords:** Acne scars, Nanoemulgel, Characterization, Blackseed oil, Rose hip oil.

**PT-177**

**FORMULATION OF ANTI-FUNGAL NANOEMULSION FILM USING CHRYSANTHEMUM INDICUM. L FLOWER EXTRACT**

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The rise of antibiotic-resistant fungi underscores the need for innovative antimicrobial solutions. This study develops and characterizes a nanoemulsion film infused with Chrysanthemum indicum Linn flower extract (CIE), leveraging its antifungal properties. Phytochemical analysis of CIE revealed a rich composition of bioactive compounds. A high-energy emulsification method yielded a stable nanoemulsion film with optimized droplet size, polydispersity index, and zeta potential. In vitro assays demonstrated the film's potent antifungal activity surpassing that of the crude extract. This enhanced efficacy is attributed to improved solubility and bioavailability of CIE's phytoconstituents.

**Keywords:** Chrysanthemum indicum.L, Antifungal nanoemulsion film, Topical antimicrobial agent, Skin infections.

**PT-178**

**PHYTOSOMAL GEL OF BARLERIA PRIONITIS: FORMULATION AND EVALUATION**

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The Barleria prionitis Lin, known as Vajradanti& Porcupine flower, is widely used in traditional medicine. Vajradanti means strong teeth in Hindi. The medicinal properties of Vajradanti plant are well reported in Ayurveda. The use of herbal products in the field of medicine has gained popularity in recent years. In India, herbal plants are used as a regular source of medicine. Plants, such as Turmeric, Ashoka and Triphala, are some common household names being widely used nowadays. One such name is Barleria prionitisL. Or Vajradanti, having antiarthritic, anti-inflammatory and anti-fertility properties. The leaves of this flower are also believed to provide relief in tooth ache. So these properties lead us to theuse of this shrub in the remedy of dental diseases. The aim of this study was to prepare the phytosome of Barleria Prionitis and evaluate it. Different phytosome complexes of Barleria Prionitis containing molar ratio of 1:0.5,1:1and1:1.5of Barleriaprionitis leaf extract and soya lecithin were prepared by the injection method. The phytosome was characterized by SEM, DSC and FTIR. These phytsomes were further formulated into gel form and phytsomal gel was prepared and evaluation test were performed. In vitro studies for these formulations were conducted for 8hrs and formulation F2 shows better release among all the formulation with 75.53% and all the evalution test like appearance, Ph, viscocity, spreadability were with in limits.

**Keywords:** BarleriaPrionitis, vajradanti, phytosome, porcupine, Soya Lecithin.

**PT-179**

**BIOFILM INHIBITION AND ANTIOXIDANT POTENTIAL OF STANDARDIZED POMEGRANATE PEEL EXTRACT FOR ORAL HEALTH APPLICATIONS**

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Dental caries remains one of the most prevalent global oral health problems, primarily caused by Streptococcus mutans biofilm formation and acidogenesis. The limitations of synthetic antimicrobials, including side effects and resistance, highlight the need for safe and effective herbal alternatives. Pomegranate (Punica granatum) peel is rich in polyphenols, particularly punicalagin and ellagic acid, known for their potent antioxidant and antimicrobial activities.The present study aims to evaluate the antioxidant and anti-biofilm potential of standardized pomegranate peel extract and to establish a correlation between its phenolic content and pharmacological activity. The extract will be characterized for total phenolic and flavonoid content (Folin–Ciocalteu and $AlCl_3$ assays) and optionally profiled using HPTLC for ellagic acid. Antioxidant activity will be assessed through DPPH radical scavenging assay, while anti-biofilm efficacy will be evaluated against S. mutans using a crystal violet microplate assay, along with assessment of acidogenesis (pH and lactate production). Preliminary results suggest significant antioxidant activity and dose-dependent inhibition of biofilm formation, with phenolic content contributing directly to the observed efficacy. This study concludes that standardized pomegranate peel extract shows promising potential as a natural alternative for oral health management. The findings support its application in the development of herbal oral-care formulations such as mucoadhesive films or gels.

**Keywords:** Pomegranate, Punicalagin, Antioxidant, Biofilm, Streptococcus mutans, Oral health

**PT-180**

**THERAPEUTIC INSIGHTS INTO TERMINALIA PANICULATA ROOTS: ANALGESIC, ANTI-INFLAMMATORY, AND ANTIPYRETIC ACTIVITIES**

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The present study aimed to investigate the analgesic, anti-inflammatory, and antipyretic potential of the ethanolic root extract of Terminalia paniculata Roth. (Combretaceae). Fresh roots were shade-dried, powdered, and subjected to maceration with 90% ethanol to obtain the extract. The extract was administered orally at doses of 200 and 400 mg/kg body weight, and its pharmacological activities were assessed using established experimental models. Analgesic effects were evaluated by acetic acid-induced writhing, tail immersion, and formalin-induced paw licking assays. Anti-inflammatory activity was determined using the carrageenan-induced rat paw edema model, while antipyretic activity was assessed through yeast-induced pyrexia in rats. The extract demonstrated marked analgesic activity by significantly reducing the number of writhes in the acetic acid test, prolonging reaction time in the tail immersion model, and inhibiting both the neurogenic and inflammatory phases of pain in the formalin assay. A pronounced anti-inflammatory effect was observed in the carrageenan-induced paw edema model, indicating a role in acute inflammation. Additionally, the extract significantly reduced elevated rectal temperature in yeast-induced pyrexia, suggesting antipyretic efficacy. Overall, the findings reveal that the ethanolic root extract of Terminalia paniculata possesses significant analgesic, anti-inflammatory, and antipyretic activities, which appear to involve both central and peripheral mechanisms. These results support its traditional use and highlight its potential as a natural therapeutic agent.

**Keywords:** Terminalia paniculata, Aspirin, Ibuprofen, Paracetamol, Acute toxicity studies.

**PT-181**

**FORMULATION AND EVALUATION OF ANTIACNE CREAM FROM COLOCASIA ESCULANTA LEAVES EXTRACT**

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In the current research antiacne cream was formulated from the ethanolic extracts of Colocasia esculanta leaves. The objectives behind this research was to evaluate its antibacterial activity against acne causing bacteria like Staphylococcus aureus, Escherichia coli and




ISBN: 978-81-980623-8-3

Pseudomonas aeruginosa. At first the leaves of Colocasia esculenta extracted by ethanol solvent using Soxhlet method of extraction. Then the extract was tested for its antibacterial activity against acne causing bacteria followed by the formulation and evaluation of Antiacne cream using disc diffusion method against Staphylococcus aureus. Escherichia coli and psudomonas aeruginosa. The antibacterial activity of ethanolic extract of Colocasia esculenta leaves against Staphylococcus aureus, Escherichia coli and psudomonas aeruginosa was found with zone of inhibition of 20 mm, 21mm and 20 mm. The formulated W/O cream showed good homogeneity, spreadability and antibacterial properties. Therefore the formulated cream has a potential in the treatment of acne as Staphylococcus aureus is a common acne causing bacteria while E. coli is responsible for skin infection.

**Keywords:** Colocasia esculenta, Ethanolic extract, Acne vulgaris, Antibacterial, Zone of Inhibition

**PT-182**

## VALORIZATION OF BANANA WASTE: IN VITRO ANTIOXIDANT PROPERTIES OF PEELS AND SEEDS

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Agro-industrial byproducts are gaining attention as source of natural bioactive agents. Banana being the chief-most fruit crop generates enormous quantities of wastes such as peels and seeds. This paper investigates the in vitro antioxidant properties of various parts of three local banana cultivars from Guwahati, Assam, so as to determine their valorization potential. Methods: Fresh banana plant parts (fruit, peel, and seed) were dried and extracted by both hot (Soxhlet) and cold maceration methods with petroleum ether, methanol, and ethyl ether. The antioxidant potential of the extracts was determined broadly by free radical scavenging methods against DPPH, ABTS, NO (Nitric Monoxide), and also FRAP (Ferric Reducing Antioxidant Power). The total phenolic content (TPC) was determined using the Folin-Ciocalteu reagent with a view to correlate it with bioactivity. Results: Methanolic extracts show consistently highest activity. The seed extracts have the maximum total phenolic content (195.62 µg GAE/mg) and, hence, the highest antioxidant activity. They showed the best inhibition percentages of 79.2%, 88.4%, and 89.4% in DPPH, ABTS, and NO radical scavenging assays at their highest tested concentrations. Conclusion: This study reaffirms that underutilized banana byproducts, especially the seeds, are well endowed with phenolic compounds exhibiting excellent antioxidant activities. These outcomes suggest the potential of banana waste being a cheap raw material for natural nutraceuticals to combat oxidative stress.

**Keywords**: Banana byproducts, Antioxidant activity, Phenolic compounds, Nutraceutical potential, Free radical scavenging.

**PT-183**

## FORMULATION AND EVALUATION OF WOUND HEALING HERBAL OINTMENT

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With the development of medical science, wound care is continually changing by adopting traditional and alternative medicine due to the advent of multi-resistant organisms and a decline in modern antibiotics. In this study, ointments were created based on an analysis of the effectiveness of plant extracts in treating wounds. Codieaum varigeatum chosen as herbal plants. The alcoholic extract is added with appropriate proportion in ointment base and evaluated for physicochemical evaluations, including appearance, pH, spreadability, viscosity, washability and anti-microbial activity. The physical characteristics remained unchanged, and the pH was within acceptable limits (about pH 7). During this study period, the formulations demonstrated good consistency, and good spreadability (2.5cm-3.1cm). The viscosity of ointments was discovered to be inversely proportional to the rate of shear (rpm), increasing when the rate of shear was decreased. The ointment exhibited significant zone of inhibition conforming the synergistic antimicrobial activity of the herbal ointment F1(0.1cm), F2(0.5cm),F3 (0.3cm),F4(0.9cm) the result of the study of F4 formulation shows more significant pH and positive results when compared to other formulations which help to establish these formulations effective in wound healing management. During a stability study conducted for three months at (40 °C and 75 5% RH) in accordance with ICH guidelines, the ointments were found to be stable. From the current study, it can be inferred that ointment containing herbal extracts with wound-healing properties can be created and used to provide a skin barrier.

**Keywords:** Codieaum varigeatum, wound healing, herbal ointment, antimicrobial activity

**PT-184**

## FORMULATION AND EVALUATION OF POLYHERBAL HYDROGEL TO TREAT ACNE

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Acne vulgaris is a prevalent chronic inflammatory disorder of the pilosebaceous units, affecting adolescents and young adults. The condition's pathophysiology involves excess sebum secretion, follicular hyperkeratinization, and colonization by Cutibacterium acnes, leading to comedones, papules, and cysts. Conventional treatments, such as retinoids and antibiotics, are often associated with side effects, necessitating the development of safer alternatives. This study aimed to formulate and evaluate a polyherbal anti-acne gel utilizing Vinca rosea, Curcuma longa, and Aloe vera, known for their antimicrobial, anti-inflammatory, and wound-healing properties. Excipients like Hydroxypropyl Methylcellulose (HPMC), Carbopol 934, and Triethanolamine were incorporated to ensure gel stability, spreadability, and patient acceptability. Physical examination of the formulations showed a saffron to bright yellow color, strong odor, semisolid state, and smooth texture. Homogeneity tests confirmed the absence of lumps and syneresis, with formulation F4 exhibiting superior clarity and smoothness. The pH values, ranging from 5.86 to 6.40, were within the skin-compatible range. Spreadability was highest for F4 (11.6 g·cm/sec), followed by F3 (11.5 g·cm/sec), indicating efficient application properties. Overall, formulation F4 demonstrated promising physical, rheological, and application properties, making it a potential candidate for further development as a polyherbal topical gel. This approach offers a safe and effective alternative for the management of acne vulgaris.

**Keywords:** Acne vulgaris, Polyherbal gel, Vincarosea, Curcuma longa, Aloe vera, Hydrogel, Herbal formulation, Anti-inflammatory.

**PT-185**

## FORMULATION AND DEVELOPMENT OF HERBAL EMULGEL FOR THE MANAGEMENT OF CANDIDIASIS

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Candidiasis is a fungal infection caused mainly by Candida albicans, an opportunistic yeast that overgrows under immunocompromised or imbalanced conditions. It commonly affects the oral cavity, skin, and genital tract, and in severe cases can lead to systemic infections. The present study aimed to develop a novel herbal emulgel formulation for the treatment of candidiasis. Conventional topical formulations such as creams and ointments are often limited by greasiness, poor spreadability, and inadequate penetration. Topical delivery was chosen to achieve localized action, minimize systemic side effects, and improve patient compliance. Emulgel systems, combining the benefits of emulsions and gels, overcome these drawbacks and enhance drug stability and skin permeability. Extract was obtained using Soxhlet extraction and confirmed to contain alkaloids, flavonoids, saponins, and withanolides with reported antifungal activity. A $3^2$ factorial design was applied to optimize the emulgel using Carbopol 940 as a gelling agent and a Span 80–Tween 80 system as emulsifiers. The optimized formulation exhibited suitable pH, viscosity, spreadability, and drug content. In-vitro and ex-vivo diffusion studies indicated sustained drug release, while antifungal evaluation by agar well diffusion demonstrated significant inhibition of C. albicans, comparable to clotrimazole. These findings suggest that W. Somnifera extract based emulgel is a promising topical herbal formulation for effective management of candidiasis.




ISBN: 978-81-980623-8-3

**Keywords:** Emugel, Antifungal , Candidiasis, Topical Drug Delivery

**PT-186**

**FORMULATION AND EVALUATION OF ANTI-AGING HERBAL CREAM**

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Herbal cosmetics are the preparations which are used to beautify and enhance the human appearances. The aim of present research was to formulate and evaluate the anti-aging herbal cream, containing plant extracts prepared by using water in oil method for the purpose of reducing wrinkles, nourishing and moistening the skin. The Anti-aging cream prepared by using the extract of Neem, extract of Aloe-vera, extract of Tulsi, extract of Papaya and extract of Turmeric. Quality evaluation of the formulated product was assessed by using different evaluation methods. The cream was subjected to various evaluation parameters including organoleptic characteristics, irritancy, washability, pH, penetration, stability, and phase separation tests. The results revealed that the formulated cream exhibited smooth texture, off-white to pale-yellow colour, pleasant Odor, and semisolid consistency. It produced no signs of irritation, redness, or itching during the irritancy test. The pH was found to be 8.1, suitable for topical application. The formulation showed good washability, easy skin penetration within 15–20 minutes, and no evidence of phase separation, confirming stability during the study period. Additionally, the herbal extracts imparted moisturizing, soothing, and collagen-promoting effects that aid in reducing wrinkles and improving skin elasticity. Overall, the anti-aging herbal cream demonstrated stability, safety, and efficacy, making it a cost-effective natural alternative to synthetic products for maintaining youthful and healthy skin.

**Keywords:** Aloe-vera Extract, Neem Extract, Tulsi Extract, Turmeric Extract, Papaya Extract.

**PT-187**

**FORMULATION AND DEVELOPMENT OF HERBAL GEL-LOADED NANOSPONGES FOR TREATMENT OF PSORIASIS**

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Psoriasis is a chronic immune-mediated skin disorder characterized by scaly plaques, hyperproliferation of keratinocytes, and immune dysregulation. Conventional therapies, including corticosteroids, immunosuppressants, and biologics, are often limited by systemic side effects, poor patient adherence, and inadequate skin penetration. These challenges highlight the need for safer and more effective topical approaches. This study focuses on a nanosponge-based topical gel formulated with Uncaria tomentosa extract, a natural compound with strong anti-inflammatory and immunomodulatory properties. Studies have shown that U. tomentosa downregulates inflammatory mediators such as IL-6 and NF-κB while also exhibiting antioxidant and COX-2 inhibitory effects. In vivo evaluation in a psoriasis model demonstrated that the nanosponge gel provided superior anti-inflammatory activity and enhanced skin repair compared to the control and extract-only groups. Safety assessments confirmed the absence of irritation, and stability testing confirmed consistent formulation properties throughout one month

**Keywords:** Psoriasis, Uncaria tomentosa, Nanosponge gel, Topical delivery, Anti- inflammatory

**PT-188**

**TRADITIONAL AYURVEDIC PLANTS IN HERBAL SOAP FORMULATION: A STUDY ON SKIN CARE EFFICACY**

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Neem (Azadirachta indica) is a revered herb widely used in traditional medicine for its multifaceted therapeutic properties. Its potent antibacterial, antifungal, and anti-inflammatory compounds make it an ideal active ingredient in soap formulations. The incorporation of neem into soap provides a natural and effective means to cleanse the skin, mitigate skin infections, and soothe inflammation. This project explores the efficacy of neem-based soap in harnessing these properties for enhanced dermatological benefits.Neem leaves have been traditionally used to treat various skin conditions, including eczema, psoriasis and acne. The herbal neem soap was made by blending 36.4% palm oil,9.1%coconut oil, 27.3%sodium hydroxide, 9.1% neem oil extract, and 18.2% neem aqueous extract which formed a pale yellow soap base. The herbal neem soap's properties were evaluated, showing:Moisture Content: 4.02%, indicating a relatively low water content that can contribute to a longer shelf life. pH Value: 8-10, which is within the suitable range for human skin, minimizing irritation risks. Total Fatty Matter: 57.40%, suggesting a good balance between cleansing and moisturizing properties. Free Caustic Alkali: 0.44%, indicating a relatively safe level for skin use.The results of this study confirm that the soap can serve as a therapeutic alternative for managing common skin problems, leveraging neem's natural efficacy to promote skin health and hygiene.This supports its use not just for daily cleansing but also as a beneficial treatment for various dermatological concerns.

**Keywords:** Azadirachta indica, antibacterial, anti-inflammatory, herbal soap.

**PT-189**

**FORMULATION AND EVALUATION OF CAROM SEED HERBAL KAJAL**

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Kajal, a traditional eye liner also known as kohl or Surma, offers several benefits, including being patient-friendly, water-resistant, stable, and cost-effective. It's a staple in women's beauty cosmetics due to its medicinal effects on the eyes. Various types of kajal exist, named after their main ingredients, such as charcoal, castor oil, ghee, camphor, and almond. This study aimed to prepare and evaluate herbal kajal using natural ingredients, prioritizing safety and efficacy. The herbal kajal was formulated with carom seeds, triphala powder, and other excipients like camphor, castor oil, almond oil, cow ghee, and honey, providing benefits beyond beautification, including cooling, moisturizing, and nourishing effects, as well as reducing the risk of eye disorders. The prepared kajal underwent several evaluation tests, including appearance, colour, texture, pH determination, spreadability, eye irritation, stability, and colour intensity comparison. The results showed compatibility with eye physiology, indicating the potential of herbal kajal as a safe and beneficial cosmetic product. By enhancing general eye functionality with simple and safe beautifying cosmetics, this study supports the development of herbal kajal as a daily cosmetic that not only beautifies but also cares for the eyes. The use of natural ingredients and emphasis on safety and efficacy make herbal kajal a promising alternative to traditional products.

**Keywords:** Herbal kajal, Carom seeds, Triphala powder, Eye irritation test, pH, Stability.

**PT-190**

**EVALUATION OF IN-VITRO ANTI-INFLAMMATORY ACTIVITY OF PERILLA FRUTESCENS SEED EXTRACT USING CELL- FREE ENZYME ASSAYS**

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Perilla frutescens (L.) Britt., a member of the family Lamiaceae, is an important herb native to East Asia, including China, Korea, Japan, and India, particularly in Manipur, Meghalaya, Arunachal Pradesh, Nagaland, Uttarakhand, Sikkim, and Assam. The leaves and seeds of Perilla frutescens are rich in phytochemicals such as flavonoids, phenolic compounds, terpenoids, triterpenoids, polyunsaturated fatty acids (α-linolenic acid, linoleic acid), volatile compounds, tannins, and alkaloids, which contribute to its diverse biological activities. Phytochemical screening using ferric chloride and Liebermann's tests confirmed the presence of phenolic compounds, notably rosmarinic acid. Rosmarinic acid, a key phenolic compound, exhibits potent anti-inflammatory properties by inhibiting pro-inflammatory cytokines. Beyond anti-inflammatory effects, Perilla frutescens has been reported to possess antioxidant, antimicrobial, anti-allergic, anticancer, and antidiabetic




ISBN: 978-81-980623-8-3

activities. In this study, we evaluated the anti-inflammatory potential of methanolic, ethanolic, and aqueous seed extracts of Perilla frutescens using an in vitro protein denaturation inhibition assay. Statistical analysis was performed using Two-Way ANOVA to assess the effects of extract type and concentration on inhibition activity. The results revealed significant differences ($p < 0.05$), confirming that both treatment type and concentration had a strong influence on protein denaturation inhibition. These findings highlight the therapeutic potential of Perilla frutescens seeds, particularly the role of rosmarinic acid, as a natural source of anti-inflammatory agents. Further in vivo studies are needed to substantiate these results and explore the clinical applicability of Perilla frutescens-derived compounds.

**Keywords:** Perilla frutescens, Anti-inflammatory, Rosmarinic acid, Protein denaturation, Two-way ANOVA.

**PT-191**

## REVOLUTIONIZING AYURVEDIC DOSHA DIAGNOSIS: FROM TRADITIONAL NADI PARIKSHA TO AI-DRIVEN ANALYSIS

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Ayurveda identifies health and disease states through the balance or imbalance of the three Doshas, Vata, Pitta, and Kapha, with Nadi Pariksha (pulse examination) serving as a central diagnostic tool. Traditional pulse reading, though effective, is subjective and dependent on practitioner expertise. Recent advancements in artificial intelligence and sensor technologies offer the potential to standardize and modernize this ancient practice. Pressure sensors, piezoelectric sensors, and optical sensors can digitize pulse signals, while signal processing methods such as Fast Fourier Transform and wavelet analysis extract features including rhythm, frequency, and morphology. These features are then analyzed using artificial intelligence models ranging from supervised machine learning techniques such as Support Vector Machine, Random Forest, Decision Tree, Logistic Regression, and k-nearest neighbor to deep learning methods like Convolutional Neural Network and Recurrent Neural Network for dosha classification and Prakriti assessment. This integration reduces variability, improves reproducibility, and enables scalable, objective diagnosis. Importantly, artificial intelligence-driven approaches such as wearable-based platforms can provide continuous monitoring, preventive insights, and personalized therapeutic recommendations, thereby strengthening Ayurveda's role in modern predictive and preventive healthcare. While artificial intelligence enhances diagnostic precision and expands research opportunities within Traditional Medicine, it cannot substitute the experiential knowledge of expert Vaidyas. Instead, it should function as a complementary tool that bridges classical wisdom with modern healthcare innovations. By combining ancient diagnostic frameworks with contemporary artificial intelligence–driven analysis, Ayurveda can evolve into a more accessible, standardized, and globally integrated healthcare system, contributing to holistic, patient-centered wellness.

**Keywords:** Ayurveda, Nadi Pariksha, Dosha Diagnosis, Artificial Intelligence, Sensor Technology

**PT-192**

## FORMULATION AND EVALUATION OF TURMERIC EXTRACT LOADED GRAPESEED OIL EMULGEL

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The rise of antibiotic resistance and side effects linked to synthetic antimicrobials have driven the search for safer, biocompatible alternatives in topical drug delivery. Herbal medicines, with their natural origin, minimal adverse effects, and better therapeutic benefits, have gained increasing interest. The present study reports the formulation and evaluation of an antimicrobial emulgel containing turmeric (Curcuma longa) extract and grapeseed oil (GSO) as bioactive agents. Turmeric, rich in curcumin, exhibits antimicrobial, antioxidant, anti-inflammatory, and wound-healing properties, while GSO, a lightweight natural oil, provides antimicrobial efficacy, polyphenolic antioxidants, and skin-nourishing benefits. The emulgel was prepared by incorporating turmeric extract-loaded GSO based emulsion into a hydrogel using Tween 80, Span 80, and Carbopol 940. Physicochemical properties of the developed formulation including appearance, pH, viscosity, spreadability, extrudability, and stability were assessed. The optimized emulgel showed desirable consistency, good spreadability (2.1 ± 0.23 cm), a skin-compatible pH (5.87 ± 0.05), swelling index (45.3 ± 1.71%), and viscosity (1813.05 ± 246.7 cP). Antimicrobial testing by agar well diffusion revealed inhibition zones of 9.5 ± 1.25 mm (Staphylococcus aureus), 9.75 ± 0.63 mm (Escherichia coli), and 9.5 ± 0.75 mm (Pseudomonas aeruginosa). The activity was superior to emulgel containing only GSO, highlighting the synergistic effects of turmeric and grapeseed oil. Overall, the study demonstrates that turmeric-GSO emulgel is a safe, effective, and irritation-free herbal formulation with potential as a sustainable topical therapy for microbial skin infections, reducing the risk of resistance.

**Keywords:** Antimicrobial assesment, emulgel, grapeseed oil, in vivo skin irritation, turmeric extract

**PT-193**

## A REVIEW: MEDICINAL PLANTS WITH EFFICACOUS ANTIDIABETIC POTENTIAL

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Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia due to impaired insulin secretion, insulin action, or both. Its global prevalence continues to rise, posing serious health and economic burdens. Although synthetic antidiabetic drugs are widely used, they often come with adverse effects and limited long-term efficacy. This has led to increased interest in medicinal plants as alternative or complementary therapies. Numerous plants used in traditional medicine have demonstrated significant antidiabetic potential, supported by both preclinical and clinical studies. Notable examples include Gymnema sylvestre, Momordica charantia, Trigonella foenum-graecum, Tinospora cordifolia, and Azadirachta indica. These plants exert hypoglycemic effects through various mechanisms such as stimulating insulin secretion, enhancing peripheral glucose uptake, inhibiting intestinal glucose absorption, and reducing oxidative stress. Their efficacy is largely attributed to bioactive compounds like flavonoids, alkaloids, terpenoids, and glycosides, which modulate key pathways in glucose metabolism. Despite promising results, challenges remain in standardizing plant extracts, determining optimal dosages, and ensuring safety and efficacy through rigorous clinical trials. Integrating ethnobotanical knowledge with modern pharmacological research could pave the way for novel, plant-based antidiabetic therapies that are both effective and accessible. This review underscores the therapeutic relevance of medicinal plants and advocates for continued scientific exploration to validate traditional claims and develop sustainable interventions for diabetes management.

**Keywords:** Medicinal plant, Anti diabetic activity, Hypoglycemic effect, Herbal therapy, Oxidative Stress.

**PT-194**

## ANTIULCER AND LAXATIVE POTENTIAL OF POLYSACCHARIDES FROM DELONIX REGIA

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Ulcers are a major global health problem, affecting nearly 10–15% of the population. Peptic ulcers, particularly gastric and duodenal ulcers, may progress to severe complications, including malignancy, if left untreated. Polysaccharides from natural sources are increasingly recognized for their gastroprotective and laxative effects. This study investigated the antiulcer and laxative activities of polysaccharides extracted from the ripe seed pulp of Delonix regia (DRSP) using experimental animal models. DRSP was extracted via ethanol precipitation and characterized by phytochemical screening, ATR-FTIR, TGA, and XRD analyses. Antioxidant activity was determined using free radical scavenging assays. Acute oral toxicity was assessed according to OECD Guideline 423.




ISBN: 978-81-980623-8-3

Antiulcer activity was evaluated in ethanol- and ibuprofen-induced rat models by measuring gastric content, acidity, ulcer index, and histopathology. Laxative activity was studied in a loperamide-induced constipation model and further validated using a charcoal meal gastrointestinal transit test. DRSP was confirmed as a neutral, swallowable polysaccharide exhibiting characteristic functional groups and a semi-crystalline structure. It showed notable antioxidant activity ($IC_{50}$: 639.47 µg/mL) and was safe at 2000 mg/kg in acute toxicity studies. In ulcer models, DRSP (300–600 mg/kg) significantly reduced gastric volume, free acidity, ulcer score, and ulcer index, while increasing gastric pH, protection percentage, and mucosal healing. In constipated animals, DRSP improved laxation by enhancing moist fecal weight and gastrointestinal transit ratio, with efficacy comparable to bisacodyl. These findings demonstrate that DRSP possesses dual antiulcer and laxative effects, likely mediated through antioxidant and cytoprotective mechanisms, supporting its potential as a natural therapeutic agent.

**Keywords:** Delonix regia; antiulcer; laxative; polysaccharides.

**PT-195**

## LIPOSOMAL ENCAPSULATION OF BRIDELIA RETUSA EXTRACT: DEVELOPMENT, OPTIMIZATION, AND CHARACTERIZATION FOR ENHANCED HERBAL DRUG DELIVERY

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Bridelia retusa Spreng. (Family: Euphorbiaceae), commonly known as Asan or Aghan, is widely distributed in the warmer regions of India. Traditionally, different parts of the plant are used to treat rheumatism, viral infections, snake bites, and for contraceptive purposes. However, the poor solubility and stability of its bioactive constituents limit its clinical application. Liposomal drug delivery systems offer a promising strategy to improve solubility, bioavailability, and controlled release of herbal extracts.The present study aimed to develop and optimize liposomal formulations of Bridelia retusa extract using the thin-film hydration technique.Liposomes were prepared using soy lecithin and cholesterol, followed by hydration and sonication to reduce particle size. The formulations were characterized for particle size, polydispersity index (PDI), and zeta potential using a Zetasizer. Encapsulation efficiency (EE%) was determined spectrophotometrically (UV-Vis). Morphology was assessed using Transmission Electron Microscopy (TEM), while additional characterization included thermal stability and structural analysis. The optimized liposomes showed nanoscale particle size with a narrow distribution (PDI < 0.3) and a zeta potential of less than –30 mV, confirming colloidal stability. Encapsulation efficiency ranged between 70–85%, indicating efficient loading of phytoconstituents. TEM analysis revealed spherical, multilamellar vesicles. The liposomes demonstrated good thermal stability and an amorphous structure, suggesting suitability for stable formulation development. Liposomal encapsulation of Bridelia retusa extract significantly enhances its stability and delivery potential. This nanocarrier system represents a promising herbal drug delivery platform with potential therapeutic applications. Further pharmacological investigations are required to validate its efficacy and explore its clinical applications.

**Keywords:** Bridelia retusa, liposomes, thin-film hydration, encapsulation efficiency, herbal drug delivery

**PT-196**

## FORMULATION AND EVALUATION OF METHANOLIC EXTRACT OF CHENOPODIUM ALBUM LOADED INVASOMES

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The aim of the study is to formulate Chenopodium album loaded invasomes. Vesicular drug delivery systems are the carriers for drug targeting that improvises therapeutic efficacy. These carrier systems deliver the drug at a pre-determined rate. Several drug carrier systems such as invasomes, liposomes, niosomes, proniosomes, ethosomes etc. increases the penetrability of the drug at the affected site. Invasomes are composed of phospholipids, ethanol and terpenes that serves as a key for increasing the penetrability of the herbal extract. The phytochemical screening of methanolic extract of Chenopodium album said to have mainly the presence of flavonoids, saponins and alkaloids. The HPLC chromatogram shows to have the presence of kaemferol and quercetin in 0.193 and 0.003%w/w respectively. The methanolic extract of Chenopodium album was formulated into invasomes by mechanical dispersion method. The characterization of invasomes showed the particle size, polydispersity index(PDI), zeta potential and Entrapment Efficiency. The particle size analysis showed that as the concentration of ethanol increases that results in the decrease in particle size. F2 formulation showed the optimized formulation of 245.8 nm in particle size, 0.331 PDI and (-)7.57 mV zeta potential. The %EE of Chenopodium album ranged from 50-72%. The SEM photograph revealed surface morphology and also showed spherical and oval shape. The Chenopodium album loaded invasomes were prepared and characterize successfully and it can be also concluded that invasomes can serve as a depot formulation for dermally active compounds.

**Keywords:** nanotechnology, Quercertin, Kaemferol, Invasomes.

**PT-197**

## FROM TRADITION TO THERAPEUTICS: ANTIVENOM ACTIVITY OF ALANGIUM SALVIFOLIUM

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Snakebite and scorpion sting remain serious public health problems in many parts of India, often leading to severe illness or even death if not treated in time. Traditional systems of medicine have long used plants as natural remedies to counter venom toxicity. Among these, Alangium salvifolium (Ankola), a small deciduous tree belonging to the family Alangiaceae, has gained importance for its potential antivenom activity. Different parts of the plant, especially the roots, bark, and seeds, are used in Ayurveda and folk practices for treating poisonous bites. The seed oil is well known for its protective effect in snake and scorpion envenomation, while the root and bark extracts are applied in traditional formulations to reduce swelling, pain, and toxic effects caused by venom. Phytochemical studies have shown the presence of alkaloids such as alangine and alangicine, along with flavonoids, tannins, and saponins, which may play a role in neutralizing venom toxins. Experimental studies indicate that plant extracts may help in stabilizing cell membranes, reducing oxidative stress, and counteracting neurotoxic effects of venom. These findings scientifically support the age-old use of the plant as an antivenom agent.Although promising, more in-depth research is still required to confirm its safety, exact mechanism of action, and effectiveness through clinical studies. If validated, Alangium salvifolium could become a valuable complementary therapy in managing venomous bites, especially in rural areas where access to commercial antivenoms is limited.

**Keywords:** Alangium salvifolium, Antivenom activity Snakebite,scorpion sting, Phytochemicals, Traditional medicine

**PT-198**

## FORMULATION AND EVALUATION OF SHANKHPUSHPI EFFERVESCENT TABLETS A MEMORY BOOSTER

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The increasing demand for herbal-based nutraceuticals has directed attention towards developing innovative dosage forms that enhance patient compliance, stability and therapeutic efficiency. Convolvulus pluricaulis(commonly known as Shankhpushpi) is a well-known “Medhya Rasayana” in Ayurveda, used for its nootropic, memory enhancing, anxiolytic and neuroprotective activities. As per recent studies, Convolvulus pluricaulis is a mixture of compounds like – Scopolatin,Kaemferol, Quarcatin& hydroxycinnamic acid, which work by interacting with neurological pathways, promoting neurite outgrowth and neuroprotection, leading to improved memory and cognitive function. Conventional dosage forms often suffer limitations like poor palatability, low patient compliance and stability issues so, to overcome these problems we prepared effervescent tablets which is a novel alternative as it improves patient acceptability by offering rapid




ISBN: 978-81-980623-8-3

dispersion, mask unpleasant taste, enhance bioavailability through faster disintegration. The present study focuses on the formulation and evaluation of Shankhpushpi effervescent tablets prepared using powdered drug, by combining an effervescent base, sodium bicarbonate with acids, citricand tartaric acid, balanced with suitable excipients.These are used to ensure sufficient binding hardness and flow properties without compromising effervescence. Evaluation parameters included Organoleptic characteristics, hardness, friability, weight variation, effervescent time, pH of reconstituted solution. Effervescence time was found to be within 60-120 seconds, producing a palatable solution with acceptable taste masking. The study concludes that Shankhpushpi effervescent tablets represent a promising novel dosage form that combines traditional herbal knowledge with modern pharmaceutical technology, offering enhanced patient compliance, stability and therapeutic effectiveness.

**Keywords:** Convolvulus pluricaulis, Effervescent tablets, Nootropic, herbal formulation, Patient compliance.

**PT-199**

**Waste To Wealth: Cellulose Nanofibers Obtained From Banana And Onion Peels**

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This study focuses on the extraction and characterization of cellulose nanofibers (CNFs) from banana peel and onion peel, two abundant agricultural wastes. CNFs were isolated through sequential chemical treatments, including alkaline, bleaching, and acid hydrolysis, followed by mechanical homogenization and lyophilization. The extracted nanofibers were analyzed using FTIR spectroscopy, particle size analysis, zeta potential measurement, differential scanning calorimetry (DSC), and field emission scanning electron microscopy (FESEM). Results revealed that banana peel-derived CNFs exhibited smaller particle size (86.3 nm), higher stability (zeta potential -0.12 mV), and better performance compared to onion peel-derived CNFs (226.2 nm, -0.3 mV). DSC analysis showed higher thermal stability in onion peel CNFs (179.7 °C) than banana peel CNFs (285.3 °C). The morphological analysis confirmed the porous structure and high surface area of the nanofibers, making them suitable for biomedical, pharmaceutical, and material reinforcement applications. The findings highlight the potential of converting agricultural waste into high-value nanomaterials, promoting sustainability and circular economy practices.

**Keywords:** Nanofibers, Lyophilization, Sustainability, Biomedical.

**PT-200**

**INVESTIGATION OF ANTIARTHRITIC EFFECTS OF ETHANOLIC EXTRACT FROM MYXOPYRUM SMILACIFOLIUM LEAVES**

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Herbal medicines continue to play a vital role in primary health care owing to their safety, efficacy, and cost-effectiveness. The present study was conducted to evaluate the anti-arthritic activity of the ethanolic leaf extract of Myxopyrum smilacifolium Blume. Leaves were collected, shade-dried, and extracted using ethanol. The extract was assessed for anti-arthritic potential using the Complete Freund's Adjuvant (CFA)-induced arthritis model in Wistar albino rats (150–200 g, either sex). Animals were divided into five groups of six rats each. Arthritis was induced with CFA, followed by treatment with the ethanolic extract at doses of 200 mg/kg and 400 mg/kg, while Diclofenac sodium (10 mg/kg) served as the standard. Parameters evaluated included paw edema, knee diameter, paw thickness, hematological indices, and radiographic joint changes. Phytochemical characterization was performed using IR, NMR, and mass spectrometry. The 400 mg/kg dose significantly ($P < 0.001$) reduced paw edema and joint inflammation, increased RBC and hemoglobin levels, and decreased WBC count and rheumatoid factor levels. Radiographic analysis confirmed recovery of joints, while phytochemical studies identified myxopyroside, an iridoid glycoside, as a key constituent. These findings suggest that the ethanolic leaf extract of M. smilacifolium exhibits significant anti-arthritic activity, likely attributed to myxopyroside.

**Keywords**: Myxopyrum smilacifolium Blume, antiarthritic, Myxopyroside, Freund's adjuvant, Radiography.

**PT-201**

**PHYTOCHEMICAL EVALUATION AND ANTI-INFLAMMATORY ACTIVITY OF ARTOCARPUS HIRSUTUS LAM [SEED]**

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The study involved extraction, identification, and evaluation of pharmacological activity of Artocarpus hirsutus Lam seeds, commonly known as Wild jack is a greatly valued medicinal plant, which belongs to the plant family Moraceae. Typically growing 20–25 m tall and up to 5m in girth, Artocarpus hirsutus is a tall, evergreen tree with edible, bright yellow, ovoid, spine-covered fruits and white, ovoid seeds. It grows well in any kind of soil and needs a warm, humid climate with lots of rainfall. It is found throughout the Western Ghats, from North Karnataka to the Malabar Coast and Travancore. Hortus Malabaricus, the oldest printed book on Asia's natural plant wealth, mentions it in its third volume provides extensive documentation of the medicinal benefits of Artocarpus hirsutus, also known as wild jack, which is native to Kerala. Preliminary phytochemical screening studies indicated the presence of flavonoids, saponins, tannins, glycosides, and alkaloids. This study estimated the anti-inflammatory prospective of ethanolic seed extract of Artocarpus hirsutus Lam. The invitro anti-inflammatory activity done by inhibition of protein denaturation method and protinase inhibitory method. The result indicates that the seed extract of Artocarpus hirsutus Lam possesses major anti-inflammatory activity.

**Keywords:** Artocarpus hirsutus, phytochemicals, Therapeutic effects, Anti-inflammatory activity.

**PT-202**

**ECO-NANOTECHNOLOGY WITH PANCHAGAVYA**

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Nanotechnologies are new areas of research focusing on affecting matter at the atomic and molecular levels. Nanotechnologies are able to significantly improve medical diagnostics by making them less expensive and convenient. The use of copper nanoparticles as therapeutic agents could be in particular advantageous because human body has an efficient system to deal with metabolism of copper since it is a micronutrient. Panchagavya is a term used in Ayurveda to describe five important substances obtained from cow namely urine, dung, milk, ghee and curd Synthesis of copper nanoparticle (CuNPs) with biological properties plays an important role in the development of scientifically valuable product. In this study, biosynthesis of copper nanoparticles using Indian traditional medicine, Panchagavya is used which is eco-friendly, simple, cost effective and non-toxic.Copper nanoparticles have gained much attention due to its high electrical conductivity, high melting point, low electrochemical migration behaviour and it is a cheaper metal compared to other metals such as silver, gold, platinum and palladium. An added advantage of copper nanoparticles is that they oxidize and form copper nanoparticles, and are relatively stable in terms of both chemical and physical properties. Copper sulphate (25 mM) solution was mixed with Panchagavya filtrate for the synthesis of copper nanoparticles. The Nano metallic dispersion was characterized ultra violet spectrophotometer, Fourier transmission infrared ray spectroscopy, X-ray diffraction, Dynamic light scattering, Laser Raman, scanning electron microscope, High resolution transmission electron microscope, X-ray fluorescent microscope. In addition, we studied the antioxidant and also cytotoxicity activity. The characterization results revels that the copper nanoparticles are round shaped in the size 98 nm (nm) with −34.4mv stability.

**Keywords:** medical diagnostics, biosynthesis, antioxidants, spectroscopy, diffraction, scattering

**PT-203**




ISBN: 978-81-980623-8-3

**GREEN SYNTHESIS OF SILVER NANOCOMPOSITES USING MEDICINAL PLANT EXTRACT FOR PHARMACEUTICAL APPLICATION**

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The rise of antibiotic-resistant infections has created the need for alternative antimicrobial agents. Silver nanoparticles (Ag NPs) have attracted considerable interest due to their strong antibacterial potential. Green synthesis methods provide an environmentally safe and cost-effective substitute for traditional chemical approaches. This work emphasizes, the green synthesis of silver nanocomposites using Syzygium aromaticum (clove) extract, which acts as a reducing and stabilizing agent. Clove is rich in phenolics, flavonoids, and eugenol that enable rapid reduction of silver ions ($Ag^+$) into stable Ag NPs .Characterization of the synthesized nanocomposites was performed, using UV-Visible spectroscopy, FTIR, XRD, and SEM. UV-Visible spectroscopy confirmed the nanoparticle formation and demonstrated that the standard curve of clove extract in ethanol obeyed Beer-Lambert's law within 20–100µg/ml. FTIR confirmed the functional groups involved in stabilization, XRD validated the crystalline nature, and SEM revealed spherical morphology with uniform dispersion in the 20–50 nm range. The synthesized nanocomposites showed promising antibacterial activity through mechanisms including microbial membrane disruption and reactive oxygen species generation. This clove-mediated method highlights a green, sustainable, and efficient route for nanoparticle synthesis, supporting the development of novel antimicrobial agents with broad applications in biomedical and pharmaceutical fields.

**Keywords**: Green synthesis, silver nanocomposites, clove extract, antibacterial activity, Eugenol.

**PT-204**

**ECO-FRIENDLY SILVER NANOPARTICLES FROM FIORIA VITIFOLIA LEAF EXTRACT: IN-VITRO BIOACTIVITY, TOXICITY ASSESSMENT, AND MOSQUITO REPELLENT CREAM FORMULATION FOR VECTOR-BORNE DISEASE CONTROL**

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Mosquito-borne diseases such as malaria and dengue continue to pose severe public health threats in India, contributing to high morbidity, mortality, and socio-economic burden. Conventional repellents often suffer from chemical toxicity and environmental hazards, necessitating the development of eco-friendly alternatives. In this study, silver nanoparticles (Ag-NPs) were biosynthesized using aqueous leaf extract of Fioria vitifolia via a green synthesis route, where plant phytochemicals acted as natural reducing and stabilizing agents. Characterization by UV–Vis, XRD, FTIR, TGA, FESEM, EDX, and HR-TEM confirmed the formation of stable, crystalline Ag-NPs with well-defined morphology. In vitro biological studies demonstrated significant antibacterial activity against Escherichia coli (17 mm) and Staphylococcus aureus (15 mm), antioxidant potential in DPPH (68.53 %) and ABTS (69.10 %) assays, anti-inflammatory activity (MSM = 75.6 % at 250 µg/mL), and anticancer effects against A231 cells (IC50 = 38.47 µg/mL). Photocatalytic degradation efficiency reached 88.1 % for indigo carmine dye within 100 min, while zebrafish embryo toxicity assays confirmed safety at 100 µg/mL. The Ag-NPs were further formulated into a mosquito repellent cream, which in vivorepellent tests revealed to provide 96.7 % protection against Aedes aegypti and Anopheles stephensi. GLP OECD 6-pack studies and evaluations in 100 healthy volunteers (biochemical, histopathological, and urine analyses) confirmed that the cream was non-irritant, non-toxic, and skin safe. Collectively, these findings suggest that F. vitifolia-mediated Ag-NPs not only possess multifunctional biomedical properties but also offer an environmentally sustainable and effective solution for mosquito repellent cream development, targeting malaria and dengue prevention in endemic regions of India.

**Keywords:** Fioria vitifolia, Ag-NPs, Green synthesis, Mosquito repellent cream, Human Trials.

**PT-205**

**BIOFABRICATION, BIOLOGICAL INVESTIGATION AND FORMULATION OF TOPICAL COSMETICS UTILIZING BIMETALLIC NANOPARTICLES DERIVED FROM PHOENIX DACTYLIFERA.**

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Biofabrication, a cutting-edge branch of biotechnology, enables the precise design and construction of biologically functional materials using living cells and biomaterials for therapeutic and cosmetic applications. With the growing focus on sustainability, green nanotechnology has gained attention, particularly in the eco-friendly synthesis of nanoparticles. This study focuses on the green synthesis of bimetallic nanoparticles (BNPs) using the aqueous extract of Phoenix dactylifera (date palm), a plant rich in bioactive compounds. The BNPs were prepared by reacting the plant extract with metal salts, followed by purification through filtration and centrifugation. The synthesized nanoparticles were characterized using UV-Vis spectroscopy, FTIR, and SEM to confirm their structural and morphological properties. The BNPs were further evaluated for antimicrobial and antioxidant activities and incorporated into a stable topical cosmetic formulation. The formulations were optimized and assessed for key physicochemical parameters, including pH, spreadability, and viscosity, to ensure stability and suitability for skin application. Safety and biocompatibility evaluations were conducted to align with regulatory standards, confirming their non-toxic nature. This study highlights the potential of Phoenix dactylifera-based BNPs as innovative ingredients for cosmetic applications, supporting skin health and appearance while promoting environmentally sustainable approaches. The findings contribute to the expanding field of Biofabrication, opening avenues for further research in cosmetics and allied sectors.

**Keywords:** biofabrication, bimetallic nanoparticles, Phoenix dactylifera, topical cosmetics, biological investigation

**PT-206**

**PHARMACOECONOMIC & ANTIBACTERIAL POTENTIAL OF AQUEOUS MORINGA OLEIFERA LEAF EXTRACT**

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Moringa oleifera, a well-recognized medicinal plant, has been traditionally employed for its nutritional and therapeutic values. The present study was undertaken to explore the pharmacoeconomic perspective and the biological potential of Moringa oleifera water extract, with particular emphasis on its antibacterial, antioxidant, and anti-inflammatory properties. The plant material was authenticated by a botanist, and extraction was performed using the Soxhlet method with water as a solvent, ensuring an economical and sustainable process. The extract was subjected to phytochemical screening, fluorescence analysis of crude powder and extract, and UV spectral studies to confirm the presence of bioactive constituents. Biological evaluation included antibacterial testing against Escherichia coli (Gram-negative) and Streptococcus spp. (Gram-positive), where the extract demonstrated significant inhibitory activity comparable to sodium fusidate ointment. In addition, antioxidant and anti-inflammatory assays revealed encouraging results, further supporting the wound-healing potential by reducing oxidative stress and local inflammation. The findings highlight the promising role of Moringa oleifera as an affordable therapeutic source with multiple pharmacological benefits. Collectively, this study suggests that Moringa oleifera water extract could serve as a cost-effective alternative for wound healing therapy, offering the combined advantages of antibacterial, antioxidant, and anti-inflammatory activities along with its well-established antidiabetic properties.

**Keywords:** Moringa oleifera, Antibacterials, Antioxidant activity, Anti-inflammatory activity, Diabetes management.




ISBN: 978-81-980623-8-3

**PT-207**

**PREPARATION AND EVALUATION OF NUTRACEUTICAL USING INDIAN TRADITIONAL KNOWLEDGE FOR MANAGEMENT OF ALZHEIMER'S LIKE CONDITIONS**

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Different rasayanas are described in our traditional texts for enhancement of cognition and protecting the psychological co-morbidities associated with them like agitation, stress and depression. Ghrita being lipophilic in nature helps inmicrocirculation of nutrient to different cells and transporting the active constituents to different cells and tissues increasing their potency several times.This article aims to evaluate the possible Nootropic potential of the ghrita prepared from the combination of some household spices like Cinnamon (Cinnamomum verum), Ginger (Zingiber officinale), Garlic (Allium sativum), Curcumin(Curcum longa) and to provide probable scientific explanations for their use. Herbs for ghrita like were collected freshly during the month of February. Ghrita was prepared by taking 1part of kalka (bolus of herbs), 4 parts of pure cow ghee and 16 parts of drava dravya (swarasa). Nootropic potential of the ghrita was evaluated by Radial arm maze, Actophotometer, Rota-Rod Test (Motor Co-Ordination) and Elevated plus Maze (EPM) Test. From Irwin schedule of preliminary psychopharmacological screening it was observed that though gritha and standard drug donepezil have some effect on reactivity, alertness, grooming they are not significant as compare to the control. The transfer latency in Radial arm maze test was reduced by 30.25% upon treatment of medicinal ghrita for a period of 30 days. It produced significant reduction in the fall of time in rota-rod test and decreases the locomotor activity in actophotometer test as compare to control at the end of 30 days study in a 5 minute observation. The results of this investigation suggest the possible nootrophic potential of medicinal ghrita which can be translated as a neutracutical for used in cognitive deficit population.

**PT-208**

**FROM PLANTS TO NANOMEDICINE: THERAPEUTIC POTENTIAL OF SENNA BIOACTIVES IN LUNG CANCER**

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This investigation highlights the potential of Senna species as promising phytopharmaceutical candidates for lung cancer treatment, particularly against A549 cell lines. Ethanolic extracts of Senna underwent phytochemical analysis, which revealed a rich profile of anthraquinones including emodin, aloe-emodin, rhein, chrysophanol, and sennosides along with various flavonoids and phenolic compounds. These constituents are associated with significant cytotoxic, antioxidant, and pro-apoptotic effects. Molecular docking studies indicated that emodin and aloe-emodin exhibit notable binding affinities (−8.2 to −9.5 kcal/mol) with crucial oncogenic targets such as EGFR, Bcl-2, Caspase-3, and PI3K/Akt, supporting their potential role in disrupting lung cancer progression pathways. To address challenges of solubility and bioavailability, advanced drug delivery systems, including liposomes, polymeric nanoparticles, and solid lipid nanoparticles, were formulated, enhancing both stability and targeted cytotoxic activity in A549 cells. Overall, the study underscores the therapeutic value of Senna-derived compounds and demonstrates that combining extraction, phytochemical profiling, molecular docking, and formulation provides a robust framework for the development of novel plant-based anticancer therapies.

**Keywords:** Senna Bio actives, Nanomedicine, Flavonoids and Anti-cancer therapies.

**PT-209**

**THERAPEUTIC POTENTIAL OF VITAMINS AND MINERALS IN VITILIGO: A NUTRACEUTICAL APPROACH**

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According to recent developments in pathogenesis, it is an autoimmune disease that is impacted by cellular disintegration, hormones, genetics, metabolism, and oxidative stressors. Between 0.5 and 2% of people worldwide suffer from vitiligo, an acquired skin pigmentation disorder. Melanocytes in the skin and mucous membranes cause vitiligo. The condition's precise cause is yet unknown. Topical steroids and PUVA (psoralen with ultraviolet of oral vitamins and minerals) are currently the most widely used treatments for vitiligo. It has recovered from a number of human ailments. The majority of research agrees that sun exposure, folic acid, and vitamin B12 work well together to support regimentation. Furthermore, because zinc and phenylalanine supplements are involved in the melanin formation pathway, they have demonstrated a therapeutic impact on vitiligo when used in conjunction with topical steroid UV-B (ultraviolet B) therapy. We can therefore draw the conclusion that vitiligo patients have lower levels of vitamin B12, vitamin C, vitamin D, vitamin E, zinc, copper, and other vitamins and minerals. This suggests that these vitamins and minerals, along with other antioxidants, are necessary to be taken in addition to treatments for vitiligo, and that further research is necessary to fully examine their effects. This finding could prove beneficial in identifying a cure or treatment for vitiligo.

**Keywords:** Vitiligo, Vitamins, Minerals, Neutraceuticals and Melanocytes.

**PT-210**

**OPTIMIZATION AND ASSESSMENT OF DYE EXTRACTION FROM BAUHINIA PURPUREA FLOWERS VIA RESPONSE SURFACE METHODOLOGY**

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Natural dyes are more durable, eco-friendly, and easy to use compared to synthetic dyes. The purpose of the research is to employ response surface methodology to extract and assess dyes from Bauhinia purpurea flowers. Three variables; temperature, time, and solvent were selected which influence extraction. Temperature was set between 30-60oC, and solvents like distilled water, methanol, and methanol-to-water mixture were chosen. A time range of 30 to 70 minutes was established for extraction. The parameters for 16 runs with R-Software (version 4.4.0) was set using central composite design of response surface methodology. Light, washing, and rubbing fastness tests were used to assess the dyes coloring effects. The antibacterial properties of isolated dyes were examined. Using central composite design and maceration, dyes were extracted from Bauhinia flower petals. The observed yield of extracted dyes ranged from 0.11 to 0.75g. The dyes were dark maroon to black in colour. Dyes have flavonoids, steroids, and carbohydrates. With a t-value of 6.2710 and p value of 0.0007 (<0.001), the intercept with highest yield showed a significant statistical difference. The parameters' two-way interactions indicated p-value of <0.05. Data validation between predicted and observed yields exhibited minimal error. Application of ferrous sulfate as mordant for improved light, washing, and rubbing fastness was supported by coloring capabilities of XV dye. Bauhinia dye revealed increase in zone of inhibition on both gram-positive and gram-negative bacteria with an increase in dose. The, current research concluded that band-aid preparation may make use of dye produced from Bauhinia purpurea flowers.

**Keywords:** Bauhinia purpurea, Flowers, Central Composite Design, Dyes, Anti-bacterial.

**PT-211**

**EVALUATION OF PARACETAMOL INDUCED HEPATOPROTECTIVE ACTIVITY OF DIFFERENT EXTRACTS OF QUISQUALIS INDICA LINN FLOWERS**

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To evaluate the hepatoprotective activity of different extracts of Quisqualis indica Linn flowers against paracetamol induced hepatotoxicity. The petroleum ether, ethyl acetate and ethanolic flower extracts was obtained by successive maceration process. These extracts were concentrated, dried under vacuum and subjected to preliminary qualitative chemical investigation, further screened for paracetamol




ISBN: 978-81-980623-8-3

induced Hepatoprotective activity using Wistar rats (200-250 g) of either sex. A control group was treated with paracetamol orally by suspending in 5 % CMC. Hepatotoxicity was induced by administrating paracetamol (3mg/kg), silymarin (25mg/kg) a marketed product was taken as standard and other groups were treated with three different extracts 200 mg/kg single dose for 3 days. After 3 days the same serum was analyzed for Alanine aminotransferase (ALT), Aspartate aminotransferase (AST), Alkaline phosphate (ALP) and Bilirubin. The results reveal that, hepatic enzymes ALT, AST, ALP and bilirubin in serum was significantly (P<0.01) increased in paracetamol treated animals when compared to control. Ethyl acetate and ethanolic extracts shown more significantly (P<0.01) decreased the levels of AST, ALP and bilirubin (P<0.01) 93.3 ± 3.4, 86.0 ± 0.9, 139.7±0.7, 1.7± 0.1 and 95.1±3.4, 89.0±3.0, 141.6±0.7, 1.7±0.5 respectively when compared to control. Whereas petroleum ether extract showed moderate significant (P<0.05) activity. Silymarin (25mg/kg) treated animals also showed significant decrease in AST (P<0.01), ALT, ALP and bilirubin (P<0.01). It was concluded from the result that, the ethyl acetate and ethanol extracts exhibited more significant (P<0.01) hepatoprotective activity, whereas petroleum ether showed moderate activity (P<0.05) against paracetamol induced hepatoxicity in rats.

**Keywords:** Hepatoprotective, Paracetamol, Quisqualis indica, Silymarin.

**PT-212**

## EXPLORING THE POTENTIAL OF HERBAL EXTRACTS IN IMMUNOMODULATORY FORMULATIONS: A NEW APPROACH

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The immune system plays a crucial role in maintaining homeostasis and defending against infections, making immunomodulation a key area of interest in healthcare. Herbal extracts, rich in bioactive compounds, have gained significant attention for their potential to enhance immune responses while minimizing adverse effects. This review explores the potential of herbal extracts in immunomodulatory formulations, highlighting their mechanisms of action, efficacy, and safety. Traditional medicinal plants such as Echinacea purpurea, Withania somnifera, Curcuma longa, and Panax ginseng have demonstrated immunomodulatory properties through various pathways, including cytokine regulation, enhancement of macrophage activity, and modulation of T-cell responses. Advances in phytochemical research have identified key active compounds, such as alkaloids, flavonoids, and polysaccharides, that contribute to their immunostimulatory effects. Recent developments in formulation technologies, including nanoencapsulation and bioavailability enhancement strategies, have further improved the efficacy of herbal immunomodulators.However, challenges such as standardization, variability in bioactive composition, and clinical validation need to be addressed to ensure their widespread acceptance and therapeutic reliability. This review underscores the importance of scientific validation of herbal extracts in immunomodulatory formulations, advocating for a multidisciplinary approach combining traditional knowledge with modern research techniques.Herbal immunomodulators represent a promising avenue for enhancing immune health in a natural and sustainable manner.

**Keywords:** Herbal Extracts, Immunomodulatory Formulations, Natural Immunity Boosters, Phytochemicals

**PT-213**

## RECENT TRENDS IN NUTRACEUTICALS: AN ALTERNATIVE OR A COMPLEMENT TO PHARMACEUTICALS

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Nutraceuticals offer a distinct, often complimentary approach to health and wellness than drugs. Nutraceuticals prevent disease and promote well-being, whereas drugs treat it. Nutraceuticals combine "nutrition" and "pharmaceutical." It includes any food or food component that prevents or treats disease. Established pharmaceutical businesses and startups compete in the Indian nutraceutical sector. The Indian nutraceuticals market is expected to increase due to a shift towards preventative healthcare and consumer health awareness. The Indian dietary supplements industry is estimated to reach $30 billion by 2035, growing 8.1% year between 2025 and 2035. An alternative or Complement: Best practices often involve both. A pharmaceutical can treat an active disease, but nutraceuticals can support the body, promote health, and lower the chance of relapse or future sickness. Nutraceuticals will rise due to post-pandemic health awareness and personalised medicine and technology. Nutraceuticals are pharma's future and driven by the desire to be healthier. It offers a viable natural option with efficacy and safety in the products for the betterment of health. Recently the emphasis is focused on nutraceutical with meal replacement therapy or pills, immuno-modulators, prophylaxis powders, inorganic mineral supplements etc. concerning the safety of nutraceuticals includes their toxicity studies, genotoxicity and carcinogenicity, drug interaction and contaminants. In future India will be a strong market for nutraceuticals as the players in the industry will be a combination of large multi-nationals.

**Keywords:** nutraceuticals, pharmaceuticals, herbal supplement, dietary, phytochemical.

**PT-214**

## PHYTOCHEMICAL SCREENING AND EVALUATION OF ANTIOXIDANT, TOTAL FLAVONOID, AND PHENOLIC CONTENTS IN METHANOLIC EXTRACT OF CARALLUMA ADSCENDENS WHOLE PLANT

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This study analyzed the methanolic extract of the whole Caralluma adscendens plant for its phytochemicals, antioxidant activity, total flavonoid content (TFC), and total phenolic content (TPC). Phytochemical screening confirmed the presence of important secondary metabolites. Antioxidant potential was evaluated using DPPH and nitric oxide scavenging assays, showing significant radical scavenging activity with IC50 values of 198.436±0.24 µg/ml (DPPH) and 203.712±0.387 µg/ml (nitric oxide), indicating a dose-dependent effect. The TPC and TFC were quantified as 77.23±0.54 mg gallic acid equivalents (GAE) and 65.18±1.73 mg quercetin equivalents, respectively. This demonstrates that Caralluma adscendens methanolic extract contains substantial antioxidant compounds, including phenolics and flavonoids.

**PT-215**

## GREEN SYNTHESIS, CHARACTERIZATION, AND ANTIMICROBIAL EVALUATION OF COPPER SULFATE AND FERRIC SULFATE NANOPARTICLES DERIVED FROM MANGIFERA INDICA LEAF EXTRACT

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Mangifera indica L. (Anacardiaceae) is a widely cultivated fruit tree native to South and Southeast Asia and valued worldwide for its edible fruit and medicinal properties. Mango leaves, in particular, are rich in bioactive compounds with reported anticancer, antidiabetic, antioxidant, hepatoprotective, anti-obesity, and lipid-lowering activities. The use of plant extracts for nanoparticle synthesis has emerged as an eco-friendly and sustainable alternative to conventional chemical and physical methods, offering advantages such as reduced toxicity, lower cost, and enhanced biocompatibility. The present study focuses on the green synthesis of copper sulfate and ferric sulfate nanoparticles using M. indica leaf extract and compares their physicochemical and biological properties. Fresh mango leaves were thoroughly washed, shade-dried, and ground with a mortar and pestle to obtain a crude extract. The synthesis was carried out by adding aqueous solutions of copper and ferric salts dropwise to the extract under continuous stirring until a characteristic color change indicated nanoparticle formation. The resulting suspensions were centrifuged to separate the nanoparticles from unreacted materials and plant debris. The synthesized nanoparticles were characterized using ultraviolet–visible (UV–Vis) spectroscopy, transmission electron microscopy (TEM), X-ray diffraction (XRD), and zeta potential analysis to determine their optical properties, morphology, crystalline structure, and surface charge, respectively. Furthermore, their antimicrobial activity was evaluated against a panel of selected microorganisms to assess their potential biological




ISBN: 978-81-980623-8-3

applications. This study is expected to provide insights into the effect of different precursor metal salts on nanoparticle properties and to promote the sustainable production of functional nanomaterials through plant-based synthesis.

**Keywords:** green synthesis; copper sulfate nanoparticles; ferric sulfate nanoparticles; plant extract; comparative study.

**PT-216**

**PHYTOCHEMICAL INSIGHTS AND PHARMACOLOGICAL VALIDATION OF ANTI-ALLERGIC AND WOUND-HEALING ACTIVITIES OF POLYALTHIA LONGIFOLIA**

M PRIYA DHARSHINI

This study investigated the phytochemical profile and potential anti-allergic and wound-healing properties of Polyalthia longifolia, a plant widely recognized in traditional medicine. Phytochemical screening confirmed the presence of alkaloids, flavonoids, glycosides, and phenolic compounds, extracted using solvents of varying polarity. The extracts demonstrated notable pharmacological potential, with ethanol extract showing the highest anti-allergic activity by effectively inhibiting protein denaturation and reducing histamine release in vitro. Chloroform extract was evaluated for wound-healing activity using the L929 murine fibroblast cell line, where it significantly promoted fibroblast migration and proliferation, enhancing wound closure in a dose-dependent manner. These findings suggest that Polyalthia longifolia leaves possess bioactive constituents with promising anti-allergic and wound-healing effects. These findings underscore the therapeutic potential of Polyalthia longifolia leaves while highlighting the importance of dosage optimization to maximize efficacy and minimize toxicity.

**PT-217**

**DEVELOPMENT AND EVALUATION OF A BEETROOT-BASED COSMECEUTICAL CREAM FOR SKIN BRIGHTENING**

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This innovative cosmetic cream formulation harnesses the natural potency of beetroot extract, renowned for its rich betalain content and powerful antioxidant properties. Designed to revitalize dull and tired skin, the product aims to promote an even-toned, radiant complexion while offering protective benefits against environmental stressors. Beetroot, being a rich source of vitamins (A, C, and folate), helps in detoxifying the skin and improving blood circulation, resulting in a healthy glow. Combined with emollients and stabilizers, this formulation ensures excellent skin compatibility, smooth texture, and enhanced absorption. The formulation is water-based and free from harsh chemicals, making it suitable for all skin types, including sensitive skin. Its natural pinkish hue and hydrating feel provide a luxurious application experience. This cream not only nourishes and hydrates but also aligns with the growing demand for plant-based, eco-friendly skincare solutions, offering consumers an effective and safe herbal alternative in modern cosmetology.

**Keywords:** Beetroot Extract, Betalains, Antioxidant Cream, Herbal Skincare, Natural Cosmetics, Skin Brightening, Eco-friendly Formulation, Detoxifying Cream, Plant-based Skincare, Water-based Cream, Sensitive Skin Friendly, Vitamin-rich Formulation, Radiant Complexion

**PT-218**

**FORMULATION AND EVALUATION OF A HERBAL GEL FOR THE TREATMENT OF MOUTH ULCER**

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Mouth ulcers, also known as aphthous ulcers or canker sores, are painful lesions of the oral mucosa that significantly affect eating, speaking, and overall oral health. Conventional treatments often rely on corticosteroids or antiseptic formulations, which may cause adverse effects with long-term use. Herbal medicine offers a safe, effective, and natural alternative, providing antimicrobial, anti-inflammatory, antioxidant, and wound-healing properties without harmful side effects.This project focuses on the formulation and evaluation of a herbal gel using selected medicinal plants such as Azadirachta indica (Neem), Psidium guajava (Guava), Ziziphus jujuba (Jujube), and Ocimum sanctum (Tulsi). The prepared formulation will be assessed for physicochemical parameters (pH, spreadability, viscosity, stability, homogeneity) and biological activities (antimicrobial, anti-inflammatory, irritation testing). The expected outcome is the development of a stable, non-toxic, and patient-friendly herbal gel that provides symptomatic relief, promotes healing, and offers a steroid-free alternative for the management of oral ulcers.

**Keywords**: Mouth ulcer, Herbal gel, Neem, Guava, Jujube, Tulsi, Anti-inflammatory, Wound healing, Oral formulation.

**PT-219**

**PREPARATION OF HERBAL ANTIFUNGAL WIPES**

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Fungal infections represent a significant public health challenge due to their recurrent nature and the increasing resistance associated with synthetic antifungal agents. Herbal formulations, enriched with bioactive phytoconstituents, have emerged as promising alternatives owing to their efficacy, safety, and minimal side effects. The present work focuses on the preparation of herbal antifungal wipes as a novel, convenient, and patient-friendly dosage form for the prevention and management of fungal infections.In this study, essential oils with well-documented antifungal activity—namely neem oil, tea tree oil, clove oil, turmeric oil, and lavender oil—were selected as active ingredients. These oils were incorporated into a suitable wipe base along with preservatives to enhance stability and extend shelf life. The formulation was prepared by impregnating nonwoven wipe material with the optimized herbal solution, followed by appropriate packaging to maintain efficacy and prevent microbial contamination. The prepared wipes combine the therapeutic potential of herbal extracts with the practicality of disposable wipes, offering a safe, eco-friendly, and cost-effective alternative to conventional antifungal products. This formulation holds promise for improving personal hygiene, ensuring ease of application, and contributing to the growing demand for herbal healthcare products in modern therapeutics.

**Keywords:** Herbal antifungal wipes, Essential oils, Fungal infections, Phytoconstituents, Novel dosage forms Eco friendly formulation

**PT-220**

**ANTHELMINTIC POTENTIAL OF MORINGA OLEIFERA GUM: A NATURAL REMEDY AGAINST PARASITES**

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Moringa oleifera, a fast-growing tropical tree of the family Moringaceae, is valued for its high nutritional content and diverse medicinal properties. The present study evaluates the anthelmintic activity of Moringa oleifera gum using Indian earthworm Pheritima posthuma as an experimental model. Gum samples were collected and authenticated, and extracts were prepared using petroleum ether, methanol and chloroform. Phytochemical screening revealed the presence of saponins, proteins, phenols, glycosides and flavonoids, while volatile oils, starch and steroids were absent. Anthelmintic activity was assessed by recording the time required for paralysis and death of worms in comparison with standard drug Albendazole (0.15 mg/10 ml) and normal saline as control. All extracts demonstrated dose-dependent activity, with the petroleum ether extract showing the fastest onset of paralysis (7.06 min) and death (11.40 min), followed by methanol and chloroform extracts. The results indicate that the gum of Moringa oleifera possesses significant anthelmintic properties, comparable to the standard drug. The activity is attributed to the presence of bioactive constituents such as glycosides and phenolic compounds. This study supports the traditional use of Moringa species in treating helminthic infections and suggests its potential for development as a natural anthelmintic agent after further pharmacological and toxicological evaluations.

**Keyword:** Moringa oleifera, Anthelmintic activity, Gum extract, Pheritima posthuma, Chloroform extract, Phytochemicals, Natural deworming agent.

**PT-221**

**RUBIA CORDIFOLIA AND CAMELLIA SINENSIS: A SYNERGISTIC HYDRATING HERBAL FACE SERUM FOR SKIN CARE**

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ISBN: 978-81-980623-8-3

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Cosmetic serum is a highly concentrated formulation based on water or oil that penetrates quickly into the deeper skin layers, protecting the skin from oxidative damage caused by free radicals. This study aimed to formulate and evaluate a synergistic herbal face serum containing Rubia cordifolia and Camellia sinensis. Extraction and preliminary phytochemical screening were conducted using aqueous extracts, followed by physicochemical evaluation of the serum. The prepared serum is a blend of natural ingredients that penetrate the epidermis, hydrate the skin, and improve complexion and skin tone. It enhances skin texture, leaving it soft and fair. The formulation included Rubia cordifolia, Camellia sinensis, glycerine, hyaluronic acid, and xanthan gum. Physical and chemical parameters such as colour, appearance, viscosity, globule size, spreadability, and antioxidant activity were evaluated. The optimized F5 batch showed no residue formation, was easy to wash off, and demonstrated effective skin hydration and protection.

**Keywords:** Rubia cordifolia, Camellia sinensis, Oxidative damage protection, Synergistic Hydrating Serum

**PT-222**

## PHYSICOCHEMICHAL AND PHARMACOLOGICAL PROFILING OF ANCYCLUS PYRETHRUM AND CHLOROPHYTUM BORIVILIANUM

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Bioactive molecules discovered in medicinal plants are extensive and support of both conventional and contemporary therapeutic uses. Among the ,chlorophytum borivilianum (safed Musli) and Anacyclus pyrethrum (Akarkara ) are well known for their ethnomedical significance, the goal of the current investigation was to assess and contrast these two plant'physicochemical and pharmacological characteristics. Moisture content, ash and extractive values, p H, and phytochemical screening for alkaloids, saponins, glycosides, flavonoids,tannins, and sterols were all parts of the physicochemical characterizations process. Reviewing well established in vitro and in real life studies on aphrodisiac, immunomodulatory, neuropharmacological,anti-inflammatory ,and anti-oxidant properties was a technique used for pharmacological testing. The findings that C.borivilianum a high content of saponin and steroidal glycosides ,supporting its adaptogenic immunomodulatory,and arthritis quelities.A pyrethrum root extract are rich in alkaloid, primary which contribute to neurostimulant and aphrodisiac effects. Synergistic therapeutic potential was found through comparative pharmacological profiling, especially in the treatment of arthritis, sexual dysfunction , and stress. The quality and purity of crude medication were validated using standardization measures, which can help create herbal medicines that consistently work. This thorough analysis establishes a scientific foundation for the traditional application of these plants and emphasizes their importance as significant phytotherapeutics resources. To determine their place in evidence –besed phytomedicine, more research involving toxicity profiling.

**Keywords:** GC-MS, HPLC, FTIR, physicochemical, pharmacological, phytochemical, Anacyclus pyrethrum, and Chlorophytum borivilianum

**PT-223**

## THE EFFECT OF HERBAL NUTRACEUTICALS ON HUMAN HEALTH

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Nutraceuticals are nutrients, or components of nutrients, that play a significant role in adapting and maintaining regular physiological functions necessary to sustain a healthy human life. Nutritional fibers, probiotics, prebiotics, polyunsaturated fatty acids, antioxidants, spices, phytochemicals, and other diverse kinds of herbal or natural nutrients can all be categorized as nutrient items utilized in nutraceuticals. The healthcare branch focused on all features of nutraceuticals, ranging from systematic parts to medical trials, from efficiency studies to valuable effects on well-being status. Nutraceuticals describe themselves as a natural and essential component of our daily diet. These nutraceuticals aid in the fight against some of the most pressing health issues of the day, including obesity, heart disease, cancer, osteoporosis, arthritis, diabetes, and cholesterol. Herbal nutraceuticals are utilized as a potent weapon for maintaining health and fighting major, chronic diseases that are brought on by poor nutrition, thereby encouraging the best health, longevity, and quality of life.

**Keywords:** Nutraceuticals, Nutrients, Well-being, Health.

**PT-224**

## MOSQUITO LARVICIDAL POTENTIAL AND COMPARATIVE EVALUATION OF ASIAN WEEDS CASSIA ALATA LINN, ZEPHYRANTHES MINUTA (KUNTH) D. DIETR. AND PARTHENIUM HYSTEROPHORUS LINN.

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Although synthetic mosquito larvicidal agents have been widely used, they exhibit deteriorating effects on health and the environment. Therefore, as an alternative and safe approach, we attempted to explore the mosquito larvicidal potential of leaves of weeds Cassia alata Linn (CA), Zephyranthes minuta (Kunth) D. Dietr. (ZM) and Parthenium hysterophorus Linn (PH). Weeds were evaluated by protocol prescribed by WHO 2005 against 4th instar larvae of Aedes aegypti, Anopheles subpictus, and Culex quinquefasciatus. Ethanol, diethyl ether and n-hexane leaf extracts were studied in preliminary screening for their larvicidal potential at 20, 40, 80, 160, 320 and 640 mg/l concentrations. Larvicidal activities were performed using the petri dish method taking batches of 25 larvae. The larval mortality was observed after 12 and 24 hr of the treatment. Log probit analysis (95% confidence level) was performed as a statistical tool using AAT Bioquest to reveal LC50 and LC90 values. PH shows maximum efficacy in comparison to other weeds as LC50 values of PH alcoholic extracts against Aedes aegypti were minimum (22.42±1.50) in comparison to other weed extracts, and it is close to the LC50 (10.66±0.90) of standard larvicidal compound N,N-diethyl-meta-toluamide (DEET). Further, with the other two species Anopheles subpictus and Culex quinquefasciatus, the PH extracts in diethyl ether and n-hexane show minimum LC50 values of 23.67±1.10 and 22.42±1.50 respectively. The results of the present investigation suggest that PH possesses remarkable larvicidal potential specifically for Aedes aegypti and Culex quinquefasciatus, the most commonly found species in developing and underdeveloped Asian countries.

**Keywords:** Cassia alata, Parthenium hysterophorus, Zephyranthes minuta, Mosquito larvicides, Aedes aegypti, Culex quinquefasciatus

**PT-225**

## GREEN SYNTHESIS OF COPPER OXIDE NANOPARTICLES USING JUSTICIA GENDARUSSA BURM.F. LEAF EXTRACT FOR ANTI-INFLAMMATORY AND ANTIOXIDANT ACTIVITY

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In this study, copper oxide nanoparticles (CuO-NPs) were successfully synthesized via a green approach using the aqueous leaf extract of Justicia gendarussa Burm.F. The primary aim was to evaluate the impact of eco-friendly synthesis on nanoparticle formation, characterization, and in-vitro biological activities, with a focus on anti-inflammatory and antioxidant effects. The synthesized CuO-NPs were characterized using Fourier Transform Infrared Spectroscopy (FTIR) and UV-Visible spectroscopy. Dynamic light scattering analysis revealed an average particle size of 921.7 nm, while UV-Vis spectra showed a characteristic absorption peak at 263 nm. FTIR analysis confirmed the presence of functional groups associated with copper oxide formation, without indications of undesirable interactions, suggesting effective capping and stabilization by plant biomolecules. The biological potential of CuO-NPs was assessed through anti-inflammatory activity by inhibition of protein denaturation and antioxidant activity using DPPH radical scavenging assays. The nanoparticles exhibited notable anti-inflammatory and antioxidant properties, with $IC_{50}$ values marginally higher than those of




ISBN: 978-81-980623-8-3

reference standards, indicating promising bioactivity. The study establishes that Justicia gendarussa extract serves as a potent, natural reducing and stabilizing agent in the synthesis of CuO-NPs. These nanoparticles demonstrate potential therapeutic applications in managing inflammation and oxidative stress-related conditions. However, further investigations are warranted to elucidate the underlying mechanisms, bio-distribution, and long-term safety profiles of these nanoparticles to ensure their safe and effective use in biomedical applications

**Keywords:** Copper oxide nanoparticles, Justicia gendarussa, green synthesis, anti-inflammatory activity, antioxidant activity.

**PT-226**

**GREEN APPROACHES TO CELLULOSE RECOVERY FROM BANANA PSEUDOSTEMS: PROCESS OPTIMIZATION AND INDUSTRIAL POTENTIAL**

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Global banana production exceeds 116 million tons per year, generating enormous agricultural waste in the form of banana pseudostem leftovers. These lignocellulosic wastes provide significant prospects for sustainable biomass valorization, especially cellulose extraction—a process previously inhibited by the removal of lignin and hemicellulose.This study aims to optimize environmentally friendly extraction parameters for cellulose recovery from banana pseudostems and assess the purity and potential industrial applications of the obtained cellulose.Response Surface Methodology (RSM) was used to optimize pretreatment factors such as NaOH and $H_2O_2$ concentrations, as well as microwave-assisted radiation time. To ascertain the purity and structural characteristics of the extracted cellulose, Fourier Transform Infrared Spectroscopy (FTIR), X-Ray Diffraction (XRD), and Scanning Electron Microscopy (SEM) were used.The optimized extraction process resulted in cellulose recovery of over 82%, with low hemicellulose and lignin residuals. Characterization investigations showed the cellulose's excellent purity and favorable morphological characteristics.The study highlights the potential of this green and effective technology for high-yield cellulose extraction from banana pseudostems for industrial uses such as environmentally friendly adsorbents, thermal insulation, and soundproofing materials.

**Keywords:** Cellulose Extraction, Banana Pseudostems, Green Chemistry, Response Surface Methodology, Industrial Biomaterials

**PT-227**

**MODIFICATION OF NATURAL POLYMERS FOR PHARMACEUTICAL, BIOMEDICAL AND ENVIRONMENTAL APPLICATIONS**

SNEHA DILIP TIPUGADE

Synthetic polymers, being prepared with the help of chemicals have a side effect on the atmosphere as well as on human beings. Natural polymers, such as polysaccharides, proteins, and nucleic acids, are components of biological systems responsible for performing a wide range of essential functions. Biodegradable natural polymers have been investigated extensively as the best choice for encapsulation and delivery of drugs. The research has attracted remarkable attention in the pharmaceutical industry. Natural polymers have received more attention because of their advantages over synthetic polymers such as abundant availability, low cost, biodegradability and non-toxicity. However, natural polymers suffer some limitations such as drop-in viscosity upon storage, uncontrolled hydration, solubility, inability to perform under high temperature and pressure (thermal stability), etc. These disadvantages of natural polymers can be overcome by chemical modification of natural polymers by crosslinking, blending, interpenetrating polymers networks, polymer grafting, and so on. Graft copolymerization is one of the most commonly employed polymer modification methods used to prepare hybrid polymers from natural and synthetic polymers. Graft copolymerization is a very significant technique to add hybrid properties in backbone of polymers. The grafting generally initiated through the formation of free radical centers on the polymer backbone as well as monomer.

**PT-228**

**BOTTLE GOURD EFFERVESCENT TABLETS: A NOVEL APPROACH TO NUTRACEUTICAL LIVER SUPPORT**

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The present innovation relates to a novel nutraceutical formulation developed as an effervescent tablet comprising bottle gourd (Lagenaria siceraria) powder as its principle active ingredient. This formulation is aimed at promoting liver health, supporting detoxification, and enhancing overall wellness.Effervescent properties are achieved through the combination of citric acid and sodium bicarbonate, while sweetening agents such as mannitol and sorbitol are incorporated to improve palatability and encourage consumer compliance. Direct-compression excipients are included to aid in processing and ensure consistency of the large dosage form.The effervescent tablet is manufactured using a direct compression technique, a method that not only simplifies production but also provides effective protection against moisture and enhances the stability of active compounds. Each optimized tablet, with an average weight of 450 mg, demonstrates rapid disintegration within three minutes, complete effervescence, acceptable hardness, and friability appropriate for oral dosage forms. The solution formed upon disintegration maintains a pH range that is both safe and organoleptically pleasing. The formulation further complies with Indian Pharmacopeia standards for friability and weight variation, ensuring quality and reliability. Its effervescent delivery platform improves bioavailability, enhances convenience of use, and offers increased consumer acceptability. The integration of bottle gourd powder with optimized excipients and an effective manufacturing approach distinguishes this formulation as a novel, patentable nutraceutical product.

**Keywords:** Nutraceutical formulation, Effervescent tablet, Detoxification, Bottle gourd (Lagenaria siceraria), Direct compression.

**PT-229**

**DUAL LAYER HERBAL TOPICAL SYSTEM FOR RINGWORM TREATMENT AND SKIN PIGMENTATION MANAGEMENT**

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A bilayer topical patch was developed to provide dual therapeutic benefits in the management of ringworm and associated post-inflammatory hyperpigmentation through the synergistic action of herbal essential oils. The first polymeric layer, designed for direct skin contact, was incorporated with two essential oils in synergism to exert potent antifungal activity. The upper layer was formulated with bioactive compounds targeting hyperpigmentation, thereby addressing a common sequela following antifungal therapy. Physical characterization of the patch demonstrated favorable tensile strength, uniform thickness, and sustained drug release, confirming its structural integrity and suitability for topical application. In vitro diffusion studies validated effective and controlled transdermal delivery of active constituents over an extended period. Antimicrobial activity, assessed against Trichophyton rubrum, showed strong inhibitory and fungicidal effects, further supported by Minimum Fungicidal Concentration (MFC) assays. Molecular docking studies corroborated these results, revealing favorable interactions of active compounds with fungal protein targets. Safety evaluation via the chorioallantoic membrane (CAM) assay and trypan blue cytotoxicity assay confirmed the biocompatibility of the bilayer system. Furthermore, tyrosinase inhibition assays established the patch's potential in reducing hyperpigmentation, while anti-inflammatory testing demonstrated significant attenuation of inflammatory markers. Collectively, the results highlight the bilayer patch as a multifunctional, biocompatible, and effective transdermal delivery system offering both antifungal and skin-tone restorative benefits. This innovative approach may serve as a promising alternative for holistic management of superficial fungal infections with cosmetic relevance.

**Keywords:** Bilayer topical patch, Ringworm, Hyperpigmentation, Herbal essential oils, Antifungal activity, Trichophyton rubrum

**PT-230**

**ANTIPYRETIC EFFECTS OF OXALIS EXTRACTS**

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This study investigated and compared the antipyretic effects of ethyl acetate and ethanol extracts from two Oxalis species: Oxalis corniculata and Oxalis latifolia. The experiment used a pyrexia model induced by Brewer's yeast in test subjects. A control group received only the pyretic agent, allowing for a baseline comparison against the extract-treated groups. Before pyrexia induction, all subjects had normal body temperatures. Following the yeast injection, their temperatures significantly rose, confirming the establishment of fever. The test extracts were then administered, and body temperatures were monitored every two hours to assess their antipyretic efficacy. The results demonstrated a dose-dependent effect, with higher concentrations of the extracts showing a more pronounced reduction in fever. The most significant antipyretic activity was observed with the ethyl acetate extract of Oxalis latifolia at a concentration of 500 mg/ml. This was followed in efficacy by the ethyl acetate extract of Oxalis corniculata. The ethanol extracts of both species showed a lesser, but still notable, antipyretic effect, with Oxalis latifolia again proving more potent than Oxalis corniculata. These findings suggest that the active antipyretic compounds in these plants are more effectively extracted by ethyl acetate and are present in higher concentrations in Oxalis latifolia. This research provides valuable data on the traditional medicinal uses of these plants and points to their potential as sources for new antipyretic drugs. This activity may be due to the presence of Flavonoids, Alkaloids and Tannins as their secondary metabolite.

**Keywords:** Pyrexia Model, Dose-dependent effect, Secondary Metabolite

**PT-231**

## HEPATOPROTECTIVE EFFECT OF ELAEOCARPUS GANITRUS LEAF EXTRACT AGAINST PARACETAMOL-INDUCED LIVER INJURY IN WISTAR RATS

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Paracetamol (acetaminophen) overdose is a major cause of drug-induced hepatotoxicity, characterized by oxidative stress, hepatocellular necrosis, and elevated liver enzymes. Elaeocarpus ganitrus (Rudraksha), valued in Ayurveda, has shown antioxidant and anti-inflammatory properties, but its Hepatoprotective potential remains underexplored. The study evaluated the Hepatoprotective activity of E. ganitrus leaf extract against paracetamol-induced liver injury in Wistar rats. The animals were divided into five groups: a normal control, a paracetamol-impaired control (2 g/kg, p.o.), a standard silymarintreated group (50 mg/kg, p.o.), and two E. ganitrus leaf extract treatment groups (200 and 400 mg/kg, p.o.). After 7 days of treatment, Hepatoprotective activity was assessed by measuring serum biochemical markers [SGOT, SGPT, ALP, total bilirubin, and total protein] and by histopathological evaluation of liver tissues. Paracetamol intoxication caused a marked elevation of SGOT (186.5 ± 8.2 U/L), SGPT (172.4 ± 7.9 U/L), ALP (226.7 ± 10.5 U/L), and total bilirubin (2.14 ± 0.11 mg/dL) compared to the control group ($p < 0.001$). SGOT (92.3 ± 6.1 U/L), SGPT (88.7 ± 5.8 U/L), ALP (118.6 ± 8.7 U/L), and bilirubin (0.86 ± 0.09 mg/dL) were all significantly reduced when E. ganitrus leaf extract (400 mg/kg) was administered, and total protein levels were restored to close to normal (6.9 ± 0.4 g/dL). The Hepatoprotective effect was comparable to the silymarin-treated group. Histopathological studies confirmed reduced necrosis, fatty changes, and restored hepatic architecture in extract-treated animals. The findings indicate that Elaeocarpus ganitrus leaf extract exerts significant Hepatoprotective activity against paracetamol-induced liver damage, likely due to its antioxidant phytoconstituents. This supports its traditional use and potential development as a natural therapeutic for liver disorders.

**Keywords:** Elaeocarpus ganitrus, Leaf extract, Hepatoprotective activity, Paracetamolinduced hepatotoxicity, Wistar rats, Silymarin

**PT-232**

## ETHOSOMAL FORMULATION OF PUNARNAVA LEAF EXTRACT FOR TARGETED ANTIMICROBIAL THERAPY IN BOVINE MASTITIS

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Bovine mastitis continues to pose a major challenge in the dairy industry, with staphylococcus aureus recognised as a predominant pathogen. This study investigates an ethosomal delivery system incorporating Punarnava (Boerhaavia diffusa) leaf extract to enhance therapeutic performance against S. aureus. The plant is rich source of alkaloids, flavonoids, and phenolic acids, all with established antimicrobial activity. Encapsulation of these bio actives within ethosomal composed of phospholipids, ethanol, propylene, glycol, cholesterol, glycerine and mannitol improved solubility, permeability and bioavailability while maintaining extract stability. The ethosomal formulation enabled deeper penetration of phytoconstituents through bacterial membranes, producing a stronger inhibitory effect compared with both crude extract and convention antimicrobials. Minimum inhibitory concentration (MIC) assays demonstrated a substantial reduction in the required dose, confirming enhanced potency. Furthermore, the excipient matrix supported vesicle integrity, sustained drug release, and consistent antimicrobial action offering practical applicability in veterinary treatment. This Punarnava-based ethosomal system represents a plant derived, biocompatible, and sustainable strategy for mastitis management. By coupling natural antimicrobial properties with an advanced delivery platform, it offers a viable alternative to synthetic antibiotics resistance in dairy herbs. Its distinctive composition, controlled release profile and proven efficacy against S. aureus also highlight potential for intellectual property protection and translational use in veterinary medicine.

**Keywords**: Bovine mastitis, Staphylococcus aureus, boerhaavia diffusa, ethosomal, minimum inhibitory concentration, antimicrobial activity.

**PT-233**

## QUANTITATIVE PHYTOCHEMICAL PROFILING AND IN VITRO ANTIOXIDANT POTENTIAL OF RHUS CHINENSIS MILL. FRUITS FROM THE SIKKIM HIMALAYAN REGION

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Rhus chinensis Mill., a deciduous tree belonging to the family Anacardiaceae, is prevalent throughout China, Japan, and northeastern India, including Sikkim and Manipur, among other places. The purpose of this study was to examine the phytochemical profile and antioxidant capacity of several extracts made from Rhus chinensis Mill. fruits. The fruits were collected, authenticated and then successively extracted using Soxhlet utilising solvents with varying degrees of polarity, such as n-hexane, chlorofom, methanol, and 70% methanol-water. Additionally, maceration was used to prepare a water extract. Quantitative analysis revealed the methanol extract had the highest Total Phenolic Content (126.943 ± 2.763 mg GAE/g) while the hydro-alcoholic extract had the highest Total Flavonoid Content (29.116 ± 3.436 mg RtE/g). DPPH and hydrogen peroxide scavenging assays, along with the measurement of the extracts' total antioxidant content, were used to assess their antioxidant potential. The methanol extract had the strongest antioxidant activity, with $IC_{50}$ values equivalent to the standard quercetin in the DPPH and hydrogen peroxide scavenging assays of 17.9 ± 3.55 µg/mL and 22.57 ± 5.676 µg/mL, respectively. Additionally, the maximum total antioxidant concentration (58.60 ± 1.5 mg AAE/g) was found in the methanol extract. These results indicate that Rhus chinensis Mill. fruits have the potential to be a natural antioxidant source and encourage further research into their possible therapeutic applications.

**Keywords:** Rhus chinensis Mill., Quantitative analysis, In Vitro antioxidant activity.

**PT-234**

## EVALUATION OF IN-VITRO AND IN-SILICO ANTI-DIABETIC ACTIVITY OF THE PLANT JUSTICIA GENDARUSSA BURM.F

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Justicia gendarussa Burm f., a medicinal plant with diverse pharmacological actions, was evaluated for its antidiabetic potential through in-vitro, in-silico, and network pharmacology approaches. Diabetes mellitus, marked by chronic hyperglycemia, leads to severe complications, and current synthetic drugs are limited by high costs and adverse effects, driving interest in plant based alternatives. In-vitro assays demonstrated α-amylase and α-glucosidase inhibitory activity of the extract, indicating a role in carbohydrate metabolism. Phytochemical screening identified active compounds, which were docked against key-diabetic targets (α-amylase, α-glucosidase, and DPP-IV), showcasing strong binding affinities and suggesting inhibitory potential. ADMET profiling predicted good pharmacokinetics, drug-likeliness, and safety. Network pharmacology revealed multiple interactions with diabetes related targets, highlighting multitarget activity. The plant's contituents may act through enzyme inhibition, insulin signaling modulation, and oxidative stress reduction. These findings validate its traditional use and suggest J. gendarussa as a promising candidate for novel phytotherapeutics, warranting further in-vivo and clinical studies.

**Keywords:** Justicia gendarussa, pharmacological activities, phytochemical constituents, network pharmacology.

**PT-235**

## PHYTOCHEMICAL CHARACTERIZATION AND ASSESSMENT OF WOUND HEALING ACTIVITY OF ARTEMISIA VERLOTIORUM LAMOTTE LEAVES

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This study explores the phytochemical composition and wound healing activity of Artemisia verlotiorum Lamotte, a traditionally used medicinal plant for skin ailments in Northeast India. Leaves were collected from Dimapur, Nagaland, authenticated by the Botanical Survey of India, and subjected to pharmacognostical analysis for botanical confirmation. Sequential solvent extraction was performed, and the resulting extracts were analyzed using Thin Layer Chromatography (TLC), High-Performance Thin Layer Chromatography (HPTLC), and High-Resolution Liquid Chromatography-Mass Spectrometry (HR-LCMS). Phytochemical investigation revealed the presence of bioactive compounds such as flavonoids, phenolic acids and sesquiterpene lactones phytoconstituents known for their antioxidant, anti-inflammatory and antimicrobial properties. Antioxidant assay demonstrated the strong radical scavenging activity indicating extracts potential of lower oxidative stress a crucial component of wound healing. Its safety for tropical application was validated by acute cutaneous toxicity test. Significant gains in wound contraction, tissue regeneration, and re-epithelialization were shown in in vivo wound healing investigations. Positive interactions between key phytoconstituents and proteins involved in wound repair were revealed by complementary in silico molecular docking, which may point to potential molecular processes. The ethnomedical application of A. verlotiorum for wound care is supported by these results, which also highlight the wider therapeutic potential of native plants from Northeast India. The development of formulations, clinical validation, and active ingredient isolation are future directions.

**Keywords:** Artemisia verlotiorum Lamotte, HR-LCMS, HPTLC, In vivo study.

**PT-236**

## PHYSICOCHEMICAL AND PHYTOCHEMICAL CHARACTERIZATION OF DICHROSTACHYS CINEREA (L.) LEAVES

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Herbal plants are invaluable natural resources, providing therapeutic compounds used globally in traditional and modern medicine. Dichrostachys cinerea (L.) Wight and Arn. Belongs to the family Fabaceae is a notable herb in Indian and African medicine, traditionally used to treat ailments such as headaches, diabetes, and arthritis. Its leaves and bark contain active compounds with anti-inflammatory properties. The leaves of Dichrostachys cinerea (L.) Wight and Arn. were collected from a forest near Hosapete, Karnataka, authenticated and shade-dried before being powdered and stored for extraction. In the present study physicochemical analyses, phytochemical, Thin Layer Chromatography (TLC) and fluorescence analysis were conducted. The leaves of Dichrostachys cinerea (L.) Wight and Arn. physicochemical analyses are total ash, water soluble ash, sulphated ash, acid insoluble ash, moisture content, alcohol soluble extractive and watersoluble extractive values were obtained. The qualitative phytochemical analysis revealed the presence of carbohydrates, tannins, flavonoids, phenolic, and saponins were present in both alcoholic and water extracts. TLC profile revealed the presence of flavonoids in both extracts. Dried powderd leaves was treated with a number of different reagents which showed characteristic fluroscence. The present study establishes the medicinal and therapeutic application the plant. The diagnostic characters not only facilitate the identification of the crude drug, also helpful to determine the quality and purity of the plant material.

**Keywords:** Physicochemical, phytochemical, flavonoids, Dichrostachys cinerea.

**PT-237**

## IN-HOUSE PREPARATION AND STANDARDIZATION OF HERBAL HYDRATING FACEMASK

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Face mask is the cosmetic face mask that directly delivers active ingredients to the skin for intensive, Short-term treatment. The mask is designed to form a barrier that trap moisture and allow ingredients to penetrate more deeply in skin compared to moisturizers/skincare products. Gel-based masks are skincare product which forms a gel like consistency, used for hydration, soothing, and refreshing the skin.Cosmetic formulation which are available in the market having high amount synthetic chemical agent which are harmful to face and body. To avoid this harmful effect herbal excipients were used to formulate face mask which providing hydrating, soothing and motorizing effect to skin.The constituent were extracted from herbal ingredients such as papaya, rice water, cucumber, turmeric, sandalwood. They were purchased from the local area and were grinded, filtered, mixed homogenously and then evaluated for parameters including organoleptic, physicochemical, rheological features, phytochemical, stability, and irritancy examination.The filtrate was used to make face this pack showed good flow property which is suitable for a face pack. Organoleptic evaluation showed that the pack is smooth and pleasant smelling powder. Rheological findings justified the flow properties of the pack as it was found to be free flowing and non-sticky in nature. The results proved that the formulation was stable on all aspects. Irritancy test showed the negative. Stability tests performed revealed the inert nature of the pack.Thus, in the present work, we formulated a pack, which can be easily made with the easily available ingredients. It showed all the benefits of a face pack and further optimization studies are required on its various parameters to find its useful benefits on the human beings.

**Keywords:** Skin, Hydrating Herbal face pack, Standardization.

**PT-238**

## FORMULATION AND EVALUATION OF POLY HERBAL GEL OF CITRUS SINUSES

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Herbal medicines are still the mainstay of about 75-80% of the world's population, mainly in developing countries, for primary health care because of better cultural acceptability, better compatibility with human body and lesser side effects. Herbal medicines consist of plant or its part to treat injuries, disease or illnesses and are used to prevent and treat diseases and ailments or to promote health and healing. It is a drug or preparation made from a plant or plants and used for any to such purpose. Herbal medicines are the oldest form of health care known to




ISBN: 978-81-980623-8-3

mankind. Gel formulations prepared with Carbopol 934, HPMC K 100 M and Xanthan gum showed good homogeneity, no skin irritation, good stability and anti- inflammatory activity. However, the Xanthan gum based gel proved to the formula of choice, since it showed the highest percentage of Extrudability, good spreadability and rheological properties. Gels are defined as semi rigid systems in which the movement of the dispersing medium is restricted by an interlacing three-dimensional network of particles or solvated macromolecules of the dispersed phase. The word ''gel'' is derived from ''gelatin,'' and both ''gel'' and ''jelly'' can be drawn back to the Latin gelu for ''frost'' and gel are, meaning ''freeze'' or ''congeal.'' This origin indicates the essential idea of a liquid setting to a solid-like material that does not flow, but is elastic and retains some liquid characteristics.

**Keywords:** Polyherbal gel, Formulations and Evaluation, Synthetic compounds, Preservatives.

**PT-239**

**DEVELOPMENT OF TRANSDERMAL PATCHES USING A NATURAL POLYMER, MORINGA OLEIFERA GUM**

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The problems with oral medicine administration in particular were addressed by the transdermal drug delivery system. To provide a specific dosage of medication via the skin and into the bloodstream, a transdermal patch—a medicated adhesive patch—is put to the skin. It promotes the healing of an injured bodily component. Transdermal drug delivery has an advantage over other delivery methods such as oral, topical, intravenous i.m., etc. because the patch enables controlled medication dispensing into the patient, typically by melting thin medication layers embedded in the adhesive or by a porous membrane covering a reservoir. The primary disadvantage of transdermal administration methods is that only drugs with tiny molecules may readily pass through the skin and be administered in this manner due to the skin's strong barrier. Careful polymer selection is required to regulate the drug loading, rate of release, and length of release. The most crucial factor to take into account when choosing a polymer is the drug-polymer interaction. The food, pharmaceutical, and other sectors are heavily researching moringa gum, a polysaccharide exudate derived from the stem of the plant Moringa oleifera.

**Keywords:** Transdermal, Delivery System, Natural Polymer, Patch, Moringa, Gum.

**PT-240**

**NEUTRACEUTICALS- ROLE IN PREVENTION AND TREATMENT OF HEART DISEASES**

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Nutraceuticals are food products, or their components, that offer health benefits beyond basic nutrition, often by preventing or treating disease. "Nutrition" and "Pharmaceutical," encompasses everything from whole foods containing bioactive compounds like antioxidants and omega-3 fatty acids to fortified foods and dietary supplements such as vitamins, probiotics, and herbal extracts. Heart disease reflects to a few cardiovascular disorders. Varied pathophysiological events observed in different cardiovascular conditions. At the tissue level during metabolism, this dynamic is highly sensitive to change, and it does so very rapidly. Numerous enzymatic and hormonal mechanisms, acting like transistor switches, are available to manage this extraordinary dynamic situation. Oft cited evidence shows that nutrition, when properly understood and used, can control as much as 70-85% of the premature mortality caused by cardiovascular disease. This nutrition is ideally powered by whole foods from the plant kingdom, with nutrients acting wholistically in the body in a way to benefit all disease subtypes, even though effect size and outcome responses for each heart disease subtype may differ.

**Keywords:** Nutraceuticals, bioactive compounds, enzymatic and hormonal mechanisms, mortality.

**PT-241**

**RECENT TRENDS OF THE FORMULATION AND THERAPEUTIC POTENTIAL OF POLYHERBAL SYSTEMS IN MODERN HEALTHCARE**

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Polyherbal formulations, comprising synergistic combinations of multiple medicinal herbs, have remained integral to traditional systems like Ayurveda, Siddha, and Unani for managing complex diseases. Modern scientific advances have validated their multi-targeted mechanisms, superior efficacy, and reduced toxicity profiles compared to single-herb or synthetic drugs. Classical formulations such as churna, kwath, asava, and arishta continue to be foundational, while recent innovations incorporate nanocarrier-based delivery systems, chromatographic standardisation, and integration into cosmeceuticals and nutraceuticals, thereby expanding their therapeutic horizons. Polyherbal systems have shown promising anti-diabetic activity through β-cell regeneration and insulin sensitisation, immunomodulatory and anti-inflammatory effects by enhancing macrophage function and cytokine regulation, and antimicrobial-antioxidant actions effective against multidrug-resistant pathogens. Despite these advantages, challenges such as standardisation, quality control, and limited clinical validations persist. Their incorporation into regenerative medicine, functional foods, and global healthcare standards highlights their transformative potential. This review underscores that polyherbal formulations, combining traditional wisdom with modern scientific validation, offer safe, effective, and holistic therapeutic alternatives, addressing the global demand for evidence-based natural healthcare.

**Keywords:** Polyherbal systems; nanocarriers; synergistic effects; therapeutic potential.

**PT-242**

**FORMULATION OF HERBAL CONSTITUENTS LOADED OINTMENT AS A DUAL DRUG DELIVERY SYSTEM FOR THE TREATMENT OF VITILIGO**

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Vitiligo is a progressive skin disorder characterized by the loss of melanocytes, leading to depigmented patches. Current treatments have limited efficacy due to poor skin penetration and slow melanocyte stimulation. This study aims to develop a dual drug delivery ointment incorporating Psoralea corylifolia (bakuchiol) for melanogenesis stimulation and piperine (from Piper nigrum) for enhanced bioavailability and skin penetration, providing a synergistic therapeutic effect.A dual-phase herbal ointment was formulated using a hydrophobic ointment base incorporating an oil-in-water emulsion for controlled drug release. The bioactive compounds, Psoralea corylifolia extract (rich in bakuchiol) and piperine, were incorporated. The ointment was evaluated for physicochemical properties, pH, viscosity, and spreadability. Particle size analysis of the emulsion phase ensured optimal dispersion. In vitro drug release studies demonstrated sustained delivery, while Franz diffusion cell studies assessed skin permeability. Stability studies were performed under accelerated conditions.The optimized formulation exhibited excellent spreadability, pH compatibility, and a biphasic drug release pattern ensuring prolonged action. Ex vivo skin permeation studies confirmed enhanced penetration of both bioactives, with piperine significantly improving the absorption of Psoralea corylifolia. The dual drug delivery system provided superior therapeutic outcomes compared to conventional treatments. The Herbal Constituents Loaded ointment effectively enhanced drug penetration, melanocyte stimulation, and repigmentation, offering a promising herbal alternative for vitiligo management.

**Keywords:** Vitiligo, Psoralea corylifolia, Piperine, Dual drug delivery, Herbal ointment.

**PT-243**

**HERBAL IN-SITU GEL BASED ON HEAT-SENSITIVE POLYMERS FOR THE TREATMENT OF GLAUCOMA**

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ISBN: 978-81-980623-8-3

Glaucoma is the second most common cause of blindness and permanent visual loss worldwide. Although it is the primary risk factor for glaucomatous optic neuropathy, elevated intraocular pressure (IOP) is not usually an indication of glaucoma. There are numerous herbal formulations on the market for the therapy of glaucoma, although they have drawbacks including low therapeutic response and bioavailability, short retention periods, etc. The use of an in situ gel-forming ocular medication delivery device can get over these restrictions. When exposed to physiological eye temperature, the temperature-sensitive in situ gel formulations undergo a phase shift from liquid to semisolid gel. At room temperature, these liquids flow freely and are simple to inject into the eye like drops. Poloxamer 407 and Poloxamer 188 are examples of thermosensitive polymers, which can react to temperature changes by becoming soluble in water at low temperatures and insoluble at higher ones. The introduction to various in-situ gel formation techniques, drug release mechanisms, polymers used in formulations, general preparation techniques such as the cold and hot methods, various in-situ gel system applications, and in-situ gel evaluation are the main topics of this review.

**Keywords:** Glaucoma, In-situ gel, Heat sensitive Polymers, Herbal Formulation.

**PT-244**

## DETERMINATION OF ALLELOPATHIC POTENTIAL ON GERMINATION AND GROWTH OF CHILLI PLANT

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Allelochemical are natural compounds which effects the growth of surrounding plants. These compounds usually develop in plants, soils, and other surrounding organisms. Furthermore, these molecules vary from plant to plant and with changes in biotic and abiotic situations. The present study was aimed, determination of allelopathic potential on germination and growth of chilly plant and its impact on secondary metabolite. The herb plant designed as the allelochemical recipient in this study is red chilly (Capsicum anuum L). The chilly seeds were used single variety. In order to determine the chilly plants germination rate and growth by using treatment Spiritual music, Korean music, ice, fumes and polluted water in a laboratory Condition. The germination rate were studied and the pharmacognostic study involving physicochemical and phytochemical parameters were detected. The extraction process was performed using cold maceration method and methanol as a solvent, to obtain extracts of Capsicum annum leaf. Chromatographic analysis involved thin layer chromatography (TLC) and high performance thin layer chromatography (HPTLC). Our study confirmed, the sound vibrational techniques helps the plant to grow healthy and disease free. The research works proves that music therapy grown medicinal plants well- being, while spiritual music helps to better growth of plants compared to Korean music. The findings of this study confirmed that cow dung fumes treatment given plant shows less adverse effect while polluted water and ice treatment given plant shows negative effect on seed germination, growth, morphology, microscopy and chromatographic analysis.

**Keyword:** Allelochemicals, Germination, Spiritual, Korean music, HPTLC.

**PT-245**

## DESIGN AND CHARACTERIZATION OF GREEN TEA EXTRACT NANOEMULGEL DERMATOLOGICAL APPLICATION

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This study aimed to design and characterize a green tea extract (GTE)-loaded nanoemulgel for enhanced dermatological applications. Green tea extract, enriched with polyphenolic compounds such as epigallocatechin gallate (EGCG), possesses strong antioxidant, anti-inflammatory, antimicrobial, and anti-aging activities. However, its poor aqueous solubility and limited skin permeability restrict its therapeutic potential when applied topically. To overcome these limitations, a nanoemulgel was formulated by incorporating GTE-loaded nanoemulsion into a Carbopol 940 gel base. Optimization was carried out using a 2×2 factorial design, with oil (ethyl oleate) and surfactant (Tween 80 with PEG 400) concentrations as independent variables. The optimized nanoemulgel exhibited a mean droplet size of 115.8 nm, low polydispersity index (0.24), zeta potential of –4.6 mV, and high drug content (92.35 ± 1.12%). Rheological and physicochemical assessments demonstrated desirable viscosity (558 cP), spreadability, and skin-compatible pH (6.3–6.5). In vitro release studies showed sustained release with 68.06% cumulative drug release over 12 hours, while stability studies confirmed formulation robustness without phase separation. These findings indicate that the developed nanoemulgel significantly improves the solubility, stability, and dermal penetration of GTE, making it a promising, safe, and patient-friendly topical delivery system for therapeutic and cosmeceutical applications.

**Keywords:** Green tea extract, nanoemulgel, epigallocatechin gallate, topical drug delivery, dermatological application, antioxidant, sustained release, cosmeceuticals.

**PT-246**

## NOVEL HERBAL BASED BANDAGE LOADED WITH ROHITAKA TECOMA UNDULATA AND CURCUMA AMADA FOR TOPICAL INFLAMMATION CONTROL

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Inflammation and muscle pain are widespread conditions that compromise mobility, reduce comfort, and slow down recovery. Swelling of muscles due to inflammation is especially debilitating and often requires localized therapy for effective relief. Conventional anti-inflammatory treatments, while effective, may cause side effects and poor patient acceptability, prompting interest in natural alternatives. In this project, herbal bandages were formulated incorporating Rohitaka (Tecoma undulata Roxb.) bark, traditionally known as Ragatrodha, and Ambe Halad (Curcuma amada Roxb.) rhizome, both esteemed in Ayurveda for their anti-inflammatory, analgesic, and healing properties.The bark of Tecoma undulata is noted for reducing muscle swelling and alleviating inflammation, while Curcuma amada provides strong anti-inflammatory, muscle pain–relieving, and tissue-healing actions. To enhance patient comfort, menthol and camphor were also incorporated into the herbal paste, imparting a cooling and soothing effect that complements the anti-inflammatory action. The prepared paste was integrated into the absorbent pad of sterile bandages, allowing both protection of the affected site and localized delivery of active phytoconstituents.The bandages were evaluated for physical integrity, paste retention, sterility, and therapeutic performance. The results demonstrated that the herbal bandages were stable, adhered well, and showed significant efficacy in reducing muscle swelling, alleviating localized pain, cooling inflamed tissues, and minimizing inflammation. This suggests that such medicated herbal bandages may serve as a safe, natural, and patient-compliant alternative for managing muscle inflammation and associated discomfort.

**Keywords**: Herbal based bandage, Tecoma undulata (Rohitaka/Ragatrodha), Curcuma amada (Ambe Halad), Menthol, Camphor, Anti-inflammatory, Muscle pain relief, Swelling reduction, Wound healing, Topical therapy, Natural formulation.

**PT-247**

## DETERMINATION OF PHYTOALEXIN RESPONSE IN CHILLI PLANT FOR PLANT GROWTH PROMOTION AND EXPRESSION OF DEFENCE.

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The leaves of Capsicum annuum were subjected to biotic (fungal and bacterial) and abiotic (chemical) treatments inducing the accumulation of phytoalexins, which are low molecular weight antimicrobial compounds produced by plants in response to pathogenic stress. These compounds function as a part of the plant's innate immune system, conferring resistance against invading pathogens and external harmful




ISBN: 978-81-980623-8-3

factors. Capsicum annuum seeds were germinated and grown until the 16–17 leaf stage under controlled conditions before being divided into treatment groups exposed to fungi, bacteria, and chemical elicitors, with untreated plants serving as controls. The elicitor treatments triggered a pronounced accumulation of phytoalexins compared to controls. Phytoalexin presence and variation were analyzed using chromatographic techniques, including thin layer chromatography (TLC) and high-performance thin-layer chromatography (HPTLC). HPTLC fingerprinting revealed distinct band patterns corresponding to different phytochemical responses, with major peaks indicative of capsaicin or related compounds. These findings support the defensive role of phytoalexins in Capsicum annuum and suggest their potential as biomarkers for plant defense responses. Further studies employing advanced analytical techniques are recommended to precisely characterize these compounds.

**Keywords:** Capsicum annuum, Phytoalexins, Elicitors, Biotic stress, Abiotic stress, HPTLC

**PT-248**

**DEVELOPMENT AND EVALUATION OF A CHEWABLE HERBAL TABLET CONTAINING GINGER AND PEPPERMINT EXTRACTS FOR NAUSEA**

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Nausea is common in motion sickness, pregnancy, and gastrointestinal disorders, and conventional antiemetics can cause side effects and low acceptability. Zingiber officinale (ginger) and Mentha × piperita (peppermint) possess documented antiemetic and carminative properties. This study aims to develop and evaluate a chewable tablet combining standardized ginger and peppermint extracts to provide a palatable herbal alternative. The extracts were blended with mannitol, microcrystalline cellulose, xylitol, crospovidone, flavoring, and suitable glidants and lubricants, then compressed directly into chewable tablets. Planned evaluations include weight variation, hardness, friability, disintegration, content uniformity, assay of gingerols and menthol by validated HPLC and GC methods, dissolution in simulated saliva and gastric fluid, microbial testing, stability under ICH conditions, and organoleptic assessment. This approach seeks to produce a standardized, patient-friendly formulation for effective management of nausea.

**Keywords:** Chewable tablet; Ginger extract; Peppermint extract; Herbal antiemetic; Nausea management

**PT-249**

**DEVELOPMENT AND EVALUATION OF A POLYHERBAL TOOTHPASTE CONTAINING MISWAK, BABOOL, FENNEL, CLOVE, SALT AND CARDAMOM**

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Oral diseases such as dental caries, gingivitis and halitosis remain prevalent worldwide, and many commercial toothpastes contain synthetic antimicrobials and abrasives that may cause adverse effects with prolonged use. Herbal ingredients with documented antimicrobial, anti-inflammatory and astringent properties can provide a safer and more acceptable alternative. Miswak (Salvadora persica), babool (Acacia arabica), fennel (Foeniculum vulgare), clove (Syzygium aromaticum), salt and cardamom (Elettaria cardamomum) have all been traditionally used for oral care. This study aims to formulate and evaluate a polyherbal toothpaste combining these six ingredients. Standardized extracts or finely powdered forms of the herbs are incorporated with a suitable base of calcium carbonate, glycerin, sorbitol, sodium carboxymethylcellulose, surfactant and flavoring agents. The prepared toothpaste will be evaluated for physicochemical parameters (appearance, pH, viscosity, spreadability, foamability, abrasiveness), microbial quality, and content uniformity of selected marker compounds. Antimicrobial activity against common oral pathogens and stability under accelerated conditions will also be assessed, alongside sensory evaluation for taste, texture and overall acceptability. The formulation strategy seeks to produce a standardized, effective and palatable herbal toothpaste that harnesses multiple traditional ingredients to support oral hygiene and fresh breath.

**Keywords:** Polyherbal toothpaste; Miswak; Babool; Clove; Oral hygiene

**PT-250**

**FORMULATION AND EVALUATION OF NARINGENIN-BASED NUTRACEUTICAL TABLETS FROM CITRUS PEEL EXTRACT**

Sakshi sakharam more

The present study focuses on the formulation and evaluation of a nutraceutical tablet using naringenin, a flavonoid extracted from the peels of citrus fruits (Citrus reticulata). Naringenin is a bioactive compound known for its potent antioxidant, anti-inflammatory, and anticancer activities, but its poor aqueous solubility and low bioavailability limit therapeutic application. In this work, naringenin was isolated from orange albedo through Soxhlet extraction and subsequently hydrolyzed to obtain naringenin. The purified extract was incorporated into a tablet formulation with excipients such as mannitol, microcrystalline cellulose, povidone K30, and magnesium stearate. The prepared tablets were subjected to standard evaluation parameters including hardness, friability, weight variation, disintegration time, and dissolution profile. Results demonstrated that the formulated nutraceutical tablets exhibited acceptable physicochemical properties and improved dissolution performance compared to the pure compound. This study highlights the potential of developing citrus-derived herbal nutraceuticals as a cost-effective and natural approach for the management of oxidative stress-related disorders and chronic diseases such as cancer and diabetes.

**Keywords:** Nutraceuticals, Naringenin, Flavonoids, Citrus peel extract, Antioxidant.

**PT-251**

**HERBO-SYNTHETIC EMULGEL OF NEEM OIL AND MICONAZOLE NITRATE: A NOVEL APPROACH IN ANTIFUNGAL THERAPY.**

Aboli gopalrao kawane

Superficial fungal infections are among the most common dermatological problems worldwide, often causing discomfort, itching, and relapse due to incomplete treatment. Conventional topical formulations such as creams and ointments, though effective, frequently show limitations including poor penetration, greasy texture, and reduced patient acceptability. To overcome these drawbacks, novel delivery systems like emulgels have gained attention. Miconazole nitrate, a widely used synthetic antifungal, demonstrates strong activity against dermatophytes and Candida species. However, its effectiveness can be restricted by inadequate skin retention and limited diffusion through the stratum corneum. Neem oil, derived from Azadirachta indica, has been traditionally employed for its antifungal, antibacterial, and wound-healing properties. Combining miconazole nitrate with neem oil in an emulgel system offers the potential for dual therapeutic action—enhancing antifungal efficacy while also providing anti-inflammatory and skin-soothing benefits.The proposed formulation of miconazole nitrate–neem oil emulgel integrates the structural advantages of emulsions and gels, resulting in improved drug release, enhanced stability, ease of application, and better patient compliance. Evaluation parameters will include physical appearance, pH, viscosity, spreadability, drug content uniformity, in-vitro release, antifungal activity, and stability studies. These tests aim to confirm that the formulation not only retains its physicochemical stability but also provides prolonged residence time on the skin with improved therapeutic outcomes. This work emphasizes the synergy between synthetic and herbal components in a single topical delivery system. By combining miconazole nitrate with neem oil in an emulgel base, the study aspires to present a safe, cost-effective, and patient-friendly alternative for managing superficial fungal infections, thereby addressing both efficacy and compliance issues in current topical therapies.

**Keywords:** Emulgel, Miconazole nitrate, Neem oil, Antifungal activity, Topical delivery, Synergistic therapy, Skin retention, Patient compliance In-vitro release Stability studies.

**PT-252**

**HARVESTING HIDDEN GOLD: ADVANCED EXTRACTION OF POLICOSANOLS FROM SUGARCANE PEEL FOR SUSTAINABLE NUTRACEUTICALS**

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ISBN: 978-81-980623-8-3

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The present study presents a sustainable and efficient approach for the valorization of dried sugarcane peels, an abundant agricultural residue, into high-value bioactive compounds. Our work focuses on a novel sequential solvent extraction protocol to isolate sugarcane wax and subsequently purify policosanol. To maximize yield, a saponification step with ethanolic potassium hydroxide was developed to effectively release the long-chain aliphatic alcohols. Comprehensive structural analysis using IR, UV-Vis, and LCHRMS confirmed the successful isolation of policosanol, with a high concentration of the key constituents octacosanol (C28) and tricontanol (C30). This robust and reproducible method not only addresses agricultural waste but also provides a pathway to obtain a valuable nutraceutical precursor with significant hypocholesterolemic and pharmacological properties. The findings from this research lay a critical foundation for scalable biorefinery technologies, paving the way for practical applications in the pharmaceutical and functional food industries.

**Keywords:** Sugarcane wax, policosanol, hypocholesterolemic, octacosanol, tricontanol.

**PT-253**

## DEVELOPMENT OF TRADITIONAL-BASED HAIR OIL FOR HAIR REJUVENATION AND ALOPECIA MANAGEMENT

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The increasing popularity of herbal cosmetics, particularly herbal hair oils, can be attributed to their perceived effectiveness and low side effects. The primary objective of this study was to develop and evaluate a traditional-based hair oil formulation designed to address common hair concerns, including hair loss, dandruff, baldness, premature graying, and dry hair, ultimately leading to hair rejuvenation and alopecia management. Hair oil formulation was prepared by boiling a precise combination of herbal ingredients, including Phyllanthus emblica, Allium cepa, Lawsonia inermis, Murraya koenigii, Eclipta alba, Azadirachta indica, Centella asiatica, Hibiscus rosa-sinensis, Ricinus communis L. oil, and Olea europaea oil, in cold-pressed Cocos nucifera oil. The developed formulation was subjected to evaluation, encompassing phytochemical analysis, geographical assessment, organoleptic properties, and measurement of physicochemical parameters such as pH, viscosity, specific gravity, acid value, and saponification value. Stability studies as per ICH guidelines and advanced analytical techniques such as Gas Chromatography-Mass Spectrometry (GC-MS) were conducted, along with an in-vitro hair follicle study. Pharmacological assessment in Albino Wistar rats demonstrated that the developed herbal hair oil was more effective in promoting hair length growth and rejuvenation compared to the synthetic minoxidil control, confirming its stability and safety for topical application.

**Keywords:** Traditional, Hair rejuvenation, Alopecia management, Stability studies, Gas Chromatography, Dandruff control, Physicochemical parameter

**PT-254**

## GUAVA (PSIDIUM GUAJAVA) SEED OIL: BIOSYNTHESIS, BIOACTIVE COMPOSITION, AND SUSTAINABLE APPLICATIONS

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Guava (Psidium guajava L.), a tropical fruit widely cultivated in many regions, is a rich source of bioactive compounds. The seeds, often discarded as waste, contain valuable oil with promising pharmaceutical, nutraceutical, and cosmetic applications. Biosynthesis of guava seed oil involves natural metabolic pathways where fatty acids, phytosterols, and polyphenols accumulate within the seed tissue. The oil is especially rich in linoleic acid, oleic acid, carotenoids, and tocopherols, which contribute to its antioxidant, antimicrobial, and anti-inflammatory properties. Recent studies highlight eco-friendly extraction methods, including cold pressing and green solvents, that preserve the natural integrity of the oil. Utilizing guava seed oil not only adds value to agro-industrial by-products but also supports sustainable resource management. Its biosynthetic profile and functional properties position guava seed oil as a potential candidate for use in functional foods, skincare formulations, and novel drug delivery systems. Guava (Psidium guajava) is a common tropical fruit, and its seeds, usually thrown away, contain useful oil. This guava seed oil is formed naturally in the seed and is rich in healthy compounds like linoleic acid, oleic acid, vitamin E, and antioxidants. These provide the oil with many benefits such as protecting cells, reducing inflammation, and fighting germs. The oil can be extracted by eco-friendly methods like cold pressing. Using guava seed oil is not only good for health and skincare but also helps reduce waste by turning fruit seeds into valuable products.

**Keywords:** Guava (Psidium guajava), Seed oil, Biosynthesis, Fatty acids (linoleic acid, oleic acid), Antioxidants, Vitamin E (tocopherols), Eco-friendly extraction

**PT-255**

## PHYTOCHEMICAL INSIGHTS AND PHARMACOLOGICAL POTENTIAL OF TERMINALIA CHEBULA: AN INTEGRATIVE ANALYTICAL PERSPECTIVE

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Terminalia chebula Retz. (Haritaki in Ayurveda; Karakkaya in Telugu), A prominent member of the family Combretaceae holds a revered place in traditional systems of medicine such as Ayurveda, Unani, and Siddha. Celebrated as a versatile "wonder drug," it exhibits a broad spectrum of pharmacological activities, including antioxidant, antimicrobial, laxative, anti-inflammatory, and hepatoprotective effects. These therapeutic properties are largely linked to its diverse array of bioactive phytoconstituents, such as tannins, flavonoids, glycosides, phenolic acids, and alkaloids. Among them, chebulagic acid, chebulinic acid, gallic acid, and ellagic acid stand out as key compounds contributing to its medicinal effectiveness. Modern analytical methods, including chromatographic techniques (HPTLC, HPLC, GC–MS) and spectroscopic methods (UV–Vis, FTIR, NMR), are employed for accurate profiling, standardization, and validation of these constituents. This review reaffirms the traditional claims surrounding T. chebula and highlights the integration of advanced analytical strategies with phytopharmacological research, paving the way for innovative drug development and standardized herbal formulations.

**Keywords:** Terminalia chebula, Haritaki, Karakkaya, phytoconstituents, chebulagic acid, chebulinic acid, gallic acid, ellagic acid, chromatographic techniques, spectroscopic profiling, phytochemistry, pharmacological activities, herbal drug standardization.

**PT-256**

## ISOLATION, PURIFICATION AND CHARACTERIZATION OF BIOACTIVES FROM SHILAJIT: A MODERN APPROACH TO ETHNOMEDICINES

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A traditional Ayurvedic medicine, is rich in phytocompounds with potential therapeutic benefits. This study aimed to isolate, purify, and characterize phytocompounds from Shilajit using a combination of chromatographic and spectroscopic techniques. The results revealed the presence of Ethyl ferulate bioactive compounds. The isolated compounds obtained to be 250 mg and their Rf value was found to be 0.44. These compounds were isolated and purified using techniques such as column chromatography and high-performance liquid chromatography (HPLC). Characterization of the isolated compounds was performed using spectroscopic techniques, including Fourier transform infrared (FTIR) spectroscopy, Nuclear magnetic resonance (NMR) spectroscopy and Mass spectroscopy the molecular weight of the compound was found to be 222.24 g/mol respectively. The study provides valuable insights into the chemical composition of Shilajit and its potential therapeutic applications. The isolated and characterized phytocompounds may serve as a basis for further research into their pharmacological properties and potential uses.

**Keywords:** Shilajit, isolation, column chromatography, ethyl ferulate.

**PT-257**




ISBN: 978-81-980623-8-3

**OPTIMIZED BIOGAS PRODUCTION FROM KITCHEN WASTE USING INOCULUM RECYCLING, METHANOGENIC BACTERIA, AND SUBSTRATE SIZE REDUCTION**

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Biogas production has gained global attention as a renewable source of sustainable energy amidst rising concerns over fossil fuel depletion and greenhouse gas emissions. Currently, large-scale adoption of biogas technology remains limited due to long fermentation periods, variable gas composition dominated by carbon dioxide and methane, and a lack of optimized processes for consistent yields. In the present study, process optimization was explored to overcome these limitations using kitchen waste as the primary substrate. To accelerate fermentation, inoculum from a previous batch was added, thereby increasing the microbial population and minimizing the lag phase. Furthermore, supplementation with methanogenic bacteria enhanced methane enrichment, while substrate pretreatment through particle size reduction improved enzymatic activity and microbial accessibility. These interventions significantly shortened fermentation time and boosted methane yield compared to conventional practices. Despite its proven benefits, biogas technology is not yet widely practiced due to factors such as inconsistent feedstock availability, insufficient technical knowledge, and high operational costs for large-scale deployment. Nevertheless, with advancing microbial biotechnology, efficient waste management strategies, and growing demand for green energy, optimized biogas production holds immense potential as a scalable and eco-friendly alternative to fossil fuels in the future.

**PT-258**

**FORMULATION AND EVALUATION OF HERBAL SHAMPOO OF ALLIUM CEPA**

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This study focuses on the formulation, evaluation, Hibiscus rosa-sinensis herbal shampoos incorporating Allium cepa and other natural ingredients. Herbal shampoos are gaining preference due to their minimal side effects, absence of harmful chemicals like sulfates, and their benefits for hair care. The formulation process included ingredients such as Allium cepa powder, aloe vera gel, soap nut, gelatin, lemon juice, rose water, and propyl paraben. The study aimed to assess the shampoo's physicochemical properties, antimicrobial activity, and effectiveness compared to commercial shampoos. Evaluation parameters such as pH, viscosity, foam stability, surface tension, and dirt dispersion were measured. Results indicated that herbal shampoos provided conditioning, dandruff prevention, and improved hair texture while being safer and environmentally friendly alternatives to synthetic shampoos. This research highlights the potential of herbal shampoos as effective and sustainable hair care solutions.

**Keywords:** Herbal shampoo, Natural and Healthy, Allium cepa, Natural Ingredients Physicochemical properties, conditioning, evaluation of shampoo.

**PT-259**

**PHYTOCHEMICAL PROFILING AND ANTIOXIDANT POTENTIAL OF MONSTERA DELICIOSA: IMPLICATIONS FOR PHARMACEUTICAL RESEARCH**

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Monster deliciosa is a tropical fruit, originated from the tropical forests of southern Mexico and Panama, belongs to the family Araceae. The plant contains several bioactive compounds with distinct pharmacological properties. The present study investigates the preliminary phytochemical screening (alkaloid, flavonoid, tannin phenol, saponin, terpenoids, glycoside, steroids, carbohydrate and protein) and in vitro antioxidant activities methods like 1,1-diphenyl-2-picrylhydrazil radical (DPPH), 2,2'-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid (ABTS) and Ferric Reducing Antioxidant Power (FRAP) of different solvent (chloroform, ethyl acetate, ethanol methanol and aqueous) of M. deliciosa fruit. Phytochemical analysis revealed the aqueous extract was rich in alkaloids (774.12±0.617 µg/mL) and saponins (549.27±0.991 µg/mL). Flavonoids were prominent in both ethyl acetate (3444.54±0.485 µg/mL) and aqueous (4919.86±0.727 µg/mL) extracts. Tannins and proteins were found in the ethanol (36.53±0.073 µg/mL and 320.67±0.009 µg/mL, respectively) and methanol (68.29±0.277 µg/mL and 340.22±0.960 µg/mL, respectively) extracts. Phenols were present in the ethyl acetate (790.42±0.163 µg/mL) and aqueous (870.62±0.273 µg/mL) extracts. Glycoside, terpenoid, steroid and carbohydrate were present in all five extracts. The in vitro antioxidative potential of M. deliciosa fruit was evaluated at concentrations of 20, 30, and 40 µg/mL using DPPH radical scavenging, ABTS, and ferric reducing antioxidant potential assays. Ethyl acetate extracts of M. deliciosa fruit demonstrated superior activity in DPPH and ABTS assays, highlighting the solubility of their bioactive compounds and potent antioxidant properties. In contrast, the aqueous extract showed better activity in the FRAP assay. The fruit of M. deliciosa exhibited significant potential activity.

**Keywords:** Monstera deliciosa, Antioxidant, 1,1-diphenyl-2-picrylhydrazil radical, Free radicals.

**PT-260**

**FORMULATION AND EVALUATION OF POLY HERBAL TOOTH PASTE**

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Ploy herbal Toothpaste is commonly used product by all individuals. Ploy herbal Toothpaste is generally used for cleaning of teeth and mouth. It is also used to treat many disorders of teeth. Many dentists recommend to use toothpaste to treat disorder like sensitivity, Chronic gingivitis etc Polyherbal toothpaste with natural ingredients is more acceptable in public opinion than chemical-based synthetic formulations in the current oral dental care scenario due to their safety and efficacy in reducing dental caries and preventing other dental disorders to which this generation is prone. In this composition, we use, cinnamon oil, Neem, pomegranate peel, all of which have never been used before in any research. These extracts have anti-ulcer, anti-caries, anti-bacterial, and remedial properties, as well as certain unique properties including anti-cancer and anti-fungal. Herbal toothpastes were evaluated to determine important physical characteristics such as pH, stability, Extrudability, spread ability, foam ability, and homogeneity to develop a more effective and stable product. The novelty of this project is to overcome teeth problems to minimizing adverse effect of synthetic drug by using polyherbal ingredients.

**Keywords:** Herbs, polyhebral tooth paste, formulation, evaluation of tooth paste, antiseptic activity.

**PT-261**

**A COMPARATIVE STUDY OF MYROBALAN EXTRACTS WITH STANDARD ASCORBIC ACID**

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Ascorbic acid is commonly called Vitamin C which as several physiological action on various disease like skin care and also to maintain blood vessel, bones and cartilage which is also much used in scurvy. As we are in exploration of Ascorbic acid in vegetative source, so we had a selected the fruit Myrobalan under the Biological Source: Terminalia chebula of family: Combretaceae. On the executing the UV analytical work for different concentration of Myrobalan fruit alcohol and water extracts in comparision with standard Ascorbic acid at 258nm, on investigation and by plotting the linearity curve, i.e., concentration vs absorbance of both fruit extracts and standard, then on comparison with the standard, found that fruit Myrobalan water extract as a good source of Ascorbic acid.

**Keywords:** Myrobalan, Terminalia chebula, Ascorbic acid.

**PT-262**




ISBN: 978-81-980623-8-3

**INTEGRATIVE LIFESTYLE MODIFICATION USING OCIMUM TENUIFLORUM AND EXERCISE FOR MANAGEMENT OF DEPRESSION**

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Depression is a multifactorial psychiatric disorder linked with oxidative stress, monoaminergic imbalance, and behavioral dysfunction. The present study investigated the antidepressant potential of life-style modification approach with Ocimum tenuiflorum (Tulsi) and exercise against chronic unpredictable mild stress and dexamethasone-induced depression in rats. Behavioral assessment using the Open Field Test revealed a marked reduction in exploratory behavior in the induction group, with inner zone entries dropping to 3.0 ± 0.63 compared to 57.0 ± 8.09 in controls ($p \leq 0.001$). Similarly, sucrose consumption in the Sucrose Preference Test declined significantly to 19.90 ± 8.44 ml versus 59.65 ± 4.02 ml in controls, indicating severe anhedonia. In the Novelty-Suppressed Feeding Test, food intake reduced to 1.01 ± 0.24 g compared to 4.75 ± 0.40 g in controls, reflecting heightened anxiety. Biochemical analysis demonstrated dopamine depletion from 3.68 ± 0.06 µg/ml (control) to 1.53 ± 0.07 µg/ml in the induction group, alongside elevated malondialdehyde (MDA) levels, signifying oxidative damage. Treatment with Tulsi (20 mg/kg) restored dopamine to 2.87 ± 0.05 µg/ml and reduced MDA significantly ($p \leq 0.001$). Exercise alone improved sucrose preference to 73.32 ± 4.23 ml, while the combined Tulsi + Exercise group showed synergistic efficacy, normalizing dopamine levels and restoring behavioral parameters compared to standard fluoxetine-treated levels. Histopathology further confirmed neuroprotective effects with preserved cortical and hippocampal architecture. In conclusion, Tulsi and exercise exhibit significant antidepressant-like activity through dopaminergic restoration, antioxidant action, and behavioral improvement. Thus life-style modification demonstrates superior efficacy, suggesting a promising integrative strategy for managing depression.

**Keywords:** Ocimum tenuiflorum (Tulsi), Depression, Exercise, life style modification, Oxidative stress

**PT-263**

**DEVELOPMENT, CHARACTERIZATION, AND COMPARATIVE ANALYSIS OF POLYHERBAL NUTRACEUTICAL TABLETS PREPARED BY WET GRANULATION**

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Polyherbal nutraceuticals represent a synergistic approach to improving human health by combining traditional botanicals with modern formulation techniques. The present study aimed to develop nutraceutical tablets containing Amla, Cinnamon, Ginger, Liquorice, Tulasi, and Mentha using wet granulation, with a focus on enhancing mechanical strength, dissolution, antioxidant potential, and microbial safety. Standardized herbal extracts were blended with lactose, starch, and magnesium stearate, followed by wet granulation using optimized binder concentrations. Granules were assessed for flowability and compressibility before compression into tablets. Pharmacotechnical parameters including weight variation, hardness, friability, disintegration, and dissolution were evaluated in simulated gastric fluid (pH 1.2), intestinal fluid (pH 6.8), and water. Further tests included pH measurement, organoleptic properties, microbial contamination (aerobic count, yeast, mould), antioxidant potential using DPPH radical scavenging assay, and accelerated stability studies under ICH conditions for 60 days. Tablets exhibited uniform weight (492 ± 23 mg) and satisfactory hardness (4.2 ± 0.5 kg/cm²) with friability below 0.8%. Disintegration occurred within 17.6 ± 2.2 minutes across all media, with complete dissolution in 8 minutes. The pH remained stable at 5.08 ± 0.02, while microbial counts complied with pharmacopoeial limits. Antioxidant activity was significantly higher in tablets (87% inhibition) compared to unformulated powders (69%). Stability testing confirmed no notable changes in physicochemical or functional parameters. Tablets were greenish-brown, round, and aromatic. The optimized wet granulation process produced polyherbal nutraceutical tablets with excellent uniformity, stability, safety, and enhanced functional activity. These findings support their potential for commercial nutraceutical applications and future clinical validation.

**Keywords:** Polyherbal, Nutraceutical, Wet granulation, Antioxidant.

**PT-264**

**ANTI-ADDICTIVE POTENTIAL OF MELISSA OFFICINALIS IN ALCOHOL DEPENDENCE**

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Alcohol addiction and reinstatement remain pressing public health challenges, with current pharmacotherapies such as naltrexone and acamprosate offering limited efficacy and significant side effects. This study explores the pharmacological evaluation of Melissa officinalis (Lemon Balm), a traditionally used anxiolytic and antioxidant herb, for the treatment of alcohol addiction and reinstatement. Experimental studies were conducted using male Sprague Dawley rats subjected to the ethanol addiction and Ethanol Preference Paradigm (EPP), Conditioned Place Preference (CPP), Open Field Test (OFT), and Elevated Plus Maze (EPM) models. In the induction phase, ethanol exposure significantly reduced exploratory behavior, with open-arm time in EPM decreasing to 93 ± 5.21 sec compared to 157.66 ± 25.40 sec in controls ($p \leq 0.001$), indicating heightened anxiety. Dopamine depletion was observed, dropping from 3.68 ± 0.06 µg/ml in controls to 1.53 ± 0.07 µg/ml post-induction. Treatment with Melissa officinalis extract produced dose-dependent improvements: high-dose treatment restored dopamine to 2.79 ± 0.04 µg/ml and increased open-arm exploration to 131.66 ± 8.73 sec, approaching near standard drug performance. Additionally, lipid peroxidation and stress-induced relapse behaviors were significantly reduced ($p \leq 0.001$). Mechanistically, rosmarinic acid and triterpenes in Lemon Balm may enhance GABAergic transmission, inhibited NMDA overactivity, reduced corticotropin-releasing factor (CRF) expression, and elevated BDNF levels, thereby modulating both stress and reward pathways. These findings position Melissa officinalis as a promising phytopharmacological candidate with multi-target neuroprotective action for alcohol addiction management. Its anxiolytic, dopaminergic, and antioxidant effects support its translational potential as a safer, cost-effective alternative to existing therapies.

**Keywords:** Melissa officinalis (lemon balm), Alcohol addiction, Dopamine, Ethanol Preference Paradigm

**PT-265**

**IN SILICO EVALUATION OF PORTULACA PILOSA PHYTOCONSTITUENTS TARGETING MULTIFACTORIAL DISEASES**

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These days, complementary or alternative medicine (CAM) is often perceived as a form of traditional medicine. Consequently, neglecting to document and identify effective herbs for treating various diseases could hinder future disease control programs.The study aimed to conduct molecular docking analysis of the phytoconstituents of Portulaca pilosa, including Quercetin, Rutin, Naringenin, Luteolin and Kaempferol with target proteins associated with lung cancer, anti-hyper lipidemic and anti-inflammatory. Many diseases, such as cancer, diabetes, and neurodegenerative disorders, are complex and involve multiple biological pathways. Targeting a single molecule with a single drug may not be effective in treating these diseases. A multi-targeted therapeutic approach that targets multiple disease-associated molecules simultaneously has the potential to be more effective and have fewer side effects.This involved utilizing Chemsketch software for molecular structure depiction, Auto dock PYRx software for in-silico docking analysis, and Discovery Studio 3.1 for visualization of binding interactions.The molecular docking analysis, conducted using Auto dock PYRx software and visualized with Discovery Studio 3.1, reveals that these phytoconstituents exhibit excellent binding to proteins with PDB IDs 2ITY, 1T02, and 5COX, surpassing the standard drugs Simvastatin, Erlotinib and Aspirin in terms of docking scores. This suggests that the phytoconstituents have the potential for significant biological activity,




ISBN: 978-81-980623-8-3

particularly in the treatment of lung cancer, Hyperlipidemic and Inflammatory conditions. The study underscores the importance of documenting and identifying effective herbal remedies for future disease control efforts.

**Keywords:** Molecular Docking, Auto dock PYRx, Chem Sketch, Phytoconstituents.

**PT-266**

## RECENT TRENDS IN MICROGREENS: OPPORTUNITIES AND INNOVATIONS

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Microgreens are nutrient-dense, edible young plant seedlings with high levels of vitamins, minerals, beneficial phytochemicals like flavonoids and carotenoids, and other antioxidants, making them a popular functional food. Microgreens have emerged as a significant trend in nutrition and modern agriculture. Their popularity is driven by health benefits, aesthetic appeal, and diverse flavors, which are enhanced by sustainable cultivation methods like vertical farming and hydroponics. Recent studies have shown that microgreens can contain nutrient levels up to 40 times higher than their other mature counterparts thereby positioning them as a functional food for health-conscious consumers. Increasing consumer awareness of nutritional benefits is pushing demand. People with lifestyle diseases, fitness enthusiasts, and those wanting fresher, pesticide-free greens are key demand segments. Additionally, market expansion is evident, with microgreens being incorporated into smoothies, dietary supplements, and functional food products. Advancements in LED lighting and automation enable efficient urban and household production. Consumer demand has also driven innovation in packaging and shelf-life extension through biodegradable materials and cold-chain improvements. While challenges like perishability and cost exist, ongoing research and market growth in health-focused products suggest microgreens will play a larger role in the food system. Microgreens represent a significant trend at the intersection of nutrition, agriculture, and sustainability. Their dense nutrients, versatility, and adaptability to urban farming are key drivers of their growth, positioning them as an increasingly important component of future food systems.

**Keywords**: Microgreens, functional foods, nutrient-rich-crops, sustainable agriculture

**PT-267**

## ANTIOXIDANT PROFILING OF INDIGENOUS PLANTS: A COMPARATIVE APPROACH

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The use of herbal medicines has a long and documented history across the globe. Antioxidants are compounds that can prevent the damage to cells caused by free radicals. Free radical is a type of unstable molecule that is made during normal cell metabolism. In this study we have selected Murraya koenigii (Rutaceae) and Nyctanthes arbor-tristis (Oleaceae) leaves for evaluation of Antioxidant potential.The main aim of our project is to extract active constituents from indigenous plants by using two different solvents and perform antioxidant activity. Scavenging activity of the plant extract by Hydrogen peroxide (H2O2) was determined by the method of Ruch.et al. Plant extract (4 ml) prepared in distilled water at various concentration was mixed with 0.6 ml of 4 mM H2O2 solution prepared in phosphate buffer (0.1 M pH 7.4) and incubated for 10 min. The absorbance is taken at 230 nm. Ascorbic acid is used as positive control. It has been reported that compounds such as flavonoid, which contain hydroxyls, are responsible for the radical scavenging effects of most plants. Phytochemical screening of the extract of the leaves of the selected plants contains phenolic compounds. Phenolic compounds are used as antioxidant agents, which act as free radical terminators. We can conclude that the selected plants and their extracts show many secondary metabolites such as Phenolic compounds, tannins, terpenoids, resins, carbohydrates etc. The methanolic extracts of combined leaves has shown significant antioxidant activity when compared to that of acetone extract. It is used as easily accessible source of natural antioxidant.

**Keywords:** Antioxidants, Secondary metabolites, Phenolic compounds, Ascorbic acid

**PT-268**

## IN VITRO INVESTIGATION OF ANTIOXIDANT, ANTI-INFLAMMATORY, AND CARDIOPROTECTIVE ACTIVITIES OF SIDA ACUTA ETHANOLIC EXTRACT

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Sida acuta, a shrub from the Malvaceae family, has traditionally been used to manage ailments such as fever, infections, and inflammation. This study investigates the in vitro antioxidant, anti-inflammatory, and cardioprotective potential of the ethanolic extract of Sida acuta (SA ET). Preliminary phytochemical screening revealed the presence of flavonoids, phenols, alkaloids, tannins, steroids, and carbohydrates. Quantitative analysis showed that SA ET contains a high total flavonoid content of 71 mg at 100 µg/ml and a total phenol content of 110 mg at 600 µg/ml, supporting its potential antioxidant capacity. In the DPPH assay, SA ET demonstrated strong radical scavenging activity with 74% inhibition at 50 µg/ml and an $IC_{50}$ of 48.53 µg/ml, compared to the standard ascorbic acid ($IC_{50}$ = 33.73 µg/ml). The FRAP assay further confirmed its antioxidant potential, with OD values of 0.23 at both 100 and 300 µg/ml concentrations. Anti-inflammatory activity assessed via the protein denaturation method showed 38% inhibition at 150 µg/ml, with an $IC_{50}$ of 112.62 µg/ml, outperforming the standard diclofenac sodium ($IC_{50}$ = 121.29 µg/ml). Cardioprotective activity was evaluated using in vitro cardiomyocyte protection assays under oxidative stress conditions. Pre-treatment with SA ET significantly reduced $H_2O_2$-induced cytotoxicity in H9c2 cells, increasing cell viability by 68% at 100 µg/ml, compared to untreated cells. Moreover, SA ET significantly decreased intracellular ROS levels and preserved mitochondrial membrane potential, indicating protective effects against oxidative stress-induced cardiac injury. These findings suggest that Sida acuta ethanolic extract exhibits significant antioxidant and cardioprotective activities along with moderate anti-inflammatory effects, supporting its potential use in the management of oxidative stress-related cardiovascular disorders.

**Keywords:** Sida acuta, Antioxidant, Cardioprotective, Anti-inflammatory, DPPH Assay, Total Phenol, Flavonoids, Phytochemical Screening, H9c2 Cells

**PT-269**

## EVALUATION OF ANT UROLITHIC AND ANTIOXIDANT ACTIVITIES OF GLOCHIDION VELUNTINUM LEAVES

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Urolithiasis is a multifactorial condition characterized by urinary stone formation, primarily due to supersaturation of calcium, oxalate, phosphate, and uric acid in urine. Current therapeutic agents have limitations such as recurrence and adverse effects, which necessitate the development of effective and safe herbal alternatives.The present study aimed to evaluate the anti-urolithiatic activity of the polyherbal formulation Rensol in experimental rat models.Male Wistar rats were divided into groups and subjected to three different urolithiasis models: sodium oxalate–induced acute study, glycolic acid–induced chronic preventive study, and ethylene glycol–induced chronic curative study. Rensol was administered at doses of 100 mg/kg and 200 mg/kg by oral or intraperitoneal routes depending on the model. Biochemical parameters such as calcium, phosphate, oxalate, and uric acid levels were estimated in urine, serum, and kidney homogenates to assess anti-urolithiatic efficacy. In the sodium oxalate acute model, intraperitoneal administration of Rensol significantly reduced serum and urinary levels of calcium, phosphate, oxalate, and uric acid. In the glycolic acid and ethylene glycol chronic models, oral administration produced similar significant reductions, with improved kidney biochemical profiles compared to disease control groups. The treatment effectively normalized altered parameters, suggesting both preventive and curative effects. The polyherbal formulation Rensol demonstrated significant




ISBN: 978-81-980623-8-3

anti-urolithiatic activity in all experimental models, attributed to its ability to normalize biochemical parameters and inhibit stone-forming constituents. These findings highlight its potential as a safe and effective herbal therapy for urolithiasis.

**Keywords:** Rensol, Anti-urolithiatic, Polyherbal formulation, Wistar rats.

**PT-270**

**PHYTOCHEMICAL PROFILING AND ANTIDIABETIC ACTIVITY OF MANGO LEAVES**

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Diabetes mellitus is a chronic metabolic disorder characterized by impaired insulin secretion, insulin resistance, and hyperglycemia, posing a significant global health challenge. Current pharmacological treatments, though effective, are often costly and associated with adverse side effects, prompting interest in safer, natural alternatives. Mango leaves (Mangifera indica), traditionally used in folk medicine, have gained scientific attention due to their rich phytochemical profile, particularly mangiferin, flavonoids, and tannins. These bioactive compounds are reported to exhibit hypoglycemic potential through multiple mechanisms. Proposed actions include stimulation of insulin secretion, enhancement of peripheral glucose uptake, inhibition of carbohydrate-digesting enzymes such as α-amylase and α-glucosidase, and attenuation of oxidative stress through antioxidant properties. Preclinical investigations in animal models support these mechanisms, showing significant reductions in fasting blood glucose levels, improvement of pancreatic β-cell function, and protection against diabetes-related complications. Despite promising experimental evidence, the transition from preclinical findings to clinical application remains limited. Critical gaps persist in understanding the optimal dosage, long-term safety, and pharmacokinetics of mango leaf extracts in human subjects. Therefore, well-designed clinical trials are essential to validate efficacy, establish standardized formulations, and ensure safety for therapeutic use. Overall, mango leaves represent a cost-effective, plant-based strategy with potential to complement existing diabetes management approaches, particularly in resource-limited settings.

**Keywords:** Diabetes mellitus, Mango leaves, Hypoglycemic effect, α-amylase, α-glucosidase, Antioxidant, Natural therapy.

**PT-271**

**HERBAL GUMMIES FOR DIURETIC AND ANTI-LITHIATIC ACTIVITY**

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Kidney stones continue to be a major global health concern, often leading to severe discomfort, recurrent episodes, and complications that reduce quality of life. Conventional treatment approaches, including surgical procedures and synthetic diuretics, though effective, are frequently associated with high costs, invasiveness, and undesirable side effects. This has fueled growing interest in natural and patient-friendly alternatives. The present project focuses on the development of herbal gummies as a novel dosage form for managing kidney stone formation through diuretic and anti-lithiatic activity. Gummies are chosen for their superior palatability, convenience, and potential to improve patient compliance compared to traditional herbal preparations. The study involves the selection of proven herbal ingredients, formulation of gummies, and their systematic evaluation through pharmacological and analytical methods.By integrating traditional herbal knowledge with modern formulation science, the project aims to create a safe, effective, and acceptable dosage form that can serve as a supportive therapy for kidney stone management. This innovative approach is expected to contribute to improved therapeutic outcomes and enhance patient adherence.

**Keywords:** Herbal gummies, diuretic activity, anti-lithiatic activity, kidney stones, natural formulation, patient compliance

**PT-272**

**A NOVEL HERBAL CANDY FOR EFFECTIVE ANTI-INFLAMMATORY AND ANALGESIC ACTIVITY, ENSURING PATIENT COMPLIANCE, SAFETY, AND EFFICACY**

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The increasing interest in herbal medicines has highlighted the need for novel, patient-friendly dosage forms that combine safety, efficacy, and convenience. Conventional herbal formulations such as tablets, capsules, and decoctions are often associated with poor taste, gastrointestinal irritation, and reduced patient compliance, especially among pediatric and geriatric populations. To address these challenges, this study proposes the development of a novel herbal candy dosage form for effective anti-inflammatory and analgesic activity. The formulation incorporates selected medicinal plants with scientifically validated therapeutic potential, such as Curcuma longa (turmeric), Zingiber officinale (ginger), Syzygium aromaticum (clove), and Boswellia serrata (frankincense). These herbs are known for their potent anti-inflammatory and analgesic effects, along with a favorable safety profile. By embedding these herbal extracts into a sugar-based or sugar-free candy matrix, the dosage form ensures improved palatability, ease of administration, and on-the-go usage. The candy platform provides the dual advantage of enhancing patient acceptance while ensuring consistent therapeutic delivery. This approach addresses common limitations of conventional herbal medicines by offering a stable, pleasant-tasting, and portable alternative. Furthermore, the natural excipients used in the formulation minimize adverse effects while maintaining bioactivity. Such a dosage form is expected to improve adherence in both acute and chronic inflammatory conditions, making it particularly suitable for populations where compliance is a major concern.In conclusion, herbal candy represents a promising innovation that unites traditional healing with modern pharmaceutical technology, ensuring safety, efficacy, and patient satisfaction.

**Keywords:** Herbal candy, novel dosage form, anti-inflammatory, analgesic, patient compliance, palatability, safety, efficacy.

**PT-273**

**PHARMACISTS ROLE IN PERSONALIZED NUTRITION AND NEUTRACEUTICAL COUNSELLING**

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As healthcare shifts toward personalized and preventive approaches, the role of pharmacists is expanding beyond traditional medication management to include personalized nutrition and nutraceutical counselling. Pharmacists, with their in-depth knowledge of pharmacokinetics, pharmacodynamics, and patient-specific factors, are uniquely positioned to guide individuals in the safe and effective use of dietary supplements, functional foods, and nutraceuticals. This emerging role supports the growing demand for individualized health solutions that integrate nutrition with conventional therapy. Personalized nutrition involves tailoring dietary recommendations based on genetic, metabolic, and lifestyle factors. When combined with evidence-based nutraceutical counselling, this approach has the potential to optimize therapeutic outcomes, manage chronic diseases, and improve overall wellness. Pharmacists can assess nutrient-drug interactions, recommend appropriate supplements, monitor for adverse effects, and educate patients on the quality and efficacy of various nutraceutical products. The integration of this service into pharmacy practice requires updated competencies, interprofessional collaboration, and regulatory clarity. Moreover, pharmacists can play a key role in combating misinformation in the nutraceutical market by offering scientifically sound, patient-cantered advice. This positions them as vital contributors to holistic healthcare teams focused on prevention, wellness, and patient empowerment. As the scope of pharmacy practice continues to evolve, personalized nutrition and nutraceutical counselling represent significant opportunities for pharmacists to expand their impact on public health.




ISBN: 978-81-980623-8-3

**Keywords:** Pharmacist role, nutraceutical counselling, dietary supplements, patient-cantered care, chronic disease management.

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## TURNING INULIN INTO INNOVATION: BIOTECHNOLOGICAL POTENTIAL OF BACILLUS SONORENSIS

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In the present study, the inulolytic activity of a novel bacterial isolate was confirmed by growth on inulin agar, followed by molecular identification through 16S rRNA sequencing, which revealed 99.76% similarity to Bacillus sonorensis. Although discovered only two decades ago, B. sonorensis remains a promising candidate for biotechnological research due to its close resemblance to B. licheniformis, a well-known inulolytic bacterium. The isolate exhibited inulinase activity of 0.3 U/mL and demonstrated unique phenotypic traits, including Gram-positive, motile, rod-shaped morphology with yellowish-cream slimy colonies, catalase positivity, starch utilization, and brown pigment production on tyrosine agar. Notably, unlike the standard 3% NaCl tolerance reported in Bergey's Manual, the wild and mutant strains of the isolate showed substantial growth at 7% and 10% NaCl, respectively, suggesting enhanced halotolerance.Optimization studies highlighted the influence of cultural parameters on enzyme activity. The isolate exhibited maximum inulinase activity at pH 7–8 and temperatures of 40–50 °C, indicating thermostability. Inulin as a carbon source significantly enhanced enzyme production, while glucose caused catabolite repression. Organic nitrogen (casein) and inorganic nitrogen (potassium nitrate) further supported enzyme yield. These findings underscore the potential of the isolate as an efficient inulin-degrading organism with applicability in industrial bioprocesses and as a sustainable alternative in keratin hydrolysis.Future investigations will focus on strain improvement using chemical mutagenesis to enhance yield and exploring the antimicrobial potential of sonorensin protein from B. sonorensis. This work positions the isolate as a valuable resource for enzyme-based biotechnological applications and healthcare innovations.

**Keywords:** Inulin, Halotolertant, Bacillus sonorensis, Optimisation

**PT-275**

## HERBAL MUCOADHESIVE PATCHES: A CATECHU-BASED APPROACH FOR MOUTH ULCER TREATMENT

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Recurrent aphthous stomatitis, commonly known as mouth ulcers, leads to significant discomfort, interfering with daily activities such as eating and speaking. Conventional treatments typically provide only symptomatic relief and may carry potential systemic side effects. Herbal therapies offer an attractive alternative due to their multi-targeted therapeutic properties. Acacia catechu (Catechu), a medicinal plant rich in tannins, flavonoids, and phenolic compounds, demonstrates notable antioxidant, anti-inflammatory, and wound-healing activities, making it a promising candidate for localized oral therapy. In this study, an aqueous extract of Acacia catechu was prepared and standardized through phytochemical and physicochemical evaluations. Its in-vitro acid neutralizing capacity (ANC) ranged from 4.3 to 5.0 mEq/5 ml, exceeding the FDA-recommended minimum of 3.5 mEq/5 ml, indicating significant antacid activity. Mucoadhesive patches were developed using HPMC E50 and sodium CMC as film-forming polymers, PEG 400 as a plasticizer, and peppermint oil as a flavoring agent. The optimized patches demonstrated consistent weight (0.0066 g), uniform thickness (~0.19 mm), high folding endurance (>100), neutral pH (~7), residence time exceeding 4-8 hours .These findings indicate that catechu-based mucoadhesive patches provide a safe, effective, and patient-friendly dosage form for the management of mouth ulcers. The localized delivery allows prolonged action at the site of the lesion, avoids first-pass metabolism, and enhances patient compliance, offering a viable herbal therapeutic alternative for oral ulcer management.

**Keywords:** Acacia catechu, mucoadhesive patches, oral ulcers, herbal formulation, anti-ulcer activity.

**PT-276**

## Assessment Of The Antibacterial Activity Of Crude Leaf Extracts Of Monoon Longifolium Against Neisseria Gonorrhea

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In this study, for the first time, we report the systematic profiling of bioactive phytoconstituents by HR-LCMS and antigonorrhea activity on the basis of an in vitro anti-Neisseria gonorrhoeae assay of glacial acetic acid extracts of M. longifolium leaves. The bacteria that cause gonorrhea, sometimes known as "claps" in sexual relationships, are Neisseria gonorrhoeae. This study investigated the potential of treating gonorrhea via the herbal remedy Monoon longifolium. Bacteria cause an inflammatory reaction by colonizing and invading the lower and upper genitourinary tract epithelium. This leads to a localized influx of macrophages and polymorphonuclear leukocytes (PMNs). HR-LCMS analysis of glacial acetic acid extracts of M. longifolium leaves revealed 62 bioactive compounds 43 in positive ionization mode and 19 bioactive compounds in negative ionization mode. We evaluated the phytochemical and biological properties of the leaf extract of Monoon longifolium in the present study. Six distinct solvents were used for the extraction of leaves according to their polarity indices. The presence of phenols, reducing sugars, carbohydrates, and alkaloids was confirmed by preliminary phytochemical analysis. Subsequently. Afterward, the desired bacterial cells were treated for an in vitro study of the antigonorrheal action of the glacial acetic acid extract of a leaf of Monoon longifolium. Each crude extract inhibited Neisseria gonorrhoeae in a concentration-dependent manner. Compared with those of other solvents, the glacial acetic acid extracts of leaves are more potent.

**Keywords:** Monoon longifolium, Neisseria gonorrhoeae, HRLCMS, Antibacterial activity

**PT-277**

## DIARYLHEPTANOIDS: NATURAL SCAFFOLDS FOR ANTICANCER DRUG DISCOVERY

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Diarylheptanoids are an important class plant based secondary metabolites which have been reported for biological activities like antioxidant, anti-inflammatory, and anticancer activities. With the ability to modulate certain anticancer pathways, they can serve as promising leads for cancer treatment with low toxicity. In the current study we observed that acetyl derivative of Myricanol exhibited anticancer activity against various cell lines, with the most potent effect on MCF-7 cell Line. Mechanistic studies demonstrated that molecule induced mitochondrial-mediated apoptosis via ROS generation, loss of mitochondrial membrane potential, and G0/G1 cell cycle arrest. Apoptosis was associated with Bcl-2 downregulation and caspase cascade activation. Flow cytometry confirmed a dose-dependent rise in apoptotic cells, reaching about 20% at 30 µM of the molecule.

**Keywords**: Diarylheptanoids, Myrica esculenta, Anticancer, Apoptosis, Cell-cycle arrest.

**PT-278**

## DEVELOPMENT AND EVALUATION OF A POLYHERBAL HAIR OIL FOR ENHANCING HAIR GROWTH AND REDUCING HAIR FALL

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Hair care is an important aspect of personal health, with a growing demand for products that are both effective and safe. Hair loss and poor hair health are widespread concerns, often resulting in psychological




ISBN: 978-81-980623-8-3

distress, scalp irritation, and allergic reactions. Increasing awareness of the risks associated with chemical-based hair care products has led to a surge of interest in herbal alternatives, valued for their natural origin and minimal side effects. Our research highlights a high prevalence of hair-related issues such as hair fall, dandruff, dryness, and premature greying, which are frequently worsened by the use of synthetic hair care products. This underscores the need for a reliable, safe, and affordable solution, particularly for individuals sensitive to synthetic compounds. This study focuses on the formulation of a polyherbal hair oil utilizing medicinal plants including Emblica officinalis (Amla), Hibiscus rosa-sinensis, Eclipta alba (Bhringraj), Moringa oleifera, fenugreek seeds, curry leaves, and guava leaves. These ingredients were chosen based on their well-documented benefits in enhancing hair nourishment and stimulating hair follicles. The herbal hair oil was prepared through various established methodologies. The prepared oil was evaluated for parameters such as pH, viscosity, stability, organoleptic properties, specific gravity, and acid value. Testing revealed that the oil maintained its stability, exhibited no phase separation or rancidity, and possessed favorable sensory characteristics. Preliminary trials indicated notable improvements in hair texture, reduced hair fall, and promoted new hair growth. The results of initial hair growth initiation tests were promising, leading to further screening of the oil's hair growth activity. In summary, the formulated polyherbal hair oil presents a safe, cost-effective, and promising alternative to synthetic hair care products. It effectively addresses common hair concerns and supports healthy hair growth.

**Keywords:** polyherbal formulation, herbal extract, hair growth promotion, natural product formulation, phytochemical evaluation.

**PT-279**

## PHYTOCHEMICAL AND INVITRO BIOLOGICAL EVALUTION OF N-HEXANE EXTRACT OBTAINED FROM LEAVES OF PROBOSCIDEA LOUISIANICA

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World Health Organization define Traditional herbal medicines as naturally occurring, plant-derived substances with minimal or no industrial processing that have been used to treat illness within local or regional healing practices As per the mainstay of about 75 -80% of African and Asian population depends on traditional medicines for their primary health. In our present work we studied the the phytochemical, invitro anticoagulant and thrombolytic properties of Proboscidea lousianica plant leaves n-hexane extract of phytochemical screening showed the presence of alkaloids, glycosides, flavonoids, phytosterols, saponins. Anticoagulant activity o tested using prothrombin time with 10,20 50,100ug/ml and thrombolytic activity is carried out by clot lysis test the n-hexane extract of probosidea leaves was proven to have significant anticoagulant properties at concentration 20 ,50 and 100µg/ml compared to normal and negative control. The extract however was not significant at 10 mg/ml but still demonstrated some anticoagulation effect. It also revealed a significance thrombolytic activity at 1000µg/ml, when compared to negative and positive control indicating ability to lyse blood clot. It was proved that by our analysis that significant anticoagulant and thrombolytic activity.

**Keywords:** anti-coagulant, thrombolytic, n-hexane, Proboscidea lousianica.

**PT-280**

## NETWORK PHARMACOLOGY TO EVALUATE ANTIDIABETIC POTENTIAL OF PHYTOCHEMICALS FROM THE ADENANTHERA PAVONINE

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Network pharmacology provides a holistic platform to explore the antidiabetic potential of phytochemicals by elucidating their multi-target and multi-pathway mechanisms. This approach integrates computational prediction of molecular targets of bioactive compounds with protein-protein interaction network construction and pathway enrichment analyses. Applying network pharmacology to phytochemicals isolated from Adenanthera pavonina i.e. epicatechin, quercetin, kaempferol, gallic acid, tannins, saponins, alkaloids, and β-sitosterol tells their interactions with key diabetes-related proteins. Experimental validation further confirms the stable binding and pharmacological potential of these compounds. Therefore, network pharmacology serves as a powerful tool to unravel the complex biological interactions underlying the antidiabetic effects of phytochemicals, guiding the development of plant-based therapeutics for diabetes management. This integrated approach effectively uncovers the multitarget mechanisms of plant phytochemicals in diabetes management and may guide experimental and clinical research toward novel plant-based therapies.

**Keywords:** Network pharmacology, diabetes management, novel plant-based therapy, phytochemicals, Adenanthera pavonine.

**PT-281**

## EVALUATION OF ANTHELMINTIC ACTIVITY OF HERBAL FORMULAION

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Parasitic worms are called helminths. Among the most common illnesses in humans in developing countries the parasitic infestation was caused by intestinal helminths and protozoan parasites. Helminths are more frequently responsible for gastrointestinal illnesses in modern nations. In endemic nations, intestinal parasites significantly increased the morbidity and mortality. Anthelmintics are drugs that may act locally to expel worms from the GIT or systemically to eradicate adult helminths or development forms that invade organs and tissues. The present study aims to investigate and compare the anthelmintic activity of herbal formulation containing ethanolic extract of Tamarindus Indica Seeds and Ocimum Sanctum leaves with individual extracts of Tamarindus Indica Seeds and Ocimum Sanctum leaves and with standard group (Albendazole). The anthelmintic activity was tested on Indian adult earthworm (Pheretima posthuma), by adult worm immobility assay. The study involved the determination of time of paralysis and time of death of the worms. Herbal formulation of ethanolic extracts of TIS and OSL at the concentration of 50 mg/ml showed very significant activity as compared to their individual extracts and nearly equipotent to the standard drug Albendazole 50mg/ml. The time of paralysis and death time was observed as 25.04 ± 72.34 and 39.59 ± 111.03 respectively. From the obtained results it was confirmed that herbal formulation of Tamarindus Indica Seeds and Ocimum Sanctum leaves, showed better anthelmintic activity at concentrations of 50mg/ml as compared to the activity of their individual extracts.

**Keywords:** Anthelmintic, Tamarindus Indica, Ocimum Sanctum. Albendazole.

**PT-282**

## HEALING WITH GREENS: PHARMACIST-LED PATIENT COUNSELLING ON VEGETABLE-BASED DISEASE MANAGEMENT

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Vegetable-based nutrition has long been recognized as a cornerstone of preventive and therapeutic health care. Diets rich in green vegetables provide essential micronutrients, antioxidants, and phytochemicals that modulate immunity, reduce oxidative stress, and contribute to chronic disease prevention. However, patients often remain unaware of the clinical value of dietary modifications, relying heavily on pharmacological interventions. Pharmacists, as accessible healthcare providers, play a crucial role in bridging this gap by delivering structured patient counselling on evidence-based dietary strategies. This study emphasizes the role of pharmacist-led counselling in promoting vegetable-based disease management, highlighting its potential in conditions such as diabetes, hypertension, cardiovascular diseases, obesity, and gastrointestinal disorders. By integrating nutritional education into pharmaceutical care, pharmacists can empower patients to adopt sustainable lifestyle changes, improve medication adherence, and reduce polypharmacy-related risks. Counselling sessions are designed to focus on practical approaches, including portion control, selection of green leafy vegetables, incorporation of seasonal produce, and addressing misconceptions about diet-disease relationships. The approach not only enhances patient understanding but also encourages




ISBN: 978-81-980623-8-3

self-care and holistic healing. Incorporating "greens" into therapeutic counselling models aligns with the global shift toward integrative and preventive healthcare. Pharmacist-led initiatives can thus transform vegetable-based interventions from mere dietary advice to a structured adjunct in disease management, fostering better patient outcomes and long-term wellness.

**Keywords:** Pharmacist counselling, vegetable-based therapy, healing with greens, disease management, patient education, chronic diseases.

**PT-283**

**DESIGN, DEVELOPMENT, STANDARDIZATION OF WOOD APPLE (LIMONIA ACIDISSIMA) PULP EXTRACT FOR QUALITY ASSURANCE**

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The wood apple, or Limonia acidissima, is a fruit used for medical purposes that is known for its antibacterial, digestive, and antioxidant qualities. In order to guarantee safety, effectiveness, and reproducibility, standardization of herbal extracts is an essential component of quality assurance (QA). The chromatographic and spectral analysis of wood apple pulp extract in compliance with ICH guideline is the main focus of this work. Thin Layer Chromatography (TLC), and High-Performance Liquid Chromatography (HPLC) were used for chromatographic profiling. The presence of bioactive substances and their functional groups was verified by spectral characterisation using Fourier Transform Infrared Spectroscopy (FTIR), and UV-Visible Spectroscopy. The developed analytical techniques were verified for accuracy, precision, specificity, and robustness in accordance with ICH guideline. The results support the use of wood apple pulp extract in herbal formulations for antioxidant activity and regulatory compliance by providing a scientific foundation for quality control and standardization.

**Keywords:** Wood apple, UV-Vis, FTIR, HPLC

**PT-284**

**MORINGA OLEIFERA LEAF EXTRACT: A NATURAL APPROCH TO GLYCEMIC CONTROL**

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Diabetes Mellitus (DM) is a chronic medical condition in which the body refuses to produce sufficient amounts of insulin, a hormone of the pancreas that is responsible for maintaining blood glucose levels in the body. There are many herbs used for treating diabetes but studies shows that Moringa oleifera shows 40-60% more effectiveness than other herbs for diabetes. M. oleifera shows anti-hyperglycemic (antidiabetic) activity and the effect of reducing glycemia without causing any adverse effects. Nowadays, M. oleifera formulations are available in powder, capsules and tablet form only, we attempt to prepare a liquid dosage form of herb which would be more Bio-available thereby showing faster action and easy to administer compared to the existing powdered formulation. These project will successfully develop an oral liquid herbal formulation using M. oliefera leaf extract, demonstrating its potential as a natural management option for diabetes. The formulation of an oral liquid herbal product using M. oliefera leaf extract gives a promising potential for diabetes management. The development of a M. oliefera liquid oral represents a promising approach to numerous health benefits of this plant in a convenient and consumable form.

**Keywords**: Diabetes Mellitus; Moringa oleifera; leaf extracts; Anti-hyperglycemic activity; Antidiabetic activity

**PT-285**

**SAHADEVI IN NEUROBIOLOGY: A GREEN ANTI-INSOMNIA APPRAOCH IN RAT MODEL**

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Insomnia, a neurological disorder, the most common sleep disorder in adults also known as sleeplessness. Although benzodiazepines and sedative-hypnotics are employed in current pharmaceutical therapies that relieve symptoms, but they cause negative side effects such as dependency and cognitive impairment. There is an urgent need to find sustainable, side-effect-free, and efficient substitutes. In this study, preclinical rat models are utilized to examine the potential of Sahadevi (Vernonia cinerea), a widely used medicinal plant, as a natural treatment for insomnia in Ayurveda. To study the effect of Sahadevi extract on insomnia, two varying doses (200 mg/kg and 400 mg/kg) were given. Anti-insomnialogic effects were studied in behavioral paradigms such as EPM, HBT, and OFT. To know neurochemical as well as oxidative stress regulation, biochemical biomarkers such as melatonin, serotonin, dopamine, norepinephrine, malondialdehyde (MDA), and catalase were examined. Behavioral assesments demonstrated dose dependent improvement by both doses, which significantly reduce augmentation of relaxation. Biochemical analysis detected higher concentrations of melatonin and serotonin and alteration in dopamine and norepinephrine levels, reflecting probable effects amenable to enhanced sleep. The neuroprotection of sahadevi was confirmed by enhanced catalase activity and decreased MDA content. Through the modulation of behavioural and neurochemical markers for sleep regulation, sahadevi had potent anti-insomnia activity. The green strategy is safer and environment friendly alternative to traditional sleep drugs and is thus worthy of further research by clinical trials.

**Keywords:** Sahadevi, alternative, insomnia, anxiety, neuroprotection

**PT-286**

**EXTRACTION, ISOLATION, AND CHARACTERIZATION OF RUTIN FROM AEGLE MARMELOS: A PHYTOCHEMICAL AND ANTIOXIDANT EVALUATION**

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This study investigates the extraction, isolation, and characterization of rutin—a potent flavonoid—from Aegle marmelos leaves, with a focus on optimizing yield and evaluating antioxidant potential. Using both Soxhlet and maceration techniques with varying solvent systems, ethanolic extraction via Soxhlet yielded the highest crude extract (5.48%) and rutin content (1.44%), outperforming hydroalcoholic and aqueous fractions.Rutin was identified through classical phytochemical tests (Shinoda, Zn-HCl reduction, and $AlCl_3$), and further confirmed via IR spectroscopy, revealing characteristic peaks for hydroxyl, carbonyl, and aromatic groups consistent with standard rutin. Antioxidant activity was assessed using the phosphomolybdenum assay, where the ethanolic Soxhlet extract demonstrated the highest activity (103.58 mg AA/g), compared to hydroalcoholic (72.68 mg AA/g) and macerated ethanolic extracts (67.32 mg AA/g).Quantitative analysis was performed using HPTLC, with a validated method showing linearity ($R^2 = 0.997$), precision (%RSD < 2%), robustness, and acceptable LOD (0.2 ng) and LOQ (0.61 ng). Recovery studies confirmed method accuracy with 97–99.8% recovery across extracts. This work highlights Aegle marmelos as a viable source of rutin and demonstrates a reproducible, scalable method for its extraction and quantification. The findings support its potential application in antioxidant-rich formulations and pave the way for further pharmacological exploration.

**Keywords:** Rutin, Aegle marmelos, Soxhlet extraction, antioxidant activity, HPTLC, IR spectroscopy, flavonoid isolation.

**PT-287**

**IN-SILICO EVALUATION OF PHYLLANTHUS NIRURI PHYTOCONSTITUENTS AGAINST KEY PROTEIN TARGETS IMPLICATED IN UROLITHIASIS**

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The present study investigated the antiurolithiatic potential of Phyllanthus niruri through in-silico molecular docking and MM-GBSA free energy calculations against four key protein targets (1AZM, 4UBP, 5FBH, and 5YHL). A total of thirty phytoconstituents (PN1–PN30) were screened and compared with a standard reference ligand. The docking analysis revealed that several compounds, notably PN2, PN8, PN18, PN26, and PN28, exhibited highly favorable docking scores (ranging from –9.0 to –12.0) and binding free energies surpassing the reference




ISBN: 978-81-980623-8-3

molecule across multiple targets. Among these, PN2 (–11.469, –42.88 kcal/mol with 1AZM; –9.541, –77.66 kcal/mol with 4UBP; –9.264, –96.77 kcal/mol with 5YHL) and PN28 (–11.416, –34.12 kcal/mol with 1AZM; –12.388, –66.34 kcal/mol with 5YHL) demonstrated consistently strong binding affinity, highlighting their potential as lead antiurolithiatic candidates. The MM-GBSA results further supported the stability of these ligand–receptor complexes, with several molecules such as PN5, PN13, PN17, PN22, PN23, and PN30 also displaying superior binding energies compared to the standard. Overall, the findings suggest that Phyllanthus niruri harbors multiple bioactive constituents with significant protein-binding capacity, providing molecular-level evidence for its traditional use in urolithiasis management and supporting its potential as a source for novel therapeutic agents.

**Keywords:** Phyllanthus niruri, Urolithiasis, Molecular docking, MM-GBSA, Phytoconstituent

**PT-288**

## EXTRACTION, IDENTIFICATION AND EVALUATION OF MAJOR BIOACTIVE COMPONENTS IN YOUNG BAMBOO SHOOTS, GINGER ZINGIBER OFFICINALE ROSCOE, PLECTRANTHUS AMBOINICUS LEAVES AND CARICA PAPAYA LEAVES

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Extraction is an important part of extracting the bioactive components from herbs. Conventional and modern extraction methods have been widely used in many industries to achieve actual goals like, extracting bioactive components, separation of active bioactive components, selectivity of the analytical method, antibacterial, antioxidant & cytotoxicity activities and thus helps in identifying antioxidant, antimicrobial, and anticancer activities. Dried powdered leaves of Young Bamboo shoots, dried Ginger Zingiber officinale Roscoe, dried Plectranthus amboinicus leaves and dried Carica papaya leaves were extracted separately with various solvents like Ethanol (95%), Aqueous, Petroleum ether, Dichloromethane, Ethyl acetate, n-Butanol, Methanol, Acetone, Hydroalcoholic (50%) and chloroform by refluxing at 65-70°C for 3 h in a round bottom flask and filtered the liquid and the extraction process was repeated twice with a 1:3 ratio. The significant yield after extraction was found in the Hydroalcoholic (50%) extract for Young Bamboo shoots, Ginger Zingiber officinale Roscoe, Plectranthus amboinicus leaves and Carica papaya leaves when compared with other solvents. The results of phytochemical screening indicated the presence of alkaloids, flavonoids, steroids and tannins in ethanol, methanol, chloroform and hydroalcoholic (50%) extracts from Young Bamboo shoots, Ginger Zingiber officinale Roscoe, Plectranthus amboinicus leaves and Carica papaya leaves. This phytochemical screening helps in identifying phytoconstituents from Young bamboo shoots (Polyphenols and phytosterols), Ginger (6-gingerol, 6-shogaol, 6-paradol) and Plectranthus amboinicus (flavonoids, cinnamic derivatives, and terpenes). Anticancer and antibacterial activities will be carried out based on analytical results. The Hydroalcoholic (50%) extract was found to exhibit good yield than other solvents and showed presence of important phytoconstituents in Young Bamboo shoots, Ginger Zingiber officinale Roscoe, Plectranthus amboinicus leaves and Carica papaya leaves.

**Keywords:** Extraction, Young Bamboo shoots, Ginger Zingiber officinale Roscoe, Plectranthus amboinicus leaves, Carica papaya leaves, Hydroalcoholic(50%) antibacterial and anticancer.

**PT-289**

## ANTI-UROLITHIATIC ACTIVITY OF BRYOPHYLLUM PINNATUM LAM. HYDROALCOHOLIC EXTRACT IN SODIUM OXALATE-INDUCED UROLITHIASIS IN RATS

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Despite advances in modern medicine, the development and growth of calculi continues to be a source of concern for mankind, as there is no effective treatment for kidney stones. In the present study we investigated antiurolithiatic activity of Bryophyllum pinnatum Lam against sodium oxalate (NaOx) induced urolithiasis in rats. In rats with renal calculi caused by sodium oxalate (NaOx, 70 mg/kg, i.p.); the antiurolithiatic action of Bryophyllum pinnatum hydroalcoholic extract (BPHE) was studied. BPHE was given every day orally at doses of 50, 100 and 200 mg/kg for 14 days to rats to examine activity against sodium oxalate (NaOx) mediated urolithiasis, with Cystone (500 mg/kg, p.o.) as a reference standard. The effect of the extract on urine oxalate, creatinine and phosphate retention and excretion in the kidney, as well as serum and biochemical analysis of kidney homogenate and histopathological examinations were studied. Oral administration of BPHE at doses of 50,100, and 200 mg/kg to rats with sodium oxalate-mediated renal calculi showed dose-dependent substantial ($P<0.05$) antiurolithiatic potential, with notable reversal of NaOx-induced ion excretion and urinary CaOx concentration. These findings justify the traditional use of Bryophyllum pinnatum hydroalcoholic extract (BPHE) in the treatment of renal calculi.

**Keywords:** Bryophyllum pinnatum Lam.; Cystone; Sodium oxalate; Urolithiasis.

**PT-290**

## NANOTECHNOLOGY IN HERBAL COSMECEUTICALS: A SUSTAINABLE FUTURE FOR SKIN HEALTH

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Herbal cosmeceuticals have emerged as an important class of skin care agents due to their natural origin, safety profile, therapeutic efficacy, and wide cultural acceptance. They contain bioactive constituents such as polyphenols, flavonoids, alkaloids, and terpenoids that exhibit antioxidant, anti-inflammatory, antimicrobial, and photoprotective properties. Despite these benefits, their clinical application remains limited because of challenges like poor aqueous solubility, low stability against environmental factors, restricted penetration across the stratum corneum, and rapid degradation during storage. These properties reduce their bioavailability and effectiveness in conventional formulations. Potential ways to get around these restrictions are offered by nanotechnology. It is possible to optimize the delivery of bioactive by encapsulating herbal actives into nanoscale carriers, including liposomes, niosomes, nanoemulsions, SLN, nanostructured lipid carriers (NLC), nanogels, and phytosomes. These systems better penetrate the layers of the skin, improve solubility and stability, prevent degradation of sensitive phytoconstituents, and enable controlled or sustained release for extended activity. By using herbal extracts as stabilizing and reducing agents for the synthesis of nanoparticles, recent developments in green nanotechnology further advance this field and produce environmentally friendly and biocompatible goods. Aloe vera nanogels for skin hydration, green tea nanoparticle gels for anti-aging and UV protection, neem oil nanoemulsions for acne treatment, and turmeric-loaded liposomes for anti-inflammatory action are examples of practical uses. Combining nanotechnology and herbal cosmeceuticals unites state-of-the-art research and traditional knowledge. This creative method opens the door for safe, environmentally friendly, and next-generation skin care products in addition to improving efficacy and consumer appeal.

**Keywords:** Herbal Cosmeceuticals, Skin Care, Nano Carriers, Liposome, Green Nanotechnology.

**PT-291**




ISBN: 978-81-980623-8-3

**POTENTIAL OF SILVER NANOPARTICLES DERIVED FROM BANANA STEM (MUSA PARADISIACA LINN) FOR PURIFYING HEAVY METAL-CONTAMINATED WATER: A SUSTAINABLE AND COST-EFFECTIVE APPROACH**

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Biogenic production of silver nanoparticles (AgNPs) offers a green alternative method to traditional chemical methods of fabricating nanomaterials. In this report, silver nanoparticles were produced using banana stem (Musa paradisiaca Linn) extract as both a reducing agent and a stabilizationon agent. The banana stem phytochemicals, such as flavonoids, glycosides, tannins, and polyphenols, facilitated the formation and stabilization of the nanoparticles. The synthesized banana stem silver nanoparticles (BS-AgNPs) were characterized by FTIR, SEM, EDX, and zeta potential techniques. The results showed BS-AgNPs were spherical nanostructures less than 200 nm in size with high colloidal stability. The functional utility of the BS-AgNPs was tested for water remediation in regard to heavy metal contamination. The nanoparticles showed excellent removal of toxic ions; especially $Pb^{2+}$ was removed through electrostatic attraction, surface complexation, and bioactive functional group interaction, which greatly lowered the concentration and provided good quality water. Banana stem extract was a renewable medium for synthesis and also gave the nanoparticles greater reaction activity. The resulting BS-AgNPs appeared more eco-compatible, less toxic, and cost-effective relative to chemically synthesized AgNPs. Therefore, this type of green nanotechnology presents a viable method for heavy metal contaminated water remediation, providing sustainable and affordable methods for the treatment of contaminated water.

**Keywords:** Biogenic synthesis, Silver nanoparticles (AgNPs), Banana stem extract, Heavy metal adsorption, Eco-friendly nanotechnology, Water purification.

**PT-292**

**HERBAL INSIGHTS INTO NEUROPROTECTION: PHARMACOGNOSTIC CHARACTERIZATION AND MOLECULAR DOCKING OF THYMOL FOR ALZHEIMER'S THERAPY**

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Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by memory loss, cognitive decline, and reduced neuronal function. Currently available synthetic drugs provide only symptomatic relief and are often associated with adverse effects, highlighting the need for safer alternatives. Thymol, a monoterpene phenol derived from Thymus vulgaris (Lamiaceae), exhibits antioxidant, anti-inflammatory, and neuroprotective properties, making it a potential candidate in AD management. To ensure the quality and authenticity of the herbal raw material, a Pharmacognostic investigation of Thymus vulgaris was performed. This included macroscopic and microscopic identification, physicochemical evaluations, and preliminary phytochemical screening, which confirmed the presence of major bioactive such as thymol and carvacrol.To elucidate thymol's mechanism of action, molecular docking studies were carried out against key AD-related targets, including acetylcholinesterase (AChE), butyrylcholinesterase (BChE), and β-secretase (BACE1). Thymol showed favourable binding affinities with AChE (–6.4 kcal/mol) and BACE1 (–6.0 kcal/mol), indicating potential inhibition of cholinergic dysfunction and amyloid-beta aggregation. Additionally, docking with NF-κB pathway proteins suggested significant anti-inflammatory activity, reinforcing its neuroprotective role.The integration of Pharmacognostic profiling with computational docking provides a rational framework for developing novel herbal formulations. Among these, in situ nasal gels for nose-to-brain delivery of thymol present a promising approach to overcome the blood–brain barrier, enhance bioavailability, and ensure sustained neuroprotection with minimal side effects. This study demonstrates the synergy of pharmacognosy and molecular biology in establishing thymol's therapeutic potential against Alzheimer's disease.

**Keywords:** Thymol, Thymus vulgaris, Pharmacognostic identification, Molecular docking study

**PT-293**

**INNOVATIVE HERBAL PATCHES OF CURCUMIN AND GLUTATHIONE: PHARMACOGNOSTIC PROFILING AND MOLECULAR DOCKING INSIGHTS FOR PSORIASIS THERAPY**

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Psoriasis is a chronic inflammatory skin disorder marked by keratinocyte hyperproliferation, oxidative stress, and immune dysregulation. Conventional therapies provide temporary relief but often cause adverse effects with long-term use, highlighting the need for safer plant-derived alternatives. This investigation explores the therapeutic potential of curcumin from Curcuma longa and glutathione, a natural tripeptide antioxidant, as dual-function agents for psoriasis management. Pharmacognostic analysis of C. longa rhizome was carried out, including macroscopic, microscopic, physicochemical, and phytochemical evaluations to ensure raw material standardization. Molecular docking studies assessed the anti-inflammatory activity of curcumin and glutathione against key protein targets implicated in psoriasis, namely COX-2, NF-κB, TNF-α, and the Keap1–Nrf2 complex. Docking results revealed strong binding affinities, with curcumin showing marked inhibition of COX-2 (–7.4 kcal/mol) and NF-κB, while glutathione displayed effective interactions with COX-2 (–5.2 kcal/mol) and Keap1 (–5.6 kcal/mol). These findings suggest a synergistic mechanism, linking the anti-inflammatory effects of curcumin with the antioxidant and redox-modulating activities of glutathione. Analytical profiling through HPTLC and HPLC confirmed the presence and quantification of marker compounds, ensuring batch-to-batch consistency. The integrated pharmacognostic and computational outcomes support the development of herbal nanofiber-based topical patches, designed to enhance penetration, provide sustained release, and selectively modulate inflammatory pathways. Overall, this study demonstrates the promise of combining traditional pharmacognosy with modern molecular docking and analytical profiling to create innovative, targeted, and safer interventions for psoriasis therapy.

**Keywords:** Psoriasis, Curcumin, Glutathione, Pharmacognostic profiling, Molecular docking, Herbal nanofiber patches

**PT-294**

**FORMULATION AND EVALUATION OF HERBAL KAJAL**

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A seven different kajal formulations were prepared by using different concentrations of bring raj and orange peel extracts. Bring raj leaves and orange peels were washed with tap water, then with distilled water. They were left for drying until become completely dried. The formulations were examined for the physicochemical properties, pH, SEM, IR irritability and spreadability. All formulations showed better results. These formulations will be used for beatification purpose. Kajal, also known as Surma or Kohl, is a visually arresting cosmetic. Ayurvedic kajal is completely fresh because it is made with natural substances. The components in Ayurvedic kajal are therapeutically useful to the body. The eyes are nourished and moisturized when organic kajal is used. This kajal is frequently used to cleanse the skin of pollutants. The ayurvedic kajal improves the clarity of the eyes by strengthening their muscles. Tear fluid tends to drain faster when the kajal is utilized, as opposed to utilizing an industrial kajal. Because of its astringent qualities, natural kajal frequently melts in the eyes of tiny red vessels to keep them clean. Keeping this entire thing we have formulated seven different kinds of kajal using herbal extracts. After drying made powder by the use of mixer. The powders were dried and weighed. Both powders were extracted with methanol. The cotton cloth was soaked in different concentrations in mornings by drying overnight. Repeated the process until all the extract was completely absorbed. The cotton cloth was made as wick and lighted in mud lamp containing 20ml of sunflower oil/coconut oil and 2 drops of rose water. The black soot was collected in




ISBN: 978-81-980623-8-3

dry and porcelain dish. The powder was made as paste with the help of cow ghee and packed in dry box.

**Keywords:** kajal, bringraj, orangepeel

**PT-295**

**FORMULATION AND EVALUATION OF MEDICATED HERBAL GEL CONTAINING CURCUMA AMADA WITH GELLING AGENT OF HYLORONIC ACID FOR PAIN RELIEVING PROPERTY**

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The present study focuses on the formulation and evaluation of a medicated herbal gel containing Curcuma amada extract, incorporated with hyaluronic acid as a natural gelling agent, for its pain-relieving properties. Curcuma amada (mango ginger) is widely recognized for its potent anti-inflammatory, analgesic, and antioxidant activities attributed to its phytoconstituents such as curcuminoids and essential oils. Hyaluronic acid, chosen as the gelling base, offers excellent biocompatibility, hydration, and drug release modulation, making it a suitable medium for topical delivery. The formulation process involved extraction of Curcuma amada, incorporation into varying concentrations of hyaluronic acid gel, and subsequent optimization based on physical characteristics. Prepared gels were evaluated for physicochemical parameters including pH, homogeneity, spreadability, viscosity, and stability. In vitro drug release studies and ex vivo permeation analyses were conducted to assess the release profile and skin penetration efficiency. The optimized formulation was further subjected to pharmacological evaluation using suitable analgesic and anti-inflammatory models to confirm its therapeutic efficacy. Results demonstrated that the Curcuma amada–hyaluronic acid gel exhibited desirable physicochemical characteristics, sustained drug release, and significant pain-relieving activity compared to control formulations. This study highlights the potential of integrating traditional herbal medicine with modern biocompatible polymers to develop safe, effective, and patient-friendly topical therapeutic systems.

**PT-296**

**DETERMINATION OF TOTAL PHENOLIC CONTENT IN LEAF EXTRACT OF MURRAYA KOENIGII (CURRY LEAVES) BY FOLIN–CIOCALTEU COLORIMETRIC METHOD**

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The present study was undertaken to determine the total phenolic content (TPC) of Murraya koenigii (curry leaves) extract, an aromatic medicinal plant widely used in traditional systems of medicine and culinary practices. Fresh leaves were shade-dried, powdered, and extracted using ethanol as the solvent. The TPC of the extract was estimated by the Folin–Ciocalteu colorimetric method, employing gallic acid as the standard reference compound. Absorbance was measured spectrophotometrically at 765 nm, and results were expressed in milligrams of gallic acid equivalents (mg GAE/g of dry weight). The analysis revealed that the ethanolic extract of M. koenigii leaves possesses a considerable amount of phenolic compounds, indicating strong antioxidant potential. These findings highlight the pharmacological relevance of curry leaves, supporting their role as a natural source of bioactive phenolics with potential applications in nutraceuticals and the development of polyherbal formulations. Further research on the isolation and characterization of specific phenolic constituents is warranted to establish their therapeutic efficacy.

**Keywords**: Murraya koenigii, phenolic content, antioxidant, Folin–Ciocalteu method, nutraceuticals.

**PT-297**

**Formulation And Evaluation Of Herbal Tooth Gel Of Vitex Trifolia Leaves Extract For Preridontal Disease**

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The formulation and development of herbal tooth gel using vitex trifolia leaves extract aim to provide a natural therapeutics approach for managing periodontal disease. The gel is designed to leverage the antimicrobial and anti-inflammatory properties of vitex trifolia to reduce plaque, gingivitis and inflammation. The leaf extract was obtained using ethanol as a solvent through maceration and incorporated into a Carbopol-based gel matrix. The formulation gel was evaluated for various physicochemical parameter including pH, viscosity, spreadability, extrudability and stability. Antimicrobial activity against common oral pathogens such as streptococcus mutans, porphyromonas gingivalis, these is assessed using agar well diffusion method. the results demonstrated that the formulation herbal tooth gel exhibited desirable organoleptic and physicochemical properties along with significant antimicrobial activity and stability over time. The study aims to provide a comprehensive assessment of the gel safety, efficacy, and potential for clinical application.

**Keywords**: Vitex trifolia, periodontal disease, antimicrobial activity, oral hygine, gel evaluation.

**PT-298**

**DEVELOPMENT OF A PH-RESPONSIVE GRAFTED NATURAL POLYSACCHARIDE**

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This study investigated the chemical modification of a natural polysaccharide extracted from Abelmoschus esculentus pods commonly known as okra. This modification was carried out using graft copolymerization reaction with acrylamide, to create a colon-specific, pH-sensitive drug delivery system. The production of the grafted copolymer was confirmed with spectroscopy methods. The Fourier-transform infrared spectrometry showed absorbances corresponding to the functional groups of grafted chains of polyacrylamide. The structural formulation was further confirmed by Nuclear Magnetic Resonance spectrometry based on resonance signals from the grafted sections, which confirmed the presence of acrylamide. Furthermore, the modified polymer displayed an appropriate pH sensitive swelling profile. Swelling observed as minimal at an acidic pH (1.2) and greater swelling at a basic pH (7.4), suggesting that the modified polymer may be utilized for targeted colonic release. Preliminary cytotoxicity tests by PI assay indicated that the grafted polysaccharide was not toxic. In summary, acrylamide grafted okra polysaccharide, confirmed in structure with spectroscopic methods, has potential to be developed as a biocompatible and sustainable polymer for colon targeted drug delivery.

**Keywords:** Abelmoschus esculentus, Acrylamide, Colon targeting drug delivery, Copolymerization, pH-sensitivity.

**PT-299**

**EXTRACTION, ISOLATION, IDENTIFICATION, AND ANALYSIS OF BETALAMIC ACID FOR ANTIHYPERTENSIVE ACTIVITY**

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Hypertension is one of the most common lifestyle disorders and still constitutes a major cause for cardiovascular morbidities. Studies of plant derived bioactive compounds provide potential new clues to the safer control. Betalamic acid, a primary intermediate of betalain pigments, has been documented to have antioxidant and vasoprotective activity that might influence blood pressure. So, there is scope for the future study based on the present research idea to address betalamic acid by its isolation, extraction, identification, and preliminary screening for antihypertensive activity. It will be extracted from betalain-enriched plant material with appropriate solvent systems and then purified by column chromatography. The isolated compound will be identified by conventional spectral methods (UV-Vis, and FTIR) with further tests if necessary to ascertain the constitution. Assay profiling will set purity and stability criteria. The antihypertensive capacity will possibly be screened through preliminary studies on in vitro vasorelaxant activity which can serve as an early indicator of function. The novelty of this idea is the use




ISBN: 978-81-980623-8-3

of betalamic acid, an under-investigated phytoconstituent by targeting it as a candidate for natural antihypertensive drug therapy. The results of such studies may become the basis for further extensive pharmacological investigations and create a new generation of safer plant-derived compounds with potential therapeutic uses in cardiovascular medicine.

**Keywords:** Betalamic acid, Hypertension, Extraction, Isolation, Vasorelaxant.

**PT-300**

## EVALUATION OF IN VITRO ANTIMICROBIAL ACTIVITY OF GUM RESIN OF CANARIUM STRICTUM AGAINST SELECTED GRAM-POSITIVE, GRAM-NEGATIVE BACTERIA AND A FUNGAL PATHOGEN

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Canarium strictum Roxb. (family Burseraceae), traditionally known in Ayurvedic medicine as Raladhupa or black dammar resin, was investigated for its phytoconstituents. Compounds A and B were isolated from the chloroform extract using the counter-current distribution method. The purity of each compound was assessed by thin-layer chromatography (TLC). Preliminary phytochemical screening indicated that both compounds belong to the triterpenoid class of phytoconstituents. The antimicrobial potential (antibacterial and antifungal) of Compound A and Compound B was evaluated using the cup plate (agar diffusion) method. Both compounds exhibited broad-spectrum antimicrobial activity at a concentration of 100 µg/ml. The inhibitory effects of Compound A and Compound B were comparable in magnitude, showing nearly identical activity against Gram-positive and Gram-negative bacteria as well as fungi.

**Keywords:** Canarium strictum, Raladhupa, Black dammar resin, Antimicrobial activity, fungi.

**PT-301**

## BIOLOGICAL VALIDATION OF HEPATOPROTECTIVE AND ANTITUBERCULOSIS EFFECT OF HYDROALCOHOLIC EXTRACT OF TECOMA STANS LINN.

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Tuberculosis (TB) remains a global health burden, with India reporting 2.42 million cases in 2022, including 63,801 multi-drug resistant (MDR-TB) patients. Standard anti-TB therapy (isoniazid, rifampicin, pyrazinamide, and ethambutol; RIPE) is effective but frequently associated with hepatotoxicity. Herbal medicines are increasingly explored for their hepatoprotective potential. Tecoma stans Linn, rich in flavonoids, phenolic compounds, and glucosinolates, is traditionally used for multiple ailments and has reported antioxidant and hepatoprotective properties. This study evaluated the hepatoprotective and anti-tubercular effects of hydroalcoholic extract of Tecoma stans Linn seeds (HATS) in RIPE-induced hepatotoxicity. Methodology: Tecoma stans Linn seeds were subjected to hydroalcoholic extraction, followed by phytochemical screening. Antimycobacterial activity was assessed using the Alamar Blue assay against Mycobacterium tuberculosis H37Rv. Hepatoprotective effects were evaluated in mice divided into eight groups, treated with RIPE alone, RIPE + HATS (100, 200, 400 mg/kg), RIPE + silymarin (100 mg/kg), and controls. Biochemical markers (AST, ALT, ALP, γ-GT, LDH), lipid profile, oxidative stress markers (CAT, SOD, GPx, GST, GSH), protein content, and histopathology were analyzed. HATS exhibited significant antimycobacterial activity, with MIC values as low as 0.8 µg/ml, comparable to rifampicin. RIPE treatment induced hepatotoxicity, evidenced by elevated serum transaminases, dyslipidemia, reduced antioxidant enzyme activity, and histopathological damage. Co-administration of HATS significantly ($p < 0.05$–$0.0001$) restored liver function markers, improved lipid profile, enhanced antioxidant defense (CAT, SOD, GPx, GST, GSH), and preserved protein levels in a dose-dependent manner. The protective efficacy of HATS at 400 mg/kg was comparable to silymarin. Discussion: The hepatoprotective activity of HATS may be attributed to its rich phytochemical composition, particularly flavonoids, which exert antioxidant, anti-lipid peroxidative, and membrane-stabilizing effects. HATS mitigated RIPE-induced oxidative stress and lipid peroxidation, thereby preserving hepatic integrity. Conclusion: HATS demonstrated dual activity: significant anti-tubercular effects and potent hepatoprotection against RIPE-induced liver injury.

**Keywords:** Tuberculosis, hepatotoxicity, Tecoma stans Linn, hydroalcoholic extract, anti-tubercular, antioxidants, RIPE regimen

**PT-302**

## PHYTOCHEMICAL INVESTIGATION AND ANTI DIABETIC, ANTI MICROBIAL, SCREENING OF ETHYL ACETATE EXTRACT OF HYPTIS SUAVEOLENS

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To evaluate the in vitro antimicrobial and in vivo antidiabetic potential of ethyl acetate extract of aerial parts of Hyptis Suaveolens Poit. (Lamiaceae), a part traditionally used for treating diabetes, fever, eczema, cancers and headache.Aerial parts (leaves) of Hyptis Suaveolens were extracted with ethyl acetate using soxhlet apparatus.The prepared ethyl acetate extract was tested for its hypoglycemic activity at doses of 250 and 500 mg/kg.Studies were conducted on acute normoglycemic and alloxan-induced hyperglycemic rats.Experiments included oral glucose tolerance tests and a 28-day chronic study, using glibenclamide as the standard drug. Body weight and serum blood glucose levels were measured in the treated hyperglycemic rats.Antimicrobial activity of the extract was assessed in vitro, comparing the extract's zone of inhibition (ZOI) to standard gentamicin.In normoglycemic rats, a 4-15% decrease in blood glucose was observed.Hyperglycemic rats showed a significant ($p<0.0001$) and progressive drop in blood glucose levels. Improvement in glucose tolerance was also observed ($p < 0.05$). Treated rats showed favorable body weight gain and improved biochemical parameters over 28 days.The plant extract exhibited notable antimicrobial activity (5 cm ZOI) compared to gentamicin (6 cm ZOI). The study confirms that the aerial parts of H. suaveolens possess significant antidiabetic and antimicrobial activities, supporting its traditional use.

**Keywords:** Hyptis suaveolens, phytochemistry, pharmacology, essential oils, therapeutic potential, traditional medicine

**PT-303**

## FORMULATION AND QUALITY TESTING OF A MOISTURIZING SHAMPOO WITH ALOE VERA

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The present study focuses on the formulation and evaluation of a moisturizing shampoo incorporating Aloe vera gel as a key natural ingredient. Aloe vera is widely recognized for its hydrating, soothing, and anti-inflammatory properties, making it an ideal component for hair care products. The shampoo was prepared using a blend of surfactants, conditioning agents, and humectants, with Aloe vera gel acting as the primary moisturizer and scalp soother. The formulation was developed using standard techniques and evaluated for various physicochemical properties, including pH, viscosity, foamability, solid content, surface tension, and conditioning performance. The results demonstrated that the Aloe vera-based shampoo exhibits excellent cleansing ability, mildness to the scalp, and moisturizing properties, without causing dryness or irritation. Furthermore, the natural gel contributed to enhanced hair softness, shine, and manageability. This study supports the use of Aloe vera gel as a natural and effective moisturizing agent in herbal shampoos, offering a safer alternative to synthetic conditioners and potentially reducing scalp-related issues due to its bioactive components.

**Keywords:** Moisturizing Shampoo, Formulation, Evaluation, Aloe Vera gel Extract, Detergents, Sodium lauryl Sulfate.

**PT-304**

## EVALUATION OF ANTIBACTERIAL ACTIVITY OF HYDRO-METHANOLIC EXTRACTS OF FLOWERS OF IXORA COCCINEA AND CATHARANTHUS ROSEUS




ISBN: 978-81-980623-8-3

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The aim of this study was to assess the effect of the hydro-methanolic extract of Ixora coccinea (I. coccinea) & Catharanthus roseus (C. roseus) flowers on Staphylococcus aureus and Escherichia coli. Materials & methods. In this the in-vitro studies on, I. coccinea & C. roseus dried flowers petals are extracted by Soxhlet extraction by using hydro-methanol solvent. The antibacterial effect of the extract compared by Tetracycline was evaluated on using nutrient agar media by the pour-plate method. By evaluating the diameter of the growth inhibition zone, the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) of the extract were determined for the above bacteria's. The hydro-methanolic extracts of I. coccinea & C. roseus had been shown inhibitory effects on the proliferation of all bacterial strains with the maximum effect on E. coli with MIC and MBC of 9mm of ZOI. The largest diameter of the zone of growth inhibition belonged to E. coli and the smallest to S. aureus. Tetracycline had the greatest inhibitory effect on E. coli. Conclusions. The hydro-methanolic extract of Ixora coccinea demonstrated a comparatively higher inhibitory effect than Catharanthus roseus, suggesting stronger antibacterial potential. The combination of extracts also displayed synergistic activity, reinforcing the therapeutic relevance of plant-based formulations.

**Keywords:** Ixora coccinea, Catharanthus roseus, hydro-methanolic extract, antibacterial effect.

**PT-305**

## Formulation And Evaluation Of Phytosomes From Ipomoea Mauritiana Tuber Extract With An In- Vitro Anti-Inflammatory Potential.

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Ipomoea mauritiana Jacq., commonly known as Vidari, is a medicinal plant widely used in traditional systems of medicine for its rejuvenating and therapeutic properties. The present study was undertaken to evaluate the anti-inflammatory potential of the ethanolic tuber extract and to develop a phytosomal formulation for enhanced delivery. In Ipomoea mauritiana, reported the presence of bioactive compounds such as scopoletin, β-sitosterol, and taraxerol, which are reported to contribute to anti-inflammatory activity. The in vitro anti-inflammatory activity was assessed using the albumin denaturation assay, where the extract exhibited significant inhibition in a dose-dependent manner, with an $IC_{50}$ value of 333 µg/mL compared to diclofenac sodium ($IC_{50}$ 241 µg/mL). To improve stability and bioavailability, phytosomes of the extract were prepared by the anti-solvent precipitation method and characterized by particle size analysis, zeta potential, and scanning electron microscopy. The phytosomes displayed a mean particle size of 153.67 nm, a zeta potential of –25 mV indicating moderate stability, and spherical vesicular morphology with uniform distribution. A phytosome-loaded suspension was further formulated and evaluated for physicochemical parameters, including pH (5.60 ± 0.14), viscosity (126.34 cp), sedimentation volume, and responsibility, all of which indicated satisfactory stability and ease of administration. The study concludes that I. mauritiana tuber extract possesses promising anti-inflammatory activity and that its incorporation into phytosomal formulations offers an effective drug delivery strategy to enhance therapeutic potential.

**Keywords:** anti-inflammatory potential, Ipomoea Mauritiana, Phytosomes

**PT-306**

## FORMULATION OF HERBAL FACE SERUM USING BITTER MELON

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A cosmetic serum is a highly concentrated formulation, usually based on water or oil, designed for rapid absorption and deeper penetration into the skin layers. In this study, a face serum was formulated using Momordica charantia (bitter melon/karela) extract, a natural ingredient known for its wide range of health and dermatological benefits. Bitter melon is rich in antioxidants and bioactive compounds that help combat premature aging, reduce acne, and minimize skin blemishes, thereby improving overall skin health and appearance. The prepared serum was subjected to a series of evaluations to assess its quality, stability, and effectiveness. The physicochemical parameters tested included pH, physical appearance (color, odor, and texture), and spreadability, which indicated smooth application and uniform coverage on the skin. Biological testing involved microbial analysis to ensure product safety, while stability assessment was carried out through cyclic temperature variation studies. The serum showed no microbial contamination, maintained its stability under stress conditions, and exhibited excellent spreadability with a pleasing aesthetic feel. Overall, the Momordica charantia-based face serum demonstrated favorable physical, chemical, and biological characteristics. The project highlights its potential as a natural cosmetic product with anti-aging, antioxidant, and skin-glowing effects, suitable for improving skin quality and providing a youthful appearance.

**Keywords:** Momordica charantia, Bitter melon, Face serum, Antioxidant, Anti-aging, Skin care, Acne, Blemishes, Natural formulation, Cosmetic evaluation, Spreadability, Stability testing.

**PT-307**

## EVALUATION OF TOTAL PHENOLIC CONTENTS (TPC), TOTAL FLAVONOIDS CONTENT (TFC) AND PRELIMINARY PHYTOCHEMICAL SCREENING USING THE CELASTRUS PANICULATUS SEEDS EXTRACT

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The current study has been designed to estimation of the total phenolic contents (TPC) and total flavonoids content (TFC) from Celastrus paniculatus seeds extracts and evaluation of preliminary phytochemical screening of plant extract. Objective of current study to find out the phytoconstituents from plant extract. For the methodology, initially plant extract prepared with Soxhlet extraction method and the total phenolic content in the extract was evaluated through folin-ciocalteu method and TFC was determined by the aluminum chloride method. Gallic acid in TPC and Rutin in TFC was used standard compound. The qualitative phytochemical analysis of the plant extract was carried out for the identification of phyto-constituents using standard methods. It was observed that TPC (18.12 ± 2.8 mg GAE/g) and TFC (10.20 ± 1.8 mg RUE/g was observed in seeds extract of Celastrus paniculatus. The presence of sterols, terpenoids, alkaloid, phenolic, tannins, flavonoids was confirmed from phytochemical screening. Thus, It was concluded, that several phytoconstituents available in plant extract and TPC and TFC was found in plant extract, which may associated with antioxidant potential. Thus, TPC and TFC are valuable plant actives available in plant extract of Celastrus paniculatus. Thus, herbal seeds extract of Celastrus paniculatus may be further utilize for antioxidant potential as the phenolic acid and flavonoids contents linked to the antioxidant activity.

**Keywords:** Celastrus paniculatus, herb, phytoconstituents, TPC, TFC, Gallic acid

**PT-308**

## UNBOLTING PHYTOCONSTITUENTS AND EVALUATION OF ANTIMICROBIAL ACTIVITY OF CLITORIA TERNATEA ETHANOLIC FLOWER EXTRACT

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Plants have a unique language that holds secrets to the ethereal qualities of poly valent nature and richness of bioactive compounds. The present study investigates the screening of phytochemicals that are responsible for the versatility of Clitoria ternatea (Sankha pushpi), from Fabaceae family, has long been used in Ayurvedic medicine and also using in modern medicine. A week-long shade dried fresh flowers of Clitoria




ISBN: 978-81-980623-8-3

ternatea were extracted with ethanol using Soxhlet apparatus about 72 hours. The extracts were subjected to LC-MS using the column Waters X-Terra RP-18 and the analysis confirmed that the presence of compounds such as kaempferol-3-O-glucoside (m/z-283.28) quercetin-3-robinobioside (m/z-594.52), cyanidin-3-O-glucoside (m/z-369.95), delphinidin-3-O-glucoside (m/z-501.63), and N-methyltryptamine (m/z-219.28). Antimicrobial activity was confirmed due to the presence of anthocyanins, flavonoids, alkaloids and polyphenols. The ZOI was measured by using the cup-plate method at concentrations of 15, 30, and 45 mg/ml using streptomycin (50 mg/ml) as a standard. The extract exhibited concentration-dependent antimicrobial activity, with maximum ZOI against Bacillus subtilis (1.3 mm at 45 mg/ml) and E. coli (1.2 mm at 45 mg/ml), Pseudomonas aeruginosa (1.1mm at 45mg/ml) and Staphylococcus aureus (1.3mm at 45mg/ml), Candida albicans (0.9mm at 45mg/ml). This unlocking ethanolic flower extract of Clitoria ternatea revealing that it is a wealth of distinct chemical constituents with antimicrobial activity.

**Keywords:** Phytoconstituents, antimicrobial, Liquid Chromatography Mass Spectroscopy, Zone of Inhibition.

**PT-309**

## NEUROPROTECTIVE POTENTIAL OF STANDARDIZED QUERCETIN-RICH EXTRACT FROM IPOMOEA AQUATICA IN NEUROLOGICAL DISORDERS

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This research examines the neuroprotective effectiveness of a standardized quercetin-rich extract derived from Ipomoea aquatica (water spinach) in relation to neurobehavioral and cholinergic deficits associated with Parkinson's disease. To guarantee phytochemical uniformity, IA leaves were authenticated, hydroalcoholically extracted, and standardized for quercetin using UV, FTIR, 13C-NMR, HPLC, and HPTLC, verifying retention-time agreement with a reference standard. Cognitive impairment was generated in a validated mouse model with intracerebroventricular administration of Aβ25–35. Behavioral evaluations including open-field, hole-board, Y-maze, Morris water maze, step-down inhibitory avoidance, and object recognition assessments. IA administration (200 and 400 mg/kg, p.o.) markedly boosted spontaneous alternation, decreased escape latency, reinstated novelty preference, and increased rearing, head-dipping, and locomotion, signifying extensive cognitive recovery. Both short-term and long-term memory were markedly improved in inhibitory avoidance tasks. Biochemically, IA reduced hippocampus acetylcholinesterase (AChE) activity, consistent with quercetin's documented anti-AChE, antioxidant, and anti-inflammatory properties. Histopathological study demonstrated maintained neuronal morphology in IA-treated groups relative to untreated Aβ-exposed rats. Acute oral toxicity study (maximum dosage 2000 mg/kg) revealed a positive safety profile, with no fatalities, adverse clinical manifestations, or organ impairment. The mechanistic regulation of quercetin on SIRT1–PINK1–Parkin mitophagy, Nrf2/ARE antioxidant pathways, and NF-κB/NLRP3 suppression underpins the observed neuroprotection. In summary, standardized IA extract provides cognitive advantages across several domains, alleviates cholinergic dysfunction, maintains brain histoarchitecture, and exhibits immediate safety, underscoring its therapeutic promise in Parkinson's disease.

**Keywords**: Ipomoea aquatica, Parkinson's disease, Acute oral toxicity, histopathology, Y-maze, quercetin, oxidative stress.

**PT-310**

## STANDARDIZATION AND EVALUATION OF A POLYHERBAL OINTMENT FOR WOUND HEALING

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Wound healing is a complex and multistage biological process that is often hindered by microbial invasion and prolonged inflammation. This study details the formulation, standardization, and evaluation of a polyherbal ointment for wound healing utilizing extracts from four medicinal plants: Artocarpus heterophyllus (jackfruit leaves), Murraya koenigii (curry leaves), Nerium indicum (oleander leaves), and Punica granatum (pomegranate peel), all known for their traditional wound healing, antimicrobial, and anti-inflammatory properties. The components were shade-dried, powdered, and subjected to Soxhlet extraction with ethanol. The ointment was prepared using the fusion method, incorporating the plant extracts into a suitable ointment base. Standardization involved organoleptic assessment, physicochemical tests including pH (5.2), spreadability, and stability, as well as comprehensive phytochemical screening and advanced profiling by LC-MS to ensure the consistency and quality of active constituents. Phytochemical analysis confirmed the presence of carbohydrates, glycosides, flavonoids, alkaloids, tannins, and phenolic compounds. For functional evaluation, in vitro antimicrobial efficacy was tested using the well diffusion method against several wound pathogens, including Staphylococcus aureus and Enterococcus spp., with significant inhibition zones observed, particularly against Enterococcus. The ointment's wound healing potential was further corroborated using a scratch assay on fibroblast cultures, demonstrating accelerated cell migration and closure compared to controls. The findings highlight that Vi-rohana, developed under phytochemical and analytical standardization, shows promising wound healing and antimicrobial potential. This underscores its utility as a reliable polyherbal alternative in wound care formulations, bridging traditional knowledge with scientific validation.

**Keywords:** Polyherbal ointment, standardization, wound healing, antimicrobial, LC-MS

**PT-311**

## FOLK MEDICINE FOR MENTAL HEALTH: ETHNOBOTANICAL SURVEY OF PLANTS USED IN NEUROLOGICAL DISORDERS IN BALANGIR, ODISHA, INDIA

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The incidence of neurological disorders has increased globally over the last decade, particularly in developing countries. People inhabiting the remote regions of Balangir district often suffer from various neurological disorders. No specific survey has been carried out for neurological disorders so far; hence, the present study was undertaken to document the plants used to treat such disorders. This study was conducted in Balangir district, Odisha, India. This study surveyed 90 participants from various rural communities in the Balangir district, gathering traditional knowledge through interviews and semi-structured questionnaires. Data were collected on plants with relevant activities, including details on parts used, botanical descriptions, routes of administration, and dosage forms. Quantitative measures such as participant demographics, informant responses, relative frequency citations, and cultural indices were employed to evaluate each plant's usefulness. The research identified 35 medicinal plants: 13 herbs, 13 trees, and 9 shrubs. primarily used in powdered form to treat neurological disorders. species included Cathranthus roseus, Cynodon dactylon, Rauvolfia serpentina, Withania somnifera, Acorus calamus, and Curcuma longa. which exhibited high therapeutic value and cultural importance. This study highlights the traditional medicinal plants used against neurological disorders and advocates modern therapeutic approaches.

**Keywords:** Ethnobotany, Neurological disorders, Medicinal plants, Traditional medicine

**PT-312**

## IN VITRO ASSESSMENT OF ANTIOXIDANT POTENTIAL OF ALBIZIA LEBBECK BARK EXTRACTS

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The present study was undertaken to evaluate the in vitro antioxidant potential of the methanolic extract and an isolated compound from Albizia lebbeck bark. The compound was isolated from the methanolic extract using column chromatography, and its purity was confirmed by thin layer chromatography (TLC). Total phenolic content (TPC) of both the methanolic extract and the isolated compound was determined using the Folin-Ciocalteu method. The isolated compound exhibited a




ISBN: 978-81-980623-8-3

higher phenolic content (84.44 mg/g gallic acid equivalent, GAE) compared to the methanolic extract (80.25 mg/g GAE). The methanolic extract and the isolated compound were evaluated for their free radical scavenging potential using the 1,1-diphenyl-2-picrylhydrazyl (DPPH) assay and reducing power assay. At a concentration of 1000 µg/ml, the DPPH free radical scavenging activity was found to be 91.82% for the methanolic extract and 90.08% for the isolated compound, indicating strong antioxidant activity. The reducing power was measured as 2.799 nm for the isolated compound and 2.2148 nm for the methanolic extract. Preliminary phytochemical screening revealed the presence of alkaloids and polyphenolic compounds. These findings suggest that Albizia lebbeck bark could serve as a valuable source of phenolic antioxidants and may provide promising leads in the search for natural antioxidants from Indian medicinal plants for the management of diseases associated with free radical mediated damage.

**Keywords:** Albizia lebbeck, free radical scavenging activity, antioxidant activity.

**PT-313**

## HERBAL INNOVATIONS IN ORAL HYGIENE: FORMULATION AND EVALUATION OF A PLANT-BASED MOUTHWASH

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Oral health is a crucial component of overall well-being, yet it is frequently compromised by microbial infections such as dental caries, gingivitis, and candidiasis. Conventional mouthwashes, although effective, are often associated with side effects like tooth staining, altered taste, and mucosal irritation due to synthetic chemical agents. This study explores a novel plant-based mouthwash formulation incorporating traditional medicinal herbs as a safer, natural alternative. The formulation comprised hydroalcoholic extracts of Azadirachta indica (neem), Ocimum sanctum (tulsi), and Syzygium aromaticum (clove), selected for their well-documented antimicrobial properties. The mouthwash was evaluated for physicochemical parameters (pH, clarity, viscosity), organoleptic qualities, microbial load, and stability. Its antimicrobial activity was assessed in vitro using the agar well diffusion method against Streptococcus mutans, Lactobacillus acidophilus, and Candida albicans, and compared with a commercially available 0.2% chlorhexidine mouthwash. The polyherbal formulation was found to be physically stable, with acceptable sensory properties and no microbial contamination over a 30-day period. It exhibited significant antimicrobial activity, especially against S. mutans and C. albicans, with inhibition zones comparable to those of chlorhexidine. The plant-based mouthwash demonstrated promising potential as an effective and safer herbal alternative to conventional chemical oral rinses. These findings support further clinical evaluation and potential commercial development of the formulation for routine oral hygiene.

**Keywords:** Herbal Mouthwash, Antimicrobial Activity, Neem, Tulsi, Clove.

**PT-314**

## THERAPEUTIC POTENTIAL OF BRYONOPSIS LACINIOSA LEAF EXTRACTS AS ANTI-INFLAMMATORY AND ANALGESIC AGENTS

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The aqueous, methanol, and chloroform extracts of Bryonopsis laciniosa Linn. leaves (AEBL, MEBL, and CEBL, respectively) were evaluated for their anti-inflammatory and analgesic activities. All extracts (100 mg/kg each) significantly ($P < 0.05$) inhibited carrageenan-induced paw edema in rats and reduced nociception in the tail immersion test (50.0 ± 1.0°C) and acetic acid-induced writhing. Among the extracts, the methanol extract (MEBL) showed the highest inhibition of paw edema. In thermally induced nociception, both MEBL and CEBL exhibited high and comparable analgesic activity to that of acetylsalicylic acid (150 mg/kg). In chemically induced pain (acetic acid model), the methanolic extract of Bryonopsis laciniosa leaves (MEBL) exhibited the highest analgesic activity, which was comparable to that of acetylsalicylic acid (150 mg/kg). Therefore, it can be concluded that, in addition to its traditional use for bilious attacks and fevers with flatulence, the various extracts of Bryonopsis laciniosa leaves also possess significant anti-inflammatory and analgesic activities. Phytochemical analysis revealed that the methanolic extract contains several secondary metabolites, including steroids and polyphenolic compounds.

**Keywords:** Bryonopsis laciniosa Linn., Analgesic activity, Anti-inflammatory activity.

**PT-315**

## FORMULATION AND EVALUATION OF POLY HERBAL SYRUP

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Nature has been a source of medicinal agents for thousands of years, and an impressive number of modern drugs have been isolated from natural sources, particularly plants and with many based on their use in traditional medicine. By using medicinal chemistry and combinatorial chemical and biosynthetic technology, novel natural product needs will be optimized on the basis of their biological activities to yield effective chemotherapeutic and other bioactive agents.1 During the past decades, public interest in natural therapies, namely herbal medicine, has increased dramatically not only in developing countries but mainly in industrialized countries.Cough associated with the acute and chronic conditions is commonly in patients of all ages, common cause of cough are bacterial or viral infection on the upper respiratory tract, air pollution cigarette smoking, foreign body, asthma and eosinophilic bronchitis.. During the past decades, public interest in natural therapies, namely herbal medicine, has increased dramatically not only in developing countries but mainly in industrialized countries. In this research article poly herbal anti- tussive syrup formulation containing some of the natural drugs like Clove (Eugenia aromatica), Cinnamon (Cinnamomum cassia), Black pepper (Piper nigrum), Tulsi (Ocimum sanctum), peppermint (menthol) & Honey (as a base) were formulated and evaluated. These particulate combinations of natural drugs which have cough repellent property are made in form of syrup. These are nontoxic not harmful does not show any of side effect on human body and most superior than of OTC drugs.

**Keywords:** Antitussives, herbal medicines, formulations, Evaluation methods, Natural Substances

**PT-316**

## FORMULATION AND EVALUATION OF POLY HERBAL GEL

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The escalating prevalence of dermatophytic infections and the emergence of antifungal resistance have necessitated the development of novel, plant-based therapeutics with improved biocompatibility, safety, and efficacy. This study reports the formulation and comprehensive evaluation of a polyherbal topical gel incorporating extracts from Azadirachta indica (Neem), Ocimum sanctum (Tulsi), and Trigonella foenum-graecum (Fenugreek), aimed at enhancing antifungal action through synergistic phytochemical interactions. Using carbopol 940 as the gelling agent, a series of formulations (PHG1 to PHG8) with varying concentrations of the polyherbal extracts were prepared and assessed for their physicochemical attributes including pH, viscosity, homogeneity, spreadability, and extrudability. The antifungal efficacy was evaluated using the agar well diffusion method against Candida albicans and Aspergillus niger, benchmarked against standard antifungal agents.

**Keywords:** Polyherbal gel, Antifungal activity, Azadirachta indica, Ocimum sanctum, Trigonella foenum-graecum, Carbopol 940, Topical drug delivery, Herbal formulation

**PT-317**

## SYNTHESIS OF SILVER NANOPARTICLES OF Amaranthus Tricolor (L) AQUEOUS LEAF EXTRACT AND EVALUATION OF ANTIBACTERIAL ACTIVITY

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Silver nanoparticles (AgNPs) are widely recognised for their strong antibacterial properties; however, their toxicity to cells necessitates careful evaluation. This study aimed to synthesise silver nanoparticles using the aqueous leaf extract of Amaranthus tricolour (L.) (ATAE) and to investigate their antibacterial potential against selected Gram-positive and Gram-negative bacterial strains. Silver nanoparticles were synthesised using ATAE through a green synthesis approach. Preliminary phytochemical screening of ATAE was carried out to identify bioactive constituents. The antibacterial activity of the synthesised AgNPs was evaluated against Staphylococcus aureus MTCC 11949, Bacillus subtilis MTCC 10010, Escherichia coli MTCC 9721, and Pseudomonas aeruginosa MTCC 9800 at different concentrations of silver nanoparticles. Phytochemical analysis of ATAE revealed the presence of carbohydrates, amino acids, proteins, alkaloids, glycosides, steroids, flavonoids, tannins, and phenolic compounds, which potentially contributed to nanoparticle synthesis and stability. The synthesised AgNPs exhibited broad-spectrum antibacterial activity against all tested organisms. Among them, Pseudomonas aeruginosa MTCC 9800 showed the highest inhibition at all concentrations of silver nanoparticles.The aqueous leaf extract of Amaranthus tricolor (L) successfully mediated the synthesis of silver nanoparticles with potent antibacterial activity. These findings suggest that A. tricolor extract could be a promising natural source for green synthesis of AgNPs with potential applications in antimicrobial therapies.
**Keywords:** Silver nanoparticles, Amaranthus tricolor, phytochemicals, antibacterial activity, green synthesis, Pseudomonas aeruginosa.

**PT-318**

## HERBAL EMULGEL FORMULATION FOR MOSQUITO REPELLENCY: A NATURAL ALTERNATIVE APPROACH

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The increasing resistance and adverse effects associated with synthetic mosquito repellents have driven the search for safer, eco-friendly alternatives. This study focuses on the development of a herbal emulgel formulation incorporating natural plant-based oils and extracts known for their mosquito repellent properties. Emulgel, combining the advantages of both emulsions and gels, offers enhanced stability, ease of application, and controlled release of active compounds. Key herbal ingredients such as citronella, neem, eucalyptus, and lemongrass oils were selected for their proven efficacy against mosquitoes. The formulation was optimized for texture, spreadability, and skin compatibility, followed by evaluation of its repellent efficacy under laboratory conditions. Results demonstrated that the herbal emulgel provides effective mosquito repellency comparable to conventional repellents, with the added benefits of being biodegradable, non-toxic, and suitable for sensitive skin. This natural approach presents a promising alternative for mosquito bite prevention and vector-borne disease control.
**Keywords:** Herbal emulgel**,** Mosquito repellent**,** Natural alternative**,** Plant-based oils**,** Vector control

**PT-319**

## THE SAFE EDGE OF SCIENCE: NEUTRACEUTICALS VS DRUGS & HERBS

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The contemporary healthcare landscape is witnessing a transformative shift, where therapeutic innovation meets the demand for safety and sustainability. While synthetic drugs have been pivotal in combating acute and chronic diseases, their widespread use is frequently shadowed by adverse effects, systemic toxicity, and long-term complications. Herbal remedies, rooted in traditional medicine, offer a natural and biocompatible alternative but often suffer from issues like variability in active compounds, lack of standardization, and unpredictable pharmacokinetics. Emerging as a bridge between nutrition and therapeutics, nutraceuticals represent a novel paradigm that harmonizes efficacy with safety. Derived from dietary sources, nutraceuticals provide bioactive compounds capable of modulating metabolic, immunological, and cellular pathways simultaneously. Unlike conventional drugs targeting isolated mechanisms, nutraceuticals offer a holistic and preventive approach, minimizing adverse effects while enhancing overall wellness. Their compatibility with human physiology positions them as a superior adjunct or alternative to synthetic and herbal interventions. Recent advances in phytochemistry, biotechnology, and nanodelivery systems have further refined the precision, bioavailability, and therapeutic potency of nutraceuticals. Clinical studies now demonstrate their effectiveness in managing chronic diseases, neuroprotection, cardiovascular health, and metabolic regulation. Beyond therapeutic potential, nutraceuticals align with eco-conscious and patient-centric healthcare trends, emphasizing preventive care and long-term safety over symptom suppression alone. Thus, nutraceuticals embody the “safe edge of science”, integrating the ancient wisdom of natural compounds with modern research rigor. They transcend the limitations of both synthetic medications and herbal therapies, redefining the paradigm of contemporary healthcare. By prioritizing safety, holistic efficacy, and innovation, nutraceuticals are not only a promising alternative but also a forward-thinking strategy in preventive and therapeutic medicine.
**Keywords:** Nutraceuticals, synthetic drugs, herbal medicines, safety, innovation, preventive healthcare, holistic therapy

**PT-320**

## EXPLORATION AND EVALUATION OF SECONDARY METABOLITES FROM PACHYSTACHYS COCCINIA AUBL: PHYTOCHEMICAL PROFILING, GC-MS ANALYSIS AND MOLECULAR DOCKING STUDIES

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The present study focuses on the phytochemical screening and GC-MS characterization and molecular docking of bioactive components present in various extracts of aerial parts of Pachystachys coccinia Aubl (Family-Acanthaceae). Powdered drug was charged into soxhlet apparatus and extraction was conducted using solvents of increasing polarity, namely petroleum ether, chloroform, ethyl acetate, ethanol, and water. Phytochemical screening of various extracts was performed to identify the presence of various secondary metabolites such as alkaloids, glycosides, phenolics, flavonoids, carbohydrates, proteins, triterpenoids, phytosterols and tannins. Both qualitative and quantitative phytochemical screening shows that chloroform extracts having plenty of secondary metabolites. The chemical composition of the extract was analyzed using Gas Chromatography-Mass Spectrometry (GC-MS) revealing the presence of thirteen bioactive compounds with 2,4-Di-tert-butylphenol, Cetene, Tetradecane, Heptadecenal, Dodecane, Hexadecane, Octadecane, Tetradecene, Behenic alcohol, Stigmasterol, Phytol, Heneicosanol. Molecular docking result indicated that 2,4-Di-tert-butylphenol bind effectively to the active site residues of Aspulvinone dimethylallyl transferase inhibitor (PDBID-7dz9) & Ubiquinol-cytochrome-c reductase inhibitor (PDBID-1p84) with docking score of -6.472kcal/mol, -5.558kcal/mol respectively. The presence of these bioactive constituents in the plant extract may authenticate the scientific evidences for various pharmacological activities and therapeutic potentiality of the plant.
**Keywords:** Pachystachys coccinia Aubl., Acanthaceae, phytochemical analysis, GC-MS Analysis, Molecular docking

**PT-321**

## GAS CHROMATOGRAPHIC ANALYSIS AND PHYTOCHEMICAL PROFILING OF METHANOLIC EXTRACT OF CUCUMIS MELO LINN FOR POTENTIAL PHARMACOLOGICAL APPLICATIONS

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ISBN: 978-81-980623-8-3

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Cucumis melo Linn (muskmelon), belonging to the family Cucurbitaceae, is a widely cultivated plant with significant nutritional and medicinal value. Traditionally, various parts of the plant have been used for their nephroprotective, anti-inflammatory, antioxidant, diuretic, antimicrobial, and antihyperlipidemic properties. The present study focused on the preparation of methanolic extract of C. melo (MECM) fruit and its phytochemical profiling using Gas Chromatography (GC). Preliminary phytochemical screening confirmed the presence of several bioactive compounds, including flavonoids, phenolic compounds, alkaloids, and triterpenoids. The GC analysis of the methanolic extract of Cucumis melo (MECM) revealed a wide range of bioactive phytoconstituents, including fatty acids, sterols, phenolic compounds, terpenoids, and cucurbitacins. Notably, several compounds were identified as precursors for the biosynthesis of essential vitamins, particularly vitamins E (tocopherols) and K1 (phylloquinone). Vitamin E serves as a potent lipid-soluble antioxidant that protects cell membranes from oxidative damage, while vitamin K1 plays a vital role in blood clotting, bone metabolism, and cardiovascular health. The presence of these compounds suggests that C. melo may have significant nutraceutical potential and could serve as a natural dietary source of essential micronutrients. Additionally, the detection of phenolic compounds, flavonoids, terpenoids, and cucurbitacins supports the plant's traditional use in Ayurveda and Unani medicine. These compounds are associated with strong antioxidant, anti-inflammatory, and cytoprotective properties, which may help in managing oxidative stress-related disorders such as diabetes, cardiovascular diseases, and cancer. The study highlights C. melo as a promising source of pharmacologically active compounds for developing herbal drugs.

**Keywords:** Cucumis melo Linn, Gas Chromatography (GC), phytochemicals, antioxidant, herbal medicine, bioactive compounds.

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## NATURE'S WHISPER VS. CHEMISTRY'S NOISE: WHY HERBS HEALS SAFER

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In the evolving landscape of healthcare, patient safety and therapeutic efficacy remain paramount concerns. Conventional synthetic medications have undoubtedly transformed modern medicine with their targeted pharmacological actions and rapid symptom relief. However, their widespread use is often accompanied by a spectrum of adverse effects, ranging from mild intolerance and allergic reactions to serious systemic toxicity. Moreover, the long-term implications of synthetic drugs, including organ stress and drug interactions, continue to challenge clinicians and patients alike. In contrast, herbal medicines, rooted in centuries of traditional practice, offer a safer and more harmonious approach to healing. Derived from natural plant sources, these remedies contain a rich array of bioactive compounds that work in synergy to restore physiological balance. Unlike synthetic drugs that typically target a single biochemical pathway, herbs exert multifaceted effects on metabolic, immunological, and cellular functions, thereby reducing the risk of unintended side effects. Their biocompatibility and gradual mode of action make them particularly suitable for long-term health management, preventive care, and chronic disease support. Recent scientific investigations have validated many traditional claims about herbal efficacy, revealing their potent antioxidant, anti-inflammatory, and immunomodulatory properties. Standardization techniques, phytochemical profiling, and quality control measures have further enhanced their reliability, bridging the gap between ancient wisdom and modern evidence-based medicine. Herbs exemplify a preventive and holistic paradigm, emphasizing wellness rather than mere symptom suppression. Ultimately, the safety profile, therapeutic versatility, and natural origin of herbal medicines position them as a viable and preferable alternative to synthetic drugs. They embody what can be described as "Nature's Whisper", offering subtle yet effective healing without the harsh consequences often associated with chemical interventions. This underscores the importance of integrating herbal therapies into modern healthcare frameworks, promoting a balanced, patient-centered approach that prioritizes safety, efficacy, and sustainability.

**Keywords:** Herbal medicines, synthetic drugs, safety, holistic healing, therapeutic efficacy, natural remedies.

**PT-323**

## ANTITUBERCULAR POTENTIAL OF EXTRACTS FROM GLYCYRRHIZA GLABRA, OPLIMINOUS BURMANII, PANDANUS AMARYLLIFOLIUS, CLINACANTHUS NUTANS, AND AERVA LANATA: PHYTOCHEMICAL CHARACTERIZATION AND BIOLOGICAL EVALUATION

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Tuberculosis (TB), caused by Mycobacterium tuberculosis, remains a major global health challenge, necessitating the search for new, effective therapeutic candidates. This study examines extracts from five medicinal plants: Glycyrrhiza glabra (liquorice), Opliminous burmanii, Pandanus amaryllifolius (Ramba), Clinacanthus nutans, and Aerva lanata (Mountain Knotgrass) to evaluate their antitubercular potential. Phytochemical constituents of the extracts were characterized using NMR, IR, and mass spectrometry to identify major bioactive components. The extracts were tested in vitro against M. tuberculosis H37Rv using a resazurin microtiter assay. Several extracts showed significant inhibitory activity, with minimum inhibitory concentrations (MICs) approaching those of standard first-line anti-TB drugs. Molecular docking studies further supported these findings, revealing favorable binding interactions of key phytochemicals with essential mycobacterial targets. Notably, extract combinations, particularly those of P. amaryllifolius and C. nutans, demonstrated synergistic effects consistent with their known antioxidant and antimicrobial activities. The results suggest that plant extracts, either alone or in combination, possess promising antimycobacterial properties and warrant further investigation through in vivo efficacy and pharmacokinetic studies for potential development as complementary anti-TB therapies.

**Keywords:** Glycyrrhiza glabra; Opliminous burmanii; Pandanus amaryllifolius; Clinacanthus nutans; Aerva lanata; tuberculosis; Mycobacterium tuberculosis; plant extracts; antimycobacterial activity; phytochemical characterization; natural product synergy; molecular docking

**PT-324**

## THERAPEUTIC POTENTIAL AND PHARMACEUTICAL DEVELOPMENT OF MULTITARGETED POLYPHENOLIC COMPOUND ETHYL GALLATE

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Ethyl gallate, a derivative of gallic acid, having significant characteristics including anti-inflammatory, antioxidant & antiviral, positioning it as potential candidate for therapeutic applications across several different illnesses, such as inflammatory condition, cancer, and viral illnesses like influenza, herpes simplex. Preclinical studies have shown that it has the capacity to modulate inflammation and oxidative stress, both of them plays significant roles in a variety of pathological diseases. The versatility of ethyl gallate in addressing a lot of disease pathways demonstrates its promise in integrated therapeutic methods. However, despite promising in vitro and animal model results, its clinical use remains unknown. The lack of human clinical studies leaves a significant vacuum in our findings, particularly of its safety, efficacy, and comprehensive pharmacological mechanisms. Future study is required to close this gap and establish the therapeutic value of ethyl gallate.

**Keywords:** Ethyl gallate, Anti-inflammatory, Cancer, Antiviral, Integrated therapeutic methods




ISBN: 978-81-980623-8-3

**PT-325**

**SASYA: PERSONALISED HERBAL CARE, REDEFINED**

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The current invention is concerned with a Personalized Herbal Care Platform which fuses conventional herbal preparations with contemporary digital technologies such as Artificial Intelligence (AI), Internet of Things (IoT), and an Interactive Sensory Simulator to offer long-term and personalized personal care solutions. The system uses AI-based profiling to examine several parameters like skin type, hair condition, lifestyle, and environmental factors. It then uses this profiling to create semi-personalized herbal formulas for skin, hair, and wellness. These formulations are created from locally available medicinal herbs, thus providing purity, safety, and batch-to-batch consistency, as well as facilitating fair-trade and farmer-friendly sourcing models. A unique feature of the invention is the Interactive Sensory Simulator, functionally connected to the AI database. The simulator allows users to sample product effectiveness and sensory properties before they buy. In particular, it offers: (i) visual simulation of anticipated improvements by means of AR-based time-lapse projections, (ii) tactile simulation of texture of the formulation via haptic feedback, and (iii) fragrance simulation by means of AI-based aroma visualization. This convergence enables consumers to make informed choices and builds trust by offering a scientific, multi-modal representation of product performance. The invention also includes mechanisms for sustainability in the form of biodegradable, zero-waste packaging that is refillable and reusable. IoT-based monitoring facilitates tracking of product use, expiration, and waste minimization through a circular distribution system. Through a combination of plant-based intelligence and state-of-the-art personalization technologies, this innovation overcomes generic formulation limitations, unsustainable packaging, and dependence on synthetics, to create a future-proof model for customized herbal wellness solutions.

**Keywords:** Herbal Care Platform, AI-based Profiling, Interactive Sensory Simulator, IoT-enabled Monitoring and Sustainable Packaging.

**PT-326**

**ADVANCES IN NUTRACEUTICAL-BASED STRATEGIES FOR THE MANAGEMENT OF DIABETES MELLITUS**

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In recent years, the use of nutraceuticals, nutritional supplements and natural remedies has increased significantly worldwide in healthcare. Diabetes mellitus, particularly type 2 diabetes, remains a major global health concern, affecting over 500 million individuals worldwide. A chronic metabolic disease, diabetes mellitus is characterised by ongoing hyperglycemia and developing consequences that impact several organ systems. Bioactive substances obtained from food, known as nutraceuticals, have shown great promise in the treatment of diabetes because of their diverse range of therapeutic applications. Omega-3 fatty acids, polyphenols, flavonoids, alkaloids, and micronutrients all exhibit antidiabetic properties through a variety of pathways, such as enhancing insulin sensitivity, maintaining pancreatic β-cell function, reducing oxidative stress, altering lipid metabolism, and regulating gut microbiota. It has also been demonstrated that a number of nutraceuticals can lower the risk of problems related to diabetes, including cardiovascular dysfunction, retinopathy, nephropathy and neuropathy. Recent developments in formulation science, like synergistic nutraceutical combinations and nanoencapsulation, have improved bioavailability and clinical efficacy even more. Clinical and preclinical research is gradually confirming their function as supplements to traditional treatment, providing more sustainable, affordable, and safe options for long-term care. Standardisation, regulatory clarity, and extensive clinical validation are still major obstacles, nevertheless. The present state of nutraceutical-based diabetic mellitus therapies is reviewed, incorporating molecular insights, treatment outcomes, and future views. There is great potential for nutraceuticals to advance patient-centered, holistic diabetic care by bridging the gap between medication and nutrition.

**Keywords:** Nutraceuticals, Diabetes mellitus, polyphenols, cardiovascular disease, kidney damage.

**PT-327**

**PHYTOCHEMICAL SCREENING AND IN VITRO ASSESSMENT OF CARDIO-PROTECTIVE POTENTIAL OF BUNCHOSIA ARGENTEA FRUIT EXTRACT USING H9C2 CARDIAC CELL LINE**

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To investigate the phytochemical composition, antioxidant potential, and cardioprotective effects of Bunchosia argentea fruit extract using the H9c2 cardiomyocyte cell line. The extract was prepared using hydroalcoholic maceration and characterized by qualitative and quantitative analyses, including HPTLC and GC–MS. Antioxidant activity was assessed using the DPPH radical scavenging assay. Cytoprotective effects were evaluated in vitro in H9c2 cells subjected to oxidative stress, with cell viability determined by the MTT assay. The extract, rich in flavonoid fractions such as quercetin, phenols, and other bioactives, exhibited strong antioxidant activity and dose-dependent cytoprotection. Treatment significantly improved cell viability under oxidative stress and confirmed the cardioprotective potential of the extract. Bunchosia argentea fruit extract demonstrates promising antioxidant and cardioprotective effects in vitro, supporting its potential as a natural therapeutic candidate for the prevention of oxidative stress–induced cardiac injury.

**Keywords:** Bunchosia argentea, cardioprotection, hydroalcoholic extract, antioxidant, isoproterenol, flavonoids.

**PT-328**

**TRADITIONAL MEDICINAL PLANT DELEK AIR TREE.: GC-MS ANALYSIS, CHEMICAL EXAMINATION, ANTIDIABETIC, AND ANTI OBESITY ACTIVITIES**

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Delek air tree is a traditional medicinal plant valued for its diverse ethno pharmacological uses, particularly in the treatment of metabolic and inflammatory disorders. In the present study, the methanol extract of the whole plant was subjected to gas chromatography–mass spectrometry (GC–MS) analysis, which revealed the presence of 17 major known phyto constituents. Subsequent chromatographic fractionation of the extract led to the isolation of six compounds.To the best of our knowledge, this is the first report of these compounds from Delek air tree.Beyond chemical profiling, the methanol extract was evaluated for its antidiabetic and antiobesity potential through in vitro enzyme inhibition assays. The extract demonstrated significant inhibitory activity against α-amylase and α-glucosidase, enzymes crucial in carbohydrate metabolism, thereby indicating its potential to regulate postprandial hyperglycemia. Furthermore, notable inhibition of pancreatic lipase was observed, suggesting promising antiobesity activity by limiting dietary fat absorption. These results not only validate the traditional claims of Delek air tree but also provide a pharmacological basis for its application in managing metabolic disorders such as diabetes and obesity. Overall, this study contributes to the phytochemical characterization of Delek air tree and highlights its therapeutic potential as a source of bioactive compounds with dual antidiabetic and antiobesity properties. Future investigations focusing on bioassay-guided isolation and mechanistic studies are warranted to further explore its medicinal value.

**Keywords:** Delek Air Tree, GC-MS Analysis, Antiobesity, Antidiabetic

**PT-329**

**HARNESSING THE POWER OF GRAPE SEED OIL AND LOTUS PETAL EXTRACT IN FACE SERUM INNOVATION**

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The present investigation aimed to formulate and evaluate a polyherbal cosmetic face serum utilizing extracts of Nelumbo nucifera and Vitis vinifera L., selected for their antioxidant potency and skin-brightening efficacy. The extracts were incorporated into a serum base with to obtain a stable formulation. Preliminary phytochemical screening confirmed the presence of bioactive constituents including fatty acids, vitamins, phytosterols, polyphenols, flavonoids, tannins, alkaloids, and essential minerals. These phytoconstituents are recognized for their role in mitigating oxidative stress and enhancing skin radiance. The study further emphasized the determination of antioxidant activity and brightening potential of the plant extracts. The formulated serum exhibited promising results, suggesting that the synergistic effects of Nelumbo nucifera and Vitis vinifera L. can be harnessed in the development of effective antioxidant-rich, skin-brightening cosmetic formulations. The findings highlight the potential application of this polyherbal serum in promoting skin health and beauty through natural plant-based actives.

**Keywords:** Nelumbo nucifera, Vitis vinifera L, Anti- oxidant, Face serum.

**PT-330**

**FROM OCEANS TO FIELDS: MARINE MACROALGAE APPLICATIONS AND ABIOTIC STRESS-INDUCED ANTHOCYANIN SYNTHESIS IN LETTUCE**

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Marine macroalgae such as Ulva clathrata are increasingly recognized as sustainable bio-stimulants that can enhance plant growth, physiology, and nutritional quality, while abiotic stresses such as salinity, acidity, drought, waterlogging, and pesticide exposure strongly influence secondary metabolite production like anthocyanins in lettuce (Lactuca sativa). In this study, seaweed extracts were prepared and applied as foliar sprays and soil drenches in both soil-based and hydroponic systems, while Red Rosso lettuce seedlings were subjected to graded abiotic stress treatments under controlled conditions. Growth parameters including shoot and root length, leaf number, biomass, and physiological markers (chlorophyll, protein, phenolics, flavonoids, and antioxidant activity) were measured alongside spectrophotometric quantification of anthocyanin content. Results revealed that macroalgae treatments significantly enhanced germination, vegetative vigor, biomass accumulation, and biochemical composition in both cultivation systems, with hydroponics showing slightly superior responses. Conversely, abiotic stresses induced variable but often elevated anthocyanin accumulation, particularly under moderate salinity, acidity, and drought, highlighting their role in oxidative stress mitigation. The integration of seaweed-based bio-inputs with insights into stress-induced secondary metabolite synthesis demonstrates a dual approach for improving lettuce productivity and nutritional value, offering a sustainable strategy for modern agriculture.

**Keywords:** Marine macroalgae, Biostimulant, Abiotic stress, Anthocyanin accumulation, Plant Tissue Culture

**PT-331**

**FORMULATION AND EVALUATION OF HERBAL TOOTH-FOAMING TABLETS AS AN ECO-FRIENDLY ALTERNATIVE**

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Oral hygiene is integral to overall health, and there is increasing interest in natural, eco-friendly alternatives to conventional toothpaste. Traditional toothpaste tubes, composed of polymers and metal coatings, pose serious environmental challenges due to poor recyclability and prolonged degradation times, often exceeding 500 years. This study aimed to formulate and evaluate herbal tooth-foaming tablets as a sustainable substitute for toothpaste, addressing both oral health and environmental concerns. Three batches of herbal tooth-foaming tablets were prepared using readily available herbal ingredients with recognized medicinal properties in dentistry. The formulations were assessed for physicochemical characteristics, stability, effectiveness in plaque removal, and overall sensory attributes. Variants with different ingredient compositions were compared to ensure suitability across consumer preferences Herbal tooth-foaming tablets demonstrated several advantages over conventional toothpaste. They were lightweight, compact, spill-proof, and packaged in minimal or plastic-free materials, thereby reducing environmental burden. The tablets showed strong efficacy in plaque reduction, elimination of bad breath, and imparted a refreshing sensation, contributing to improved oral cleanliness. Among the formulations tested, F3 was identified as optimal due to its superior physicochemical properties and overall performance. Herbal tooth-foaming tablets represent a promising eco-friendly alternative to toothpaste. By combining oral health benefits with environmental sustainability, they offer a viable solution to reduce plastic waste while meeting consumer demand for natural, holistic oral care. Further clinical validation could establish their role as a revolutionary oral hygiene product.

**Keywords:** Herbal Tooth foaming Tablets, oral hygiene, Eco friendly, Pre and post compression evaluation.

**PT-332**

**ASSESSMENT OF GENETIC SIMILARITY AMONG MULBERRY ACCESSION BY A RAPD MARKER.**

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Mulberry (Morus spp.), the pivotal crop for sericulture, faces major challenges in genetic improvement due to its outbreeding nature and high heterozygosity. Root traits are critical for drought resilience and productive cultivation, especially under rain-fed conditions. This study addresses the need for efficient screening and genetic mapping by employing RAPD markers for analysing the genetic diversity and inheritance of root traits in mulberry. A contrasting parental set – Dudhi White (high root type) and UP (poor root type) – was selected from field and germplasm screening. A mapping population (F1 hybrids) of 200 progeny was developed and analysed. Genomic DNA was isolated and quantified, followed by PCR amplification using selected RAPD primers (e.g., OPAC-17). Detailed procedures for DNA extraction, amplification cycles, and marker scoring are described, ensuring reproducibility. Chi-square analysis was utilized to test segregation ratios and identify polymorphic markers. Comparative morphological profiling indicated distinct variability in root and leaf traits between parental lines. RAPD profiling of 200 progeny revealed clear polymorphism, confirming segregation of markers for mapping root traits. Six polymorphic RAPD markers amplified among the progeny with OPAC-17, ranging from 600 to 2300 bp, were evaluated for their segregation pattern. Four markers showed non-significant deviation from the expected 1:1 ratio, while the remaining markers deviated significantly. DNA profiles generated (refer to Figures 2–4) demonstrate robust marker segregation and polymorphism. RAPD and ISSR markers proved simple, reliable, and cost-effective for mapping in this perennial crop, in contrast to more laborious and expensive RFLP techniques. The integration of RAPD marker analysis in mulberry germplasm enables the identification of genetically diverse root traits, facilitating marker-assisted breeding for drought resilience. The developed marker profiles and mapping strategies provide a framework for future genetic improvement, aiming to enhance root architecture and stress tolerance in mulberry.

**Keywords:** Mulberry, Morus spp., root traits, RAPD markers, genetic mapping, marker-assisted selection, drought resilience, sericulture

**PT-333**

**EVALUATION OF ANTI THROMBOTIC ACTIVITY OF CHRYSANTHEMUM INDICUM FLOWER- AN IN VITRO STUDY**

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Cardiovascular diseases involving deep vein thrombosis, stroke, hypertension, and heart attacks are the leading causes of morbidity and mortality worldwide. Synthetic drugs used to treat these disorders often




ISBN: 978-81-980623-8-3

cause serious adverse effects. The discovery of natural products for treating these diseases can reduce side effects. Inhibiting platelet aggregation prevents thrombus formation, which is the most common mechanism to assess the potential efficacy of anti-thrombotic agents. Therefore, the present study aimed to evaluate the in vitro anti-thrombotic activity of the hydroalcoholic extract of Chrysanthemum indicum flowers. This study assessed the anti-thrombotic activity of the extract using clotting time and CaCl2-induced clotting time assays. The inhibitory activity of the Chrysanthemum indicum flower extract was comparable to that of the standard drug. The percentage inhibition was attributed to the presence of flavonoids, phenols, and carotenoids. The IC50 values of the extract, determined by clotting time and CaCl2-induced assays, were 41.96 and 49.75 µg/ml, respectively, while the IC50 of the standard was 24.36 µg/ml.

**Keywords:** In vitro, Chrysanthemum indicum flower, anti-thrombotic activity, clottingtime.

**PT-334**

## ALLIUM CEPA EXTRACT: A NOVEL TREATMENT FOR ALOPECIA AREATA

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Alopecia areata is an autoimmune disorder characterized by non-scarring hair loss, often leading to psychological distress in affected individuals. Current treatment options, including corticosteroids and immunotherapies, have variable efficacy and potential side effects. This study explores the therapeutic potential of Allium cepa (onion) extract as a novel, natural treatment for alopecia areata. Allium cepa is rich in sulfur compounds, flavonoids, and antioxidants, known for their anti-inflammatory, A randomized, double-blind, placebo-controlled clinical trial was conducted involving patients diagnosed with mild to moderate alopecia areata. Participants were divided into two groups: one received topical Allium cepa extract, while the other was treated with a placebo solution, both applied twice daily over an 8-week period. Efficacy was assessed through clinical evaluation, digital photography, and patient self-reports.Results showed that the Allium cepa-treated group exhibited significantly greater hair regrowth compared to the placebo group, with improvements observed as early as four weeks into treatment. Additionally, patients reported enhanced scalp condition and minimal adverse reactions, mainly limited to mild irritation in a few cases.The findings suggest that Allium cepa extract can serve as an effective and well-tolerated alternative therapy for alopecia areata. Its natural composition and favorable safety profile make it a promising candidate for broader clinical application. Further studies with larger sample sizes and longer follow-up periods are recommended to validate these results and establish standardized treatment protocols.

**Keywords:** Alopecia areata, Allium cepa, natural treatment, randomized controlled trial, alternative therapy, hair regrowth, topical application, anti-inflammatory, antioxidants, sulfur compounds.

**PT-335**

## EVALUATION OF IN-VITRO ANTI-INFLAMMATORY AND ANTIOXIDANT ACTIVITIES OF ETHANOLIC EXTRACT OF HIBISCUS CANNABINUS ROOTS

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Hibiscus cannabinus L., known as kenaf, has been used in traditional medicine for a long time to treat inflammatory and oxidative stress-related conditions. This study introduces a unique examination of the in vitro anti-inflammatory and antioxidant properties of its root ethanolic extract through protein denaturation and free-radical scavenging assays. The extract was prepared using optimized maceration and then tested for denaturation of bovine serum albumin (BSA) and 1,1-diphenyl-2-picrylhydrazyl (DPPH) at five different concentrations (50–500 µg/mL). In the BSA assay, the extract stopped proteins from denaturing in a way that depended on the concentration. At 500 µg/mL, the extract stopped proteins from denaturing by 78.6%, which was better than aspirin's 65.4% at the same concentration. Spectrophotometric analysis revealed an IC50 of 212.3 µg/mL for anti-inflammatory activity, indicating enhanced efficacy relative to the standard. The DPPH assay showed strong free-radical scavenging, with a maximum inhibition of 91.2% at 500 µg/mL and an IC50 of 84.7 µg/mL, which is very close to the IC50 of ascorbic acid (72.5 µg/mL). Using high-performance liquid chromatography to do phytochemical profiling, we found high levels of quercetin, kaempferol, and chlorogenic acid, which were strongly linked to the bioactivities we saw. Fourier transform infrared spectroscopy indicated hydrogen bonding and conjugated systems typical of polyphenolic structures. Multivariate analysis validated substantial positive correlations between flavonoid content and bioactivity metrics ($r > 0.89$, $p < 0.01$). The extract's dual-action bioactivity and low cytotoxicity in RAW 264.7 macrophages show that it could be a safe, plant-based treatment for inflammatory and oxidative stress disorders. These results provide a foundation for in vivo validation and the development of formulations of kenaf root–derived phytopharmaceuticals aimed at chronic inflammation and associated disorders.

**Keywords:** Hibiscus cannabinus, Kenaf, Anti-inflammatory, Antioxidant, Bovine serum albumin (BSA) assay, DPPH assay, Oxidative stress

**PT-336**

## EVALUATION OF ANTIGOUT POTENTIAL ON TRIGONELLAFOENUM-GRAECUM MUCILAGE

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Gout is a type of arthritis caused by the buildup of uric acid crystals in the joints, leading to inflammation, pain, and swelling. Trigeonellafoenum- graecum is a plant that commonly used both as an herb and a spice which belongs to Fabaceae family. They have slight bitter taste and strong aroma. The seeds are small golden-brown seeds, hard, angular in shape. The mucilage has a viscous, gel like texture and become more thicker and more gelatinous when they are soaked in water. They are used for digestive health, weight management, blood sugar control etc. Here we use the mucilage of Trigonellafoenum-graecum for the Pharmacological and Phytochemical analysis. The phytoconstituents present in mucilage is alkaloids, fiber, protein but rich in flavonoids, polyphenols, triterpenoids. The Trigonellafoenum-graecum mucilage having antigout property. The assay of xanthine oxidase reductase inhibitors has been conducted and all the above. Further studies reveal the therapeutic value of Trigonellafoenum-graecum mucilage in future.

**Keywords:** Trigonellafoenum-graecum, Phytochemical screening, Physicochemical, Antigout

**PT-337**

## EVALUATION OF ANTIDIABETIC AND ANTIOXIDANT ACTIVITIES OF METHANOLIC EXTRACT OF MARSILEA MINUTA L.

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Marsilea minuta L. (Marsileaceae), a semi-aquatic fern found in tropical and subtropical areas of India, has great potential as a dual-action phytomedicine for treating diabetes and oxidative stress. This study is the first to fully test the methanolic extract from the whole M. minuta plant for its combined antidiabetic and antioxidant effects using new in vitro bioassay methods. The methanolic extract showed very strong α-amylase inhibitory activity, with IC50 values that were similar to those of standard acarbose. This means that it was able to stop a carbohydrate-metabolizing enzyme from working, which is important for controlling blood sugar after eating. Advanced spectrophotometric analysis demonstrated substantial antioxidant capacity via the DPPH radical scavenging assay, with the extract exhibiting enhanced free radical neutralization potential across concentration gradients (0.2-1.0 mg/mL) when compared to the ascorbic acid standard. The dose-response relationship showed a linear connection between the concentration of




ISBN: 978-81-980623-8-3

the extract and its biological activity. At the best concentrations, the extract inhibited α-amylase by 89.4% and scavenged DPPH by 92.1%, which was better than synthetic antioxidants. Phytochemical profiling indicates the existence of bioactive compounds such as flavonoids, phenolic acids, and terpenoids that contribute to the identified dual therapeutic effects. The methanolic extraction protocol, optimized for maximum recovery of bioactive compounds, signifies an innovative method for exploiting the medicinal potential of M. minuta. This important study shows that M. minuta is a promising natural treatment for diabetes that also protects against oxidative stress, which is a big step up from synthetic drugs that only target one thing. The findings scientifically substantiate traditional applications and facilitate the development of standardized phytopharmaceutical formulations aimed at metabolic disorders associated with oxidative stress.

**Keywords:** Marsilea minuta, Antidiabetic, Antioxidant, α-amylase inhibition, DPPH assay, Phytotherapy, Metabolic disorders

**PT-338**

## PREPARATION AND EVALUATION OF HERBAL CREAM FOR DIAPER RASHES

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Diaper rash is a common and uncomfortable skin condition often found in infants and toddlers, representing about 10–20% of all skin-related complaints seen by paediatricians. This rash develops when the skin covered by the diaper remains exposed to moisture, friction, and irritating substances for a long time, which weakens the outermost layer of skin and makes it easier for harmful agents to enter, resulting in redness and soreness. This study aimed to develop a natural cream using hazelnut and wheat germ oils, selected for their well-known skin-nourishing and protective qualities. Once these oils and necessary ingredients were obtained, multiple batches of cream were formulated and examined for properties such as pH balance, texture, ease of application and uniformity without separation. The creams maintained a mild pH near 6, spread easily over the skin, and showed optimal thickness that changed appropriately with applied pressure, ensuring user-friendly application and protection. Stability tests conducted over three months under warm, humid environments confirmed no alterations in the cream's appearance or texture. Additionally, antimicrobial testing against bacteria and fungi commonly associated with diaper rash—including Pseudomonas aeruginosa, Candida albicans, Staphylococcus aureus, and Escherichia coli—demonstrated the cream's ability to inhibit these microorganisms. These findings suggest that the cream formulated with hazelnut and wheat germ oils offers a safe and effective solution to soothe, protect, and heal diaper rash by hydrating the skin, reinforcing its natural barrier, reducing inflammation, and combating infection, all in a single, convenient product.

**Keywords:** Diaper rash, Herbal cream, Antimicrobial Activity, Stability, Healing oils

**PT-339**

## IN VITRO ANTHELMINTIC ACTIVITY OF AERIAL PARTS AND FLOWERS OF MELASTOMA MALABATHRICUM

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Melastoma malabathricum is a traditionally important plant which has proven therapeutic activities such as ant diabetic, antiulcer, wound healing, anti-inflammatory, antimicrobial, antiviral and gastro protective properties. Current study focused to investigate the in vitro anthelmintic activity of ethanolic and aqueous extracts of aerial parts and flowers of Melastoma malabathricum on Indian earth worms (Pheretima posthuma). The earth worms were classified into 6 groups with 6 worms in each group. The anthelmintic activity of ethanolic and aqueous extracts of both aerial parts and flowers of Melastoma malabathricum at two concentrations such as 25mg/ml and 50mg/ml was investigated by assessing the time of paralysis and time of death of the earth worms. Standard used is piperazine citrate and 2% gum acacia as the standard. All the four extracts (MMAE, MMAA, MMFE, MMFA) depicted significant anthelmintic activity ($p<0.001$) in a dose dependent manner and the activity was comparable to that of the standard drug piperazine citrate. The anthelmintic activity of ethanolic and aqueous extracts of aerial parts and flowers of Melastoma malabathricum is demonstrated for the first time.

**Keywords:** Anthelmintic, Melastoma malabathricum, Piperazine citrate, Indian earth worms

**PT-340**

## ANTIMICROBIAL ACTIVITY OF CLITORIA TERNATEA (L.) EXTRACTS

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The antimicrobial activity of methanolic extracts from different parts of Clitoria ternatea L. (leaves, stems, flowers, seeds, and roots) was evaluated against a panel of pathogenic microorganisms. Antimicrobial efficacy was assessed using agar well diffusion and broth microdilution methods against 12 bacterial strains (Escherichia coli, Pseudomonas aeruginosa, Klebsiella pneumoniae, Staphylococcus aureus, Bacillus subtilis, Salmonella typhi, Proteus mirabilis, Enterobacter aerogenes, and others), two yeasts (Candida albicans, Saccharomyces cerevisiae), and three filamentous fungi (Aspergillus niger, Aspergillus flavus, Penicillium chrysogenum). The leaf and root extracts demonstrated the highest antimicrobial activity ($p < 0.05$), with minimum inhibitory concentrations (MICs) ranging from 0.3 to 100.0 mg/mL. These extracts also exhibited corresponding bactericidal (MBC) and fungicidal (MFC) activity, confirming their potential for broad-spectrum microbial inhibition. Phytochemical screening revealed the presence of flavonoids, tannins, alkaloids, saponins, cardiac glycosides, steroids, terpenoids, and volatile oils, while anthraquinones and phlobatannins were absent. The antimicrobial effects are likely attributable to the synergistic action of these phytochemicals, particularly flavonoids and alkaloids, known for their ability to disrupt microbial membranes and inhibit key enzymatic pathways. The results highlight Clitoria ternatea, especially its leaves and roots, as promising sources of bioactive compounds with significant antimicrobial potential. These findings support its ethnomedicinal use and justify further research focused on compound isolation, mechanism of action, and in vivo validation for potential applications in pharmaceutical and food preservation industries.

**Keywords:** Clitoria ternatea, antimicrobial, Phytochemical screening

**PT-341**

## PRELIMINARY PHARMACOGNOSTICAL PHYTOCHEMICAL AND PHARMACOLOGICAL SCREENING OF THE BARK OF CASSIA FISTULA L.

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Cassia fistula L. (Fabaceae) is commonly known as golden shower tree. It is highly demanded in herbal medicine due to its extensive medical, pharmacological, ethnomedicinal and conventional properties and uses such as antioxidant, antimicrobial, antifungal, antidiabetic and anti-inflammatory activity. The prime objective of the study is to assess the phytochemical characterization of Cassia fistula L. bark for their biological properties. The study evaluates the preliminary phytochemical analysis, invitro antioxidant activity and invitro anti-inflammatory activities. The antioxidant activity was studied by using DPPH free radical scavenging assay method and the anti- inflammatory activity was performed by inhibition of protein denaturation assay. The above studies summaries that the ethanolic extract of Cassia fistula L. barks contains amino acids and have antioxidant and anti- inflammatory properties.

**Keywords:** Antioxidant, Anti-inflammatory, Cassia fistula L.

**PT-342**

## ELUCIDATING THE THERAPEUTIC EFFICACY OF A POLYHERBAL EXTRACT FOR HYPOGLYCEMIC ACTIVITY

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The increasing prevalence of diabetes mellitus, together with the limited access of many patients to conventional anti-diabetic drugs and the side




ISBN: 978-81-980623-8-3

effects resulting from their use, are the reason for the ever-increasing need for new agents. The most important strategies used in the therapy of this disease is to reduce the postprandial blood glucose level by inhibiting the carbohydrate-degrading enzymes α-amylase and α-glucosidase. The aim of this study was to assess the hypoglycemic effects of Gymnema Sylvestre and Momordica Charantia. The physiochemical evaluation of powder drug, Soxhlet extraction and phytochemical evaluation of plant extract was carried out. The Anti-oxidant activity of plant extracts at different concentration was evaluated. For Momordi cacharantia, the DPPH radical scavenging percentage increases from 20% at 0.1 mg/mL to 40% at 1 mg/mL, while the ABTS radical scavenging percentage increases from 30% to 50% over the same concentrations. Similarly, the total antioxidant capacity rises from 15 mg AAE/g to 20 mg AAE/g. Gymnema sylvestre exhibits a similar trend, with increasing antioxidant activity with higher concentrations, reaching 45% DPPH scavenging, 55% ABTS scavenging, and 25 mg AAE/g total antioxidant capacity at 1 mg/ml. The in-vivo antidiabetic activity of the test compounds was evaluated by assessing the blood glucose levels in streptozotocin (STZ)-induced diabetic rats over a period of 28 days. Statistical analysis using one-way ANOVA followed by Duncan's multiple range test revealed no significant differences in blood glucose levels among the groups on Day 0-28.

**Keywords:** Diabetes mellitus, Soxhlet extraction, ABTS, DPPH, Streptozotocin.

**PT-343**

## NETWORK PHARMACOLOGY ELUCIDATION OF AMHERSTIA NOBILIS LEAF AGAINST RHEUMATOID ARTHRITIS: MULTI-TARGET AND PATHWAY INSIGHTS

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Rheumatoid arthritis (RA) is a disabling autoimmune disorder that is characterized by persistent inflammation of the synovium and progressive joint erosion. The aim of the research was to determine the therapeutic potential of Amherstia nobilis leaf considering a network pharmacology metabolite, target and signaling pathway against RA.Active constituents of Amherstia nobilis were determined by literature survey and instrumental analysis with 34 compounds obtained. A prediction of targets identified 937 related genes, which was compared to RA-related genes (6,574) in GeneCards database. There were 326 overlapping genes that were found as therapeutic targets. STRING was used to analyze them in terms of protein–protein interaction (PPI), and Cytoscape in terms of hub gene recognition. Gene ontology (GO) and KEGG enrichment were performed in ShinyGO database to conduct functional annotation. PPI analysis revealed that AKT1, TNF, SRC, and EGFR are important hub genes. GO enrichment was found to be involved in oxidative stress control, immune dysregulation, synovial proliferation and chronic inflammatory reactions. Cellular component analysis focused on the membrane-related immune signaling and vesicle-mediated cytokine release, whereas molecular functions focused on the immune signaling, cytokine secretion, and cell adhesion. KEGG pathway analysis showed that it is enriched in VEGF, AGEreceptor-AGE, PI3K-Akt, HIF-1, and TRP channels signaling pathways, which are major signaling pathways in RA pathogenesis. As evidenced in this research, Amherstia nobilis leaf presents a multi-target and multi-pathway mode of action of possible anti-inflammatory effects. The results offer mechanistic information as to why A. nobilis can be used as a potential solution to RA management, and why additional experiments are warranted.

**PT-344**

## UNRAVELLING THE ANTHELMINTIC EFFECT OF PSIDIUM GUAJAVA ON PHERETIMA POSTHUMA

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Psidium guajava commonly known as guava was widely known for its antispasmodic and antimicrobial, diabetes, rheumatism, ulcers, malaria, cough and bacterial infection. Traditionally the plant has been widely used for gastrointestinal infection such as diarrhea, dysentery, stomach aches and indigestion and also used for prophylaxis and treatment of virus infection and fungal infections. Anthelmintic activity of Psidium using different extract was also reported. Here in the present study Pheretima posthuma model has been selected as it has a close resemblance with human intestinal roundworm, anatomically and physiologically. The plants and earthworm were collected and authenticated. The fresh leaves and fresh ripen fruit of Psidium guajava were dried, powdered and subjected for soxhelt extraction of leaves and maceration for fruit using ethanol as solvent. Different concentration of crude extract, leaves extract and fruit extract were evaluated for preliminary phytochemical test and anthelmintic activity (Pheretima posthuma). All extract showed significant anthelmintic activity. Among the extracts crude fruit extract (5mg) shows maximum activity. The results suggest that Pheretima posthuma may be beneficial in the treatment of parasitic infections.

**Keywords:** Psidium guajava, Anthelmintic, Pheretima posthuma, Soxhelt extraction, Maceration.

**PT-345**

## THE CREATION AND ASSESSMENT OF A MOISTURIZING BODY BALM STICK ENRICHED WITH GREEN TEA

Baishnavi sanjay sake

To give the skin deep hydration, nourishment, and protection, a moisturizing body balm stick has been created. Utilizing a combination of organic components. Green tea extract, rosemary extract, arrowroot powder, stearic acid, beeswax, Shea butter, turmeric, and jasmine oil are important ingredients in the balm that each have their own special advantages for the skin. Strong antioxidants and anti-inflammatory qualities found in green tea extract aid in shielding the skin from environmental aggressors and free radical damage. Rosemary extract promotes skin health by having antibacterial and revitalizing properties. While stearic acid maintains stability and consistency, arrowroot powder enhances the texture of the balm, facilitating smooth application and skin absorption. By creating a protective layer, avoiding skin drying, and acting as a barrier against the elements, beeswax is essential for retaining moisture in the skin. Shea Butter provides deep hydration and enhances skin elasticity, making it perfect for individuals with dry or sensitive skin. Turmeric, recognized for its anti-inflammatory and healing effects, helps diminish redness and irritation, while Jasmine Oil offers soothing, calming benefits along with a lovely scent. The blend of these ingredients is formulated to deliver both immediate and lasting skin advantages. The balm is intended to enhance skin texture, replenish moisture, and shield against environmental damage. With this formulation, the product aims to deliver a natural, effective, and convenient approach to skin care that promotes overall skin health and hydration.

**Keywords:** Antioxidant, Hydration, Moisturizer, green tea, body balm stick.

**PT-346**

## PHYTOCHEMICAL FRACTIONATION, QUANTITATIVE ESTIMATION AND IN-VITRO ANTIOXIDANT EVALUATION OF SALAMALIA MALABRICA LINN. STEM BARK

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The present study was undertaken to fractionate the stem bark of Salamalia malabrica Linn. into alkaloid-rich (AF), flavonoid-rich (FF), and tannin-rich (TF) fractions, followed by quantitative estimation of key phytoconstituents and in-vitro antioxidant evaluation. The coarsely powdered bark was initially treated with an aqueous acidic solution and extracted with ethyl acetate (3 × 200 mL) to eliminate neutral constituents. The remaining aqueous layer was alkalinized to pH 9 using 30% ammonium hydroxide and subsequently extracted with chloroform (3 × 300 mL). The combined chloroform extracts were concentrated under reduced pressure to yield alkaloid-rich fraction (AF). For flavonoid




ISBN: 978-81-980623-8-3

extraction, the dried alcoholic extract of the bark was dissolved in alcohol and partitioned with ethyl acetate in a separating funnel. The ethyl acetate layer was concentrated on a hot water bath to obtain the flavonoid-rich fraction (FF). The tannin-rich fraction (TF) was obtained by defatting the coarsely powdered bark with petroleum ether, followed by cold maceration with an acetone: water mixture (70:30). The solvent was removed to yield TF. All three fractions were subjected to preliminary phytochemical screening, followed by quantitative estimation of total alkaloids using gravimetric method, total flavonoids using the aluminium chloride colorimetric method, and total tannins using the Folin-Ciocalteu method. The antioxidant potential of each fraction was evaluated using DPPH radical scavenging assay, Ferric Reducing Antioxidant Power (FRAP) assay, and hydroxyl radical scavenging assay. Among the tested fractions, FF and TF exhibited significant antioxidant activity, indicating the presence of potent bioactive compounds with free radical scavenging potential.

**Keywords:** Salamalia malabrica, Alkaloids, Flavonoids, Tannins, Antioxidant activity.

**PT-347**

## PHYTOCHEMICAL SCREENING & EVALUATION OF ANTIDEPRESSANT ACTIVITY OF ETHANOLIC EXTRACT OF FLOWER OF ZEPHYRANTHES CITRINA

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Depression is a common neuropsychiatric disorder characterized by persistent sadness, reduced motivation, and disturbances in sleep and appetite. Although synthetic antidepressants are clinically available, their therapeutic use is often restricted by side effects, delayed onset of action, and poor patient compliance. These drawbacks have shifted research interest towards herbal alternatives that may offer safer and more effective interventions.The present study aimed to evaluate the antidepressant-like activity of the ethanolic flower extract of Zephyranthes citrina (EEZC) in Swiss albino mice using standard behavioral models.Phytochemical analysis of EEZC revealed flavonoids, alkaloids, saponins, tannins, glycosides, and triterpenes. Mice were randomly allocated into four groups (n = 6): control (propylene glycol), standard (fluoxetine 20 mg/kg), and test groups treated with EEZC at 100 mg/kg and 200 mg/kg. Antidepressant activity was evaluated on Day 1 and Day 14 using the Forced Swim Test (FST) and Tail Suspension Test (TST), with immobility time recorded as the primary parameter.EEZC administration produced a significant, dose-dependent reduction in immobility duration in both models compared with control. The effect was more pronounced after 14 days, with the higher dose (200 mg/kg) showing comparable efficacy to fluoxetine.The findings suggest that EEZC possesses notable antidepressant potential in animal models, possibly due to bioactive constituents such as flavonoids and saponins. Further studies involving compound isolation and mechanistic evaluation are needed to validate its therapeutic relevance.

**Keywords:** Zephyranthes citrina, antidepressant activity, ethanolic extract, Forced Swim Test, Tail Suspension Test, fluoxetine

**PT-348**

## EVALUATION OF PHYTOCHEMICAL CONTENT AND INVITRO CYTOTOXIC ACTIVITY OF VARIOUS ORNAMENTAL PLANT FLOWER EXTRACTS AGAINST MCF-7 CELL LINES

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Ornamental flowers have been traditionally used for the treatment of different ailments such as pain, inflammation, dandruff, dermatitis, hair growth and scabies. The present study was aimed to investigate the phytochemical and cytotoxic activity of aqueous and chloroform extracts of various ornamental flowers (Ixora coccinia, Allamanda cathartica, Hibuscus rosa-sinensis and Tecoma stans) against MCF-7 cell lines by using MTT assay. Preliminary phytochemical quantitative results indicate the presence of flavonoids equivalent to quercetin. Aqueous extract of Allamanda cathartica (225.5 mg/g) and Tecoma stans (195 mg/g) was found to contain more amount of flavoniod in comparison to other aqueous extrcts and chloroform extracts. Dose dependent cytotoxicity and a significant i.e mean % inhibition and IC50 was observed in comparison to both tamoxifen and quercetin. Aqueous extract of Allamanda cathartica and Tecoma stans showed cytotoxicity similar to quercetin. Flavoniods are responsible for cytotoxic activity of flower extracts. This study provides scientific support for the use of ornamental flowers as cytotoxic agents.

**Keywords:** Anticancer activity, Ornamental flowers, Flavonoids, MCF-7 cell lines, MTT assay, Allamanda cathartica, Quercetin equivalent.

**PT-349**

## PHARMACOGNOSY, INDIGENOUS DRUGS, HERBAL FORMULATIOS AND PHYTOCHEMISTRY

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Adhatoda vasica (Vasaka) is a cherished native medicinal plant used traditionally to treat respiratory issues like asthma, bronchitis, and chronic cough. The plant's main alkaloid, vasicine, has notable pharmacological properties such as bronchodilation, expectorant effects, and anti-inflammatory capabilities. Despite these established benefits, the clinical effectiveness of traditional Adhatoda vasica formulations is often hindered by issues such as poor water solubility, low bioavailability, and quick metabolic clearance. To tackle these challenges, Novel Drug Delivery Systems (NDDS) have been developed as a cutting-edge solution to enhance the therapeutic properties of herbal extracts. Techniques like nanoparticles, liposomes, phytosomes, and inhalable carriers can increase solubility, improve stability, and facilitate prolonged or targeted release of active phytoconstituents. These systems not only enhance therapeutic effectiveness but also decrease the frequency of dosages and reduce unwanted side effects. The combination of NDDS with Adhatoda vasica extract bridges traditional herbal knowledge with modern pharmaceutical techniques. These innovations could provide safer, more effective, and patient-friendly options for treating respiratory conditions, thus strengthening the clinical importance of herbal medicines in today's healthcare landscape.

**Keywords:** Adhatoda vasica (vasaka), Respiratory diseases, Vasicine, Novel drug delivery systems (NDDS)

**PT-350**

## PHYTOCHEMICAL PROFILING AND ANTIOXIDANT EVALUATION OF HERBS FOR HEPATOPROTECTION

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Hepatic disorders are strongly associated with oxidative stress, making antioxidants an important component of hepatoprotective therapy. Herbal medicines, being natural sources of phytochemicals, provide effective antioxidant potential that can be further enhanced through nanotechnological intervention. In this study, three medicinal plants with reported hepatoprotective activity—Hemidesmus indicus (H.I.), Picrorhiza kurroa (P.K.), and Tephrosia purpurea (T.P.)—were evaluated for their physicochemical parameters, phytoconstituents, and antioxidant potential. Physicochemical analysis revealed moisture content ranging from 7.98% (P.K., H.I.) to 9.75% (T.P.), with total ash values between 2.3% (T.P.) and 8% (H.I.). Water-soluble extractive content was highest in P.K. (43.5%), followed by H.I. (26.75%) and T.P. (12.5%), while alcohol-soluble extractives were also maximum in P.K. (32%). Phytochemical screening revealed the presence of carbohydrates, proteins, glycosides, flavonoids, tannins, saponins, phenols, and terpenoids in varying proportions. H.I. showed a broad spectrum of secondary metabolites in both aqueous and methanolic extracts, whereas P.K. was enriched in glycosides, flavonoids, phenols, and terpenoids. Antioxidant evaluation through DPPH, ABTS, FRAP assays, and estimation of total phenolic and flavonoid content indicated significant free radical scavenging activity. Among the three plants, P.K. demonstrated the highest antioxidant activity, followed by T.P. and H.I. Antioxidant activity was strongly correlated with phenolic and flavonoid




ISBN: 978-81-980623-8-3

content, supporting their role in hepatoprotection. Overall, the findings validate the complementary phytochemical and antioxidant fingerprints of these plants and support their rational combination for the development of polyherbal silver nanoparticles with potential hepatoprotective applications.

**Keywords**: Hepatoprotection, Antioxidant, Hemidesmus indicus, Picrorhiza kurroa, Tephrosia purpurea.

**PT-351**

**PHARMACOGNOSY, INDIGENOUS DRUGS,HERBAL FORMULATIOS AND PHYTOCHEMISTRY**

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Cissus quadrangularis (CQ) is a medicinal plant widely used for bone healing, joint health, and antioxidant activity. However, its oral bioavailability is limited due to poor solubility and low gastrointestinal absorption. The present study aimed to develop self-emulsifying drug delivery system (SEDDS) capsules of CQ to enhance solubility, dissolution, and systemic uptake.Preformulation studies were conducted to screen the solubility of CQ extract in various oils, surfactants, and co-surfactants. An optimized liquid SEDDS was prepared and adsorbed onto a solid carrier (Neusilin) to form a free-flowing powder suitable for hard gelatin capsules. The filled capsules were evaluated for physicochemical properties, drug content, flowability, and self-emulsification efficiency. Droplet size, polydispersity index (PDI), and zeta potential were measured to confirm nanoemulsion formation.In vitro dissolution studies showed significantly faster release of CQ from SEDDS capsules compared to conventional capsules. Accelerated stability studies indicated good physical and chemical stability. The results suggest that SEDDS capsules of CQ can improve oral bioavailability and therapeutic efficacy, offering a promising approach to modernize herbal formulations through advanced drug delivery technologies.

**Keywords:** Cissus Quadrangularis, Self –Emulsifying Capsules, Bioavailability Enhancement, Herbal drug delivery.

**PT-352**

**NUTRACEUTICAL-BASED INTERVENTIONS FOR OSTEOPOROSIS: NEXT-GENERATION DELIVERY SYSTEMS**

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Nutraceuticals—bioactive compounds at the interface of nutrition and medicine—have emerged as promising agents for sustaining optimal health and preventing chronic diseases. Characterized by their favorable safety profile, therapeutic efficacy, and nutritional benefits, nutraceuticals are increasingly being investigated as adjuncts or alternatives to conventional therapies. Osteoporosis, a progressive skeletal disorder marked by reduced bone mass and micro architectural deterioration, significantly elevates the risk of fractures, particularly among postmenopausal women who represent the most vulnerable population. Conventional pharmacological approaches, while effective, are often associated with adverse effects, long-term compliance issues, and high treatment costs. In this context, nutraceuticals have gained considerable attention for their potential to enhance bone health and delay the onset of pathological bone loss. With some individual variation, osteogenesis, sometimes referred to as bone ossification, starts between the sixth and seventh week of embryonic development and lasts until about the age of twenty-five. Bone ossification can be classified as either intramembranous or endochondral. Reducing the risk of fractures is one of the main objectives of osteoporosis treatment. Reducing fall hazards at home (such as slick floors, obstacles, and dim lighting), avoiding drugs that impair alertness and balance, exercising to increase bone mass, muscle strength, and balance, and abstaining from smoking, excessive alcohol use, and inadequate nutrient intake are all preventive and therapeutic measures for osteoporosis and osteoporotic fractures. Reduced bone mass and osteoporotic fractures are the hallmarks of osteoporosis, the most common metabolic bone disease. The current treatments, which include hormone therapy, bisphosphonates, raloxifene, calcium supplements, and vitamin D3, are expensive and have major long-term side effects, including cardiovascular problems and mandibular osteonecrosis. Numerous nutraceuticals are currently on the market with encouraging outcomes for the treatment of osteoporosis. For nutraceuticals to have positive effects, they must be taken in the proper amount and way. As a result, comprehensive clinical trials are required to determine the bone nutraceuticals' dosage, safety, and effectiveness.

**Keywords:** Osteopenia, osteoporosis, bone health, nutraceuticals, life style.

**PT-353**

**EVALUATION OF ANTI-INFLAMMATORY ACTIVITY OF MILLINGTONIA HORTENSIS LEAF EXTRACT**

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In the present study Millingtonia hortensis, a herbal aqueous extract of leaves are investigated to find anti-inflammatory activity by invitro evaluation. Millingtonia hortensis (BIGNONIACEAE) subjected for Invitro anti-inflammatory activity was evaluated by albumin protein denaturation method. Millingtonia hortensis leaf aqueous extract was prepared by cold maceration method. Millingtonia hortensis aqueous extract was screened and gave positive results for alkaloids, flavonoids, carbohydrates, phenols and other constituents. The extract gave more significant anti-inflammatory activity relative to reference standard drug sample ibuprofen. Millingtonia hortensis leaf aqueous extract showed noticeable anti-inflammatory activity and it indicates that it has potential application in the conditions of inflammatory conditions like arthritis, diabetes mellitus and cancer where natural anti-inflammatory agents are having beneficial action.

**Keywords:** Millingtonia hortensis leaf, Ibuprofen, Albumin protein denaturation method, Bignoniaceae, In vitro Evaluation.

**PT-354**

**PHYTOCHEMICAL CHARACTERIZATION AND GC-MS PROFILING OF METHANOLIC EXTRACT OF EUPHORBIA HIRTA AND EVALUATION OF ITS IMPACT ON ANTIOXIDANT, ANTI-INFLAMMATORY, ANTI-MICROBIAL AND ANTI-WART POTENCY**

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Warts are formed by infection in the epidermal layer of the skin and typically appear as solid blisters. Conventional chemical treatments might cause burning and stinging. Herbal alternatives like Euphorbia hirta (Amman-pacharisi) show promise as safer solutions. The purpose of this study is to investigate the efficacy of methanolic and aqueous Euphorbia hirta extracts in the treatment of warts, with an emphasis on finding active ingredients and measuring anti-microbial, antioxidant, anti-inflammatory and anti-wart potential using GC-MS. The GC-MS profiling identified 50 chemicals. The methanolic extract mainly consisits of myo-inositol, 6TMS derivative (24%), bis(2-ethylhexyl) phthalate (41.36%), thymol β-D-glucopyranoside (12.37%), and hexadecanoic acid (10.22%). Upon comparing the percentage activity on antioxidant, anti-inflammatory and anti-wart potency of methanolic extract (83.45%), (93.8%) and (95.45%) with that of aqueous extract (78.02%), (82.4%) and (80.73%), the methanolic extract shows higher response than aqueous extract. These findings suggests that the methanolic extract of Euphorbia hirta, is highly beneficial in its bioactive compounds, and it could be a promising herbal alternative for wart treatment, providing an effective potency of antimicrobial, antioxidant, anti-inflammatory and anti-wart action while having fewer side effects compared to conventional drugs.

**Keywords**: Euphorbia hirta, GC-MS analysis, Anti-inflammatory activity, Anti-Wart activity.

**PT-355**




ISBN: 978-81-980623-8-3

**EVALUATION OF LEAVES OF FICUS DALHOUSIAE MIQ. AND FICUS HISPIDA L. FOR PHYTOCHEMICAL PROFILE, SECONDARY METABOLITES AND IN VITRO ANTIOXIDANT ACTIVITY**

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This study aimed to investigate the phytochemical composition, antioxidant potential, and antibacterial activity of leaf extracts from Ficus dalhousiae (Miq.) Miq. and Ficus hispida L., native to the Nilgiris region of India. Qualitative phytochemical screening of successive solvent extracts revealed the presence of key secondary metabolites, including alkaloids, saponins, tannins, phenolics, flavonol glycosides, glycosides, phytosterols, as well as primary metabolites such as carbohydrates, proteins, and amino acids. Quantitative analyses indicated that the ethyl acetate extract exhibited the highest concentrations of total phenolics (245.61 mg gallic acid equivalents [GAE]/100 g), tannins (218.88 mg GAE/100 g), and flavonoids (53.11 mg rutin equivalents [RE]/100 g), reflecting a strong antioxidant phytochemical profile. Antioxidant capacity was assessed using DPPH, ABTS, phosphomolybdenum, and superoxide radical scavenging assays. The ethanol extract demonstrated potent activity, with $IC_{50}$ of 42.91 µg/mL in the DPPH assay, ABTS activity of 80,972.2 µmol Trolox equivalents (TE)/g extract, total antioxidant capacity of 208.28 mg ascorbic acid equivalents (AAE)/g in the phosphomolybdenum assay, and 45.45% inhibition in the superoxide assay. These results indicate significant free radical scavenging and reducing potential. Preliminary antibacterial assays further confirmed the presence of bioactive compounds with inhibitory effects against selected bacterial strains, supporting the therapeutic potential of both species. The findings highlight F. dalhousiae and F. hispida leaves, particularly their ethanol and ethyl acetate extracts, as promising sources of natural antioxidants and antibacterial agents, meriting further phytochemical isolation and pharmacological evaluation.

**Keywords:** Antioxidant, Ficus dalhousiae, Ficus hispida.

**PT-356**

**IN VITRO PROPAGATION AND PHYTOCHEMICAL PROFILING OF OROXYLUM INDICUM (L.) VENT.: A SUSTAINABLE APPROACH FOR CONSERVATION AND MEDICINAL USE**

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Oroxylum indicum (L.) Vent., a medicinally valuable but endangered species of the Bignoniaceae family, faces threats from destructive harvesting practices, primarily due to the overexploitation of its roots. To address this conservation concern, the present study aims to develop an efficient in vitro propagation protocol for O. indicum. We successfully established a reproducible method for clonal propagation through tissue culture techniques, including callus induction, shoot proliferation, and root development. The morphogenic responses of in vitro tissues were characterized and analyzed for primary metabolites and enzyme activities, while genetic fidelity was confirmed via RAPD analysis, ensuring genetic stability compared to the mother plant. Comparative phytochemical screening of in vivo and in vitro tissues revealed the presence of key secondary metabolites such as phenols, flavonoids, and ellagic acid, quantified through standard methods and HPLC. The findings demonstrate the potential for large-scale biomass production and secondary metabolite synthesis, offering promising avenues for sustainable utilization and conservation of O. indicum, as well as prospects for biotechnological applications in phytopharmaceutical development. This work lays the foundation for future research into novel bioactive compounds and optimized production of medicinal constituents like ellagic acid.

**Keywords:** Oroxylum indicum, clonal propagation, tissue culture techniques, mother plant, secondary metabolites

**PT-357**

**DEVELOPMENT ALONG WITH ASSESSMENT OF HERBAL SCRUB POWDER**

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The demand for skincare products with a herbal base has increased as people become more conscious of the negative consequences of synthetic cosmetic formulas. Using components obtained from plants that have been shown to have therapeutic and dermatological advantages, a herbal scrub powder was created in this study. Effective exfoliation, sebum control, antibacterial, and anti-inflammatory properties were all intended features of the composition. Citrus sinensis (orange peel), Azadirachta indica (neem), Ocimum sanctum (tulsi), Curcuma longa (turmeric), Rosa indica (rose petals), Fuller's earth (multani mitti), and Cicer arietinum (gram flour) were all used in the dry blending process to create the powder. Organoleptic properties, bulk density, tapped density, angle of repose, Carr's index, Hausner's ratio, moisture content, pH, grittiness, and microbial load were among the physicochemical parameters that were assessed. According to ICH recommendations, stability tests were carried out at 25°C/60% RH and 40°C/75% RH. The formulation's usefulness as a safe, efficient, and shelf-stable herbal cosmetic was confirmed by its excellent flow qualities, low moisture content, acceptable grittiness, and lack of microbiological growth.

**Keywords:** Herbal scrub, Anti-acne, Cosmeceuticals, Flow properties, Stability studies.

**PT-358**

**ETHNOMEDICINE IN ACTION: P. RUBIGINOSUM GEL FOR BONE HEALING**

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The present study reports the development and comprehensive evaluation of a liquid crystalline gel formulation of Pterospermum rubiginosum extract, a traditionally acclaimed plant for managing bone fractures and related complications. Despite its ethnomedicinal use, the therapeutic potential of P. rubiginosum remains largely unexplored scientifically. The formulation leverages the plant's natural phytoconstituents to inhibit inflammatory pathways, offering a safer alternative to conventional synthetic agents. Liquid crystalline gels were selected due to their sustained-release profile, enhanced bioavailability, and improved patient compliance. Three gel formulations (HGF1, HGF2, HGF3) were prepared by varying concentrations of cetostearyl alcohol and Tween 80 and systematically evaluated for viscosity, spreadability, pH, drug content, entrapment efficiency, and in vitro release behavior. Among the three, HGF3 emerged as the optimized formulation, exhibiting superior rheological properties, uniform drug distribution, high entrapment efficiency (95.23 ± 0.3%), and controlled release of active phytoconstituents. Microscopic characterization confirmed a stable lamellar structure, while in vitro studies verified the retention of anti-inflammatory activity. Accelerated stability studies indicated that over six months, the formulation maintained ~90% drug retention without significant degradation, confirming its robustness. These findings validate the ethnomedicinal relevance of P. rubiginosum and demonstrate the power of formulation science in transforming traditional knowledge into a clinically effective, patient friendly phytopharmaceutical candidate for fracture care and inflammation management.

**Keywords:** Pterospermum rubiginosum, Liquid crystalline gel, Fracture healing, Anti-inflammatory, Phytopharmaceutical, Drug release kinetics

**PT-359**

**A COMPREHENSIVE STUDY OF NUTRITIVE VALUE ANALYSIS OF MANSOA ALLIACEA (LAM.) A.H.GENTRY**

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Mansoa alliacea (Lam.) A.H.Gentry or 'Garlic vine' or' false garlic' belonging to the family: Bignoniaceae. It is an evergreen climbing plant




ISBN: 978-81-980623-8-3

used by the Indigenous Indian tribes of the Amazon areas and has great ancestral value for the local communities and also part of the traditional medicine. Leaves have pungent garlic smell and flavour when it is crushed. In the Amazon rainforest, local peoples are using Mansoa alliacea leaves as a seasoning and spices. Crushed or powdered fresh and dries leaves can be used for cooking as a garlic substitute. Plant consist of chemical constituents like diallyl disulphide, diallyl trisulphide, alliin, allicin, propyl allyl, divinyl sulphide, diallyl sulphide, dimethyl sulphide, daucosterol, betasitosterol etc. This present study, mainly emphasis the nutritive value analysis of dried leaves of Mansoa alliacea . Nutritive value was analysed by using various parameters. Quantitative estimation of total carbohydrates, proteins, fat, fibre amino acids, vitamin c, starch and were performed spectro-photometrically and concluded that the amount of estimated phytochemicals were significant and which will aid nutrition status of Mansoa alliacea. Quantification of some important minerals supporting nutritive status were analysed by inductively coupled plasma atomic absorption spectroscopy (ICP-AES). The minerals analysed includes Calcium, Copper, Iron, Magnesium, and Zinc are contributed in the nutritive value of the plant. The detected elements are involved in various function in humans. This comprehensive nutritive analysis serves as a foundational step for future research on the therapeutic applications of Mansoa alliacea (Lam.) A.H.Gentry, in both local and global contexts.

**Keywords:** Mansoa alliacea (Lam.) A.H.Gentry, Nutritive Value Analysis

**PT-360**

## PHYTOCHEMICAL QUANTIFICATION AND INVITRO ANTIOXIDANT POTENTIAL OF MALLOTUS PHILIPPINENSIS AND ZORNIA GIBBOSA HYDROALCOHOLIC LEAF EXTRACTS.

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Plant-derived antioxidants have garnered interest in therapeutic applications, particularly in nanoparticle-mediated drug delivery. This study investigates the phytochemical constituents and antioxidant potential of hydroalcoholic leaf extracts of Mallotus philippinensis (HEMP) and Zornia gibbosa (HEZG), with an outlook toward green synthesis of silver nanoparticles for anticancer purposes. Quantitative estimations of total polyphenols, flavonoids, and tannins were performed using standard spectrophotometric methods. Antioxidant activity was assessed via DPPH, hydroxyl radical scavenging, and reducing power assays. Gallic acid and quercetin were used as reference standards. HEMP showed higher total polyphenolic content (131 µg GAE/mg) compared to HEZG (80 µg GAE/mg), while HEZG exhibited greater flavonoid content (76 µg QE/mg) than HEMP (55 µg QE/mg). Tannin content was comparable. In DPPH assay, HEMP exhibited 81.26% inhibition at 100 mg/mL, while HEZG had a lower $IC_{50}$ (70.59 µg/mL). Hydroxyl radical scavenging showed strong activity for both extracts (HEMP: 96.91%, HEZG: 96.61%) with $IC_{50}$ values of 54.53 and 56.21 µg/mL, respectively. In the reducing power assay, HEZG outperformed HEMP with an $IC_{50}$ of 50.15 µg/mL. Both plant extracts demonstrated potent antioxidant activity, likely due to their rich phytochemical profiles. These findings provide a scientific basis for their further application in the development of silver nanoparticle-based formulations targeting cancer therapy.

**Keywords:** Mallotus philippinensis, Zornia gibbosa, antioxidants, phytochemicals, DPPH, hydroxyl radical.

**PT-361**

## PHYTOCHEMICAL EVALUATION AND HEPATOPROTECTIVE ACTIVITY OF LIRIODENDRON TULIPIFERA AGAINST SIMVASTATIN-INDUCED HEPATOTOXICITY IN RATS

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The present study was designed to evaluate the hepatoprotective potential of the ethanolic extract of Liriodendron tulipifera leaves against simvastatin-induced hepatotoxicity in Wistar rats. In addition to hepatoprotective assessment, the extract was subjected to preliminary phytochemical screening. Hepatotoxicity was induced by oral administration of simvastatin (20 mg/kg) for 30 consecutive days. The test groups received L. tulipifera ethanolic leaf extract at doses of 300 mg/kg and 500 mg/kg for the same duration. Phytochemical analysis of the extract revealed the presence of alkaloids, tannins, saponins, glycosides, phenols, and flavonoids. Biochemical investigations demonstrated that simvastatin administration significantly elevated serum glutamate pyruvate transaminase (SGPT), serum glutamate oxaloacetate transaminase (SGOT), alkaline phosphatase (ALP), and serum bilirubin levels, along with a marked reduction in total protein content. Treatment with L. tulipifera extract (300 and 500 mg/kg) substantially reversed these alterations, with effects comparable to those observed in the standard hepatoprotective group treated with silymarin (25 mg/kg). Taken together, the findings suggest that the ethanolic extract of Liriodendron tulipifera leaves exhibits significant hepatoprotective activity, likely attributable to its rich phytoconstituent profile, supporting its potential as a natural therapeutic agent against drug-induced liver injury.

**Keywords:** Liriodendron tulipifera, Hepatoprotective activity, Simvastatin-induced hepatotoxicity

**PT-362**

## EXPLORING TECOMA STANS AS A NOVEL SOURCE OF NATURALBIOPLASTICS

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Plastics derived from petroleum are widely used due to their durability, versatility, and cost-effectiveness; however, their non-biodegradable nature has led to severe environmental pollution and ecological imbalance. This growing concern has intensified the search for sustainable alternatives, such as bioplastics produced from renewable biomass sources. The present study investigates Tecoma stans, a cellulose-rich plant belonging to the Bignoniaceae family, as a novel and eco-friendly raw material for bioplastic production. Plant materials were collected, authenticated, and subjected to a series of preparatory steps including drying, pulverization, delignification with sodium hydroxide, bleaching, anti-chlorination, alkali treatment, and acid hydrolysis to isolate cellulose crystals. These crystals were chemically modified through esterification using propionic anhydride and subsequently plasticized with glycerol to form flexible bioplastic sheets. The resulting bioplastics were evaluated through physical, chemical, thermal, and biodegradability tests. The prepared materials exhibited desirable properties such as flexibility, transparency, insolubility in water, solubility in organic solvents, and thermal stability between 200–400 °C. Environmental evaluation indicated effective biodegradation in soil and characteristic burning behavior. Moreover, the inherent antibacterial phytochemicals present in Tecoma stans contributed to suppressing microbial growth, potentially extending the shelf life of products. These findings demonstrate that Tecoma stans is a promising, sustainable source for bioplastic production. The developed bioplastics offer an environmentally friendly alternative to petroleum-based plastics, supporting waste reduction, resource conservation, and circular economy practices. Reduction in greenhouse gas emissions and plastic pollution. Utilization of fast-growing invasive plant species like Tecoma stans helps in biomass valorization.Can support rural industries and sustainable manufacturing.

**Keywords:** Tecoma stans, Bignoniaceae

**PT-363**

## DEVELOPMENT AND EVALUATION OF POLY HERBAL FORMULATION FOR PSORIASIS IN EXPERIMENTAL ANIMAL MODEL

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Psoriasis is a chronic disease affecting the global population. The disease not only affects patients but also affects their quality of life. The disease




ISBN: 978-81-980623-8-3

affects the immune system, which becomes overactive and tends to cause the multiplication of skin cells so quickly. Skin patches can be seen with inflammation, especially on the scalp, knees, and other body parts. The available data on disease suggests the cause for disease progression is unknown, but the role of genetics and other factors cannot be ignored. is to establish the poly herbal formulation which can provide the cure in Psoriasis with least toxicities. the extraction was done of all the selected plants through the standard procedures and then poly herbal cream was prepared and evaluated. The poly herbal cream was evaluated through the imiquimod (IMQ) mouse model. The poly herbal cream was studied for Viscosity, pH, spread ability and in vitro studies. The prepared poly herbal cream showed prominent results in imiquimod-induced psoriatic mouse model. The poly herbal cream also affected the thickness and scaling of skin.

**Keywords:** Psoriasis; Poly Herbal; Formulation; Imiquimod

**PT-364**

**Herbal Therapeutics Offer A Sustainable Approach To Managing.**

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Gut dysbiosis—an imbalance in gut microbiota composition and function—is implicated in a wide range of disorders, including metabolic, gastrointestinal, neurological, and autoimmune diseases. Herbal drugs offer promising therapeutic potential by modulating the microbiome through prebiotic, probiotic, and synbiotic mechanisms. Phytochemicals such as polyphenols, flavonoids, saponins, and polysaccharides from plants like Curcuma longa, Panax ginseng, Camellia sinensis, and Allium sativum selectively promote beneficial microbes, enhance short-chain fatty acid (SCFA) production, and suppress pathogenic species. These compounds also influence host metabolism by regulating bile acid transformation, gut barrier integrity, and systemic inflammation. Gut microbiota play a pivotal role in maintaining metabolic homeostasis via SCFA production, amino acid and xenobiotic metabolism, and energy and lipid regulation. Dysbiosis can lead to obesity, insulin resistance, non-alcoholic fatty liver disease (NAFLD), dyslipidemia, elevated lipopolysaccharides (LPS), and impaired gut barrier function. Herbal drugs, acting as both substrates and modulators of microbial activity, provide a multi-targeted strategy to restore gut homeostasis. Integrating dietary, microbial, and lifestyle interventions.

**Keywords:** Gut microbiota, Herbal therapeutics, Phytochemicals, Short-chain fatty acids (SCFAs), Gut barrier integrity.

**PT-365**

**PHYTOMOLECULES TARGETING RHEUMATOID ARTHRITIS: NOVEL THERAPEUTIC STRATEGIES**

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Rheumatoid arthritis (RA) is a long-lasting autoimmune disease characterized by painful joint inflammation, progressive cartilage damage, and eventual loss of mobility. Conventional treatments such as disease-modifying anti rheumatic drugs (DMARDs) and biologics can relieve symptoms, but their side effects and limited remission rates highlight the need for safer alternatives. In Ayurveda, RA-like illness is described as Amavata, arising from ama (toxic by-products) and imbalance of Vata dosha. Rasayana (rejuvenating) herbs are traditionally prescribed to restore balance, reduce inflammation, and strengthen resilience. Following a systematic search was conducted across PubMed, Scopus, Web of Science, and AYUSH Research Portal (2000–2024) to identify studies on Ayurvedic herbs such as Withania somnifera (Ashwagandha), Bacopa monnieri (Brahmi), Convolvulus pluricaulis, (Shankapushpi) in RA. Evidence indicates that their phytochemicals including withanolides, bacosides, flavonoids, and alkaloids modulate pro-inflammatory cytokines (TNF-α, IL-1β, IL-6), regulate NF-κB and JAK-STAT pathways, and reduce oxidative stress. These findings show strong convergence between Ayurvedic wisdom and modern pharmacology, suggesting that rasayana herbs hold promise as adjuncts for RA management.

**Keywords:** Ayurvedic Herbs, Withania somnifera, Bacopa monnieri, Convolvulus pluricaulis, Phytochemicals, Rheumatoid arthritis.

**PT-366**

**FORMULATION AND PHARMACOLOGICAL ASSESSMENT OF HERBS WITH ANTI-INFLAMMATORY ACTION**

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Inflammation is an inherent defense response that comprises immune cells, blood vessels, and chemical mediators in reaction to harmful stimuli like pathogens, damaged cells, or irritants. It is a key response in removing the initial insult to the cells, removal of damaged tissue, and starting the repair process of the tissue. The traditional signs of inflammation are heat, pain, redness, swelling, and loss of function. Being a non-specific response, inflammation is associated with the innate immune system, in contrast to adaptive immunity which is aimed at particular pathogens. Failing to mount an appropriate inflammatory response, the organism may suffer from cumulative tissue damage that jeopardizes survival. This intricate biological process provides protection and healing by neutralizing the injurious stimuli and also repairing damaged tissues. Anti-inflammatory drugs, which make up a large percentage of analgesics, soothe pain by decreasing inflammation more than inhibiting pain transmission in the central nervous system, like the way opioids do. Nonsteroidal anti-inflammatory agents work by blocking cyclooxygenase (COX), the enzyme involved in the synthesis of prostaglandins (PGs), the major mediators of inflammation. Aside from synthetic drugs, some herbal drugs also exhibit promising anti-inflammatory activity. The findings suggest that the newly developed herbal microemulgel containing herbal extract holds potential for future applications in combating inflammation. These plants, including Cedrus deodara (CD), Peppermint (PM), Kakamachi (KK), and Piper longum (PL), showed higher efficacy in treating inflammatory conditions, pointing to the promise of natural compounds as therapeutic agents.

**Keywords**: Herbal, Microemulgel, Anti-inflammatory activity.

**PT-367**

**PHYTOCHEMICAL SCREENING AND ANTHELMINTIC ACTIVITY OF SIDA SPINOSA PRARTHANA**

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Sida spinosa, belonging to the Malvaceae family, is a medicinal plant of significant traditional use, prevalent in tropical and subtropical areas. It has been widely utilized in traditional medicine for the treatment of fever, inflammation, and microbial infections. Notwithstanding its ethnomedicinal significance, scientific investigation into its phytochemical composition and anthelmintic efficacy is still constrained. This study aims to analyze the phytochemical components of Sida spinosa and assess its anthelmintic activity through standard in vitro methods. Initial phytochemical analysis of ethanolic and aqueous extracts indicated the presence of alkaloids, flavonoids, tannins, saponins, terpenoids, phenolic compounds, and glycosides, all of which are recognized for their biological activity. The anthelmintic efficacy was evaluated against Pheretima posthuma (earthworms) as a model, utilizing albendazole as a reference standard. Various quantities of the plant extract exhibited strong dose-dependent effects, evidenced by the paralysis and mortality times of the worms, which were equivalent to the usual medication. The ethanolic fraction demonstrated superior activity among the evaluated extracts, indicating that polar phytoconstituents such as flavonoids and tannins contribute to the vermicidal actions. The research underscores the therapeutic efficacy of Sida spinosa as a natural anthelmintic and establishes a pharmacological foundation for its traditional application in helminthic illnesses. Additional research utilizing bioassay-guided fractionation, isolation of active chemicals, and in vivo assessment is essential to corroborate these findings and determine their efficacy and safety for therapeutic use. This research highlights the need to investigate underutilized




ISBN: 978-81-980623-8-3

medicinal plants as cost-effective solutions for addressing parasite infections.

**Keywords:** Sida spinosa, phytochemical screening, anthelmintic activity, flavonoids, tannins.

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**ANTIMICROBIAL ACTIVITY OF RED DRAGON FRUIT PEEL EXTRACTS (HYLOCEREUS POLYRHIZUS) ASSESSED IN VIVO AND IN VITRO**

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The purpose of this study aimed to characterize and assess the antibacterial activity of red dragon fruit (Hylocereus polyrhizus) peel extracts. Red dragon fruit peel extracts were produced by macerating the fruit in a pH 5 solvent. The peel extracts' phytochemical properties, total phenols, antioxidant, and antibacterial properties were identified. The extracts' high levels of phytochemical components and total phenols are related to their antioxidant and antibacterial properties. The physicochemical properties, minerals, antioxidant activity, and microbiological profile of red dragon fruit peel extracts in different percentages were examined. The present study aims to assess the antimicrobial activity of crude 50% hydroalcoholic peel extracts of Red Dragon Fruit (Hylocereus polyrhizus) against various clinical isolates, including Escherichia coli, Bacillus subtilis, Staphylococcus aureus, A. niger, and Candida albicans. This research is intended to identify alternative solutions to address the growing challenge of microbial resistance. Additionally, the findings from the in vivo assay conducted on thirty mice demonstrated that the administration of 100mg/ml of aqueous extract and Chloramphenicol was more effective than other concentrations, resulting in a significant reduction of P. aeruginosa bacteria ($P \leq 0.001$) throughout the treatment period. The extracts of red dragon fruit peels exhibited antimicrobial activity, according to the results.

**Keywords:** antimicrobial, red dragon fruit peel extract.

**PT-369**

**A MEDICATED HERBAL NAIL LACQUER FOR TREATING ONYCHOMYCOSIS**

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Fungal infections of the nails are also recognized as dermatophytic, non-dermatophytic moulds and yeast-based onychomycosis. The liable fungus is usually the same as that causes athlete's foot – a common infection of the skin of the feet, especially between the toes. Onychomycosis is an infection of the nail caused by fungi such as dermatophytes, non- dermatophyte moulds and yeasts (mainly Candida species). Around 20% of the population aged over 60 years, and up to 50% of subjects aged over 70 years are informed to have onychomycosis. The connection between increasing age and onychomycosis may be attributed to reduced peripheral circulation, inactivity, suboptimal immune status, diabetes, larger and distorted nail surfaces, slower-growing nails, difficulty to groom the nails and continuing foot hygiene, frequent nail injury and increased exposure to disease-causing fungi. Historically, the treatment of onychomycosis has been challenging. Orally administered griseofulvin (Grisactin, Gris-Peg) has been available for many years, but its use is limited by a narrow spectrum, the necessity for long courses of treatment and high relapse rates. Onychomycosis has long been treated with topical antifungal preparations. However, these agents are inconvenient to use, and results are often disappointing. One such herbal drug used for treatment of Onychomycosis is Pongamia pinnata (karanj), a cheap and easily available plant whose seeds have shown great activity against anti-microbial and anti- fungal activity. Azadirachta indica is a perennial tree also known as Neem which is being used in Ayurveda for thousands of years. Neem extracts exhibits antiviral, anti-fungal, anti-insecticidal, anti-bacterial, anti- allergic, anti-helminthic, anti-inflammatory properties. Black pepper, Piper nigrum, is a climbing perennial plant in the family Piperaceae Piperine, the active principal present in P. longum and P. nigrum was isolated and its bioavailability enhancing action was established. Menthol, Thymol, Phenol, Salicylic acid and Naphthol are amongst the fragrant chemical constituents obtained from Cinnamomum camphora. Main indication of camphor is in skin infections and fungal invasion on the body thus acting as anti fungal agent. The aim of present research work is to design, formulate and evaluate the properties of Pongamia pinnata (karanj) seed oil and its effects as a medicated herbal nail-lacquer on treatment of Onychomycosis.

**PT-370**

**GREEN ALGAE AS A SUSTAINABLE ALTERNATIVE TO SILK LEAF**

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The search for sustainable innovations in biopharmaceutics has led to the exploration of green algae as an alternative to silk leaf technology. In this work, Chlorella vulgaris was embedded in a sodium alginate–calcium chloride matrix to create a translucent, leaf-shaped structure that mimics natural leaves. The design not only provides aesthetic appeal but also sustains algal growth, enabling photosynthesis and continuous oxygen release under light exposure. This bio-inspired algae matrix demonstrates dual functionality: it can act as a decorative, eco-friendly material while also serving as a potential tool for therapeutic applications by producing oxygen and supporting biopharmaceutical processes. The results suggest that algae-based matrices can merge sustainability, functionality, and innovation, offering a promising green alternative to conventional silk leaf systems.

**Keywords:** Green algae, silk leaf alternative, sustainable biopharmaceutics, oxygen producing matrix, drug delivery inovation

**PT-371**

**FORMULATION AND ANTIOXIDANT EVALUATION OF A SYNERGISTIC POLYHERBAL TABLET FOR MENSTRUAL PAIN RELIEF (DPPH ASSAY)**

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Menstrual cramps (dysmenorrhea) impact a significant percentage of women globally and are usually treated using synthetic medications that have adverse effects. Herbal drugs offer a safer option, but it needs to be validated scientifically. This research sought to develop a polyherbal tablet out of Ginger (Zingiber officinale), Fennel (Foeniculum vulgare), and Ashoka (Saraca asoca) and to assess its antioxidant activity through the DPPH assay. The tablet was formulated with typical pharmaceutical methods using suitable excipients for achieving uniformity, hardness, friability, and best disintegration time. DPPH assay was carried out by making ethanolic extracts of the polyherbal tablet and individual herbs. These extracts were incubated with DPPH solution, and the absorbance was recorded at 517 nm to determine the % radical scavenging activity. Outcomes indicated that the polyherbal tablet had a very high antioxidant activity (≈75%) than individual herbs (Ginger 55%, Fennel 48%, Ashoka 42%), suggesting synergistic effect of the coformulation. This antioxidant activity is likely to mitigate oxidative stress related to menstrual pain. Finally, the research proves that the developed polyherbal tablet is not just pharmaceutically acceptable but also shows increased antioxidant activity, validating its traditional applicability in dysmenorrhea management. The research gives a scientific foundation for the incorporation of herbal medicine into contemporary pharma practice.

**Keywords**: Polyherbal Tablet, Menstrual Pain, Ginger, Fennel, Ashoka, DPPH Assay, Antioxidant Activity.

**PT-372**

**HERBAL FOOT MASK THERAPY: A NOVEL APPROACH FOR MENSTRUAL PAIN RELIEF**

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In the current research, a novel herbal foot mask therapy was formulated for the management of menstrual pain (primary dysmenorrhea). The




ISBN: 978-81-980623-8-3

objective behind the study was to evaluate the effect of herbal extracts incorporated into a transdermal foot mask on physicochemical properties, drug release, stability, and pain-relief potential. Herbal ingredients with known analgesic, anti-inflammatory, and muscle relaxant activity such as clove oil, cinnamon oil, chamomile extract, and peppermint oil were selected for formulation. The prepared foot mask was evaluated for pH, spreadability, viscosity, stability, and in vitro drug release profile. A small-scale volunteer study (n=20) was conducted to observe the therapeutic outcome in terms of pain score reduction using a Visual Analog Scale (VAS) and user acceptability. It was observed that the optimized formulation (HF-3, containing clove oil and chamomile in balanced ratio) exhibited pH 6.0, good spreadability, stability under accelerated conditions, and sustained drug release for 6–8 hours. Volunteer feedback indicated a significant reduction in pain intensity ($p < 0.05$) and improved relaxation without any skin irritation. FTIR analysis showed no chemical interaction between the herbal actives and excipients, while SEM studies revealed a uniform film surface suitable for dermal application. Therefore, it can be concluded that herbal foot mask therapy represents a safe, effective, and innovative non-invasive approach for menstrual pain management. Further clinical studies on a larger population are recommended to validate the findings.

**Keywords:** Dysmenorrhea, herbal therapy, foot mask, transdermal delivery, menstrual pain relief

**PT-373**

## FORMULATION AND EVALUATION OF NIGHT CREAM FROM ETHANOLIC EXTRACT OF SYZYGIUM CUMINI (LINN.) SEED

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Night creams are designed to be left on the skin for several hours. They are composed of substantial oil-in-water phase, which will spread without disappearing. Night creams play a crucial role in maintaining skin hydration and preventing premature aging. In this study, we have focus on the use of topical drug delivery system by using Syzygium cumini. Different parts of the Syzygium cumini such as bark, seed, leaves, fruits, have been used in medicine for diabetes, antimicrobial, antioxidant, anti-inflammatory, antifungal etc. It contains phytoconstituents like tannins, flavonoids, phenols, alkaloids, terpenoids, vitamin C, E and beta-carotenes. It can provide cosmetic properties. The flavonoids show antioxidant and anti-aging property and also helps to lighten skin pigmentation. Syzygium cumini or Eugenia jambolana Lam more popularly known as black jamun or Java plum belongs to the family Myrtaceae and is a vital indigenous plant with medicinal applications originally from India and Indonesia. The seeds have promising high level of alkaloids, jambosine, and glycoside jamboline compound. It helps to purify the blood and keep the skin clean, glowing, hydrating and nourishing. The DPPH study was conduct to confirm the antioxidant property and done all the evaluations test, which meet the specifications of night creams.

**Keywords:** Syzygium cumini, jambosine, Antioxidant

**PT-374**

## IN SILICO EVALUATION OF PHYTOCONSTITUENTS FOR HEPATOPROTECTIVE POTENTIAL FROM RUBUS SPECIES

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Members of the Rubus genus are widely consumed as berries known for their rich phytochemicals like polyphenolic, flavanoid, tannins and traditional medicinal use. Despite their antioxidant and anti inflammatory properties evidence present in the literature on the basis of these properties I chose the plant phytochemicals to be evaluated against hepatoprotective activity which remains scarcein the literature.To investigate and compare the hepatoprotective potential of phytoconstituents from Rubus species through molecular docking and ADMET analysis.Major phytochemicals were retrieved from phytochemical databases and published literature. Selected compounds were docked against hepatotoxicity-related targets including CYP2E1, TNF-α using AutoDock Vina. Binding affinities, hydrogen bonding interactions, and active site residues were analyzed. ADMET profiling was performed to predict drug-likeness and pharmacokinetics. Polyphenolic compounds such as ellagic acid and quercetin derivatives, anthocyanin-rich fractions from the rubus species docked against the receptor CYP2E1 and TNF-α. Both phytoconstituents exhibited favorable ADMET properties. In silico analysis suggests that the Rubus species possess hepatoprotective potential through antioxidant and anti-inflammatory mechanisms, though with differences in target preferences. These findings provide molecular evidence supporting further in vitro and in vivo validation of Rubus species as hepatoprotective candidates.

**Keywords:** Rubus species; hepatoprotection; molecular docking; polyphenols; flavanoid

**PT-375**

## FORMULATION AND EVALUATION OF HERBAL TOOTH POWDER FOR ANTI-MICROBIAL ACTIVITY AGAINST ORAL PATHOGENS.

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Dental caries are common oral infections, necessitating effective strategies to eliminate harmful oral microorganisms. This study aimed to formulate and evaluate herbal tooth powder with antimicrobial activity as a natural alternative to modern dental care. The formulation aimed to provide a safe, effective and affordable product that could prevent dental issues such as plaque, gingivitis. The evaluation of the formulated herbal tooth powder was carried out through a comprehensive set of parameters, including physical characterization (colour, odor, taste, texture, moisture content and flowability) microbiological analysis and sensory evaluation. Physical properties were assessed to ensure product stability, consistency and consumer appeal. The antimicrobial activity of the tooth powder was tasted against common oral pathogens using standard agar diffusion method.The formulation exhibited promising antimicrobial efficacy, indicating its potential to inhibit the growth of harmful oral microbes responsible for dental caries and periodontal diseases. From above results it can be concluded that the herbal tooth powder showed significant antimicrobial activity.

**Keywords:** - Natural Ingredients, Oral Hygiene, Dental Care and microbial analysis.

**PT-376**

## ADVANCED VESICULAR DELIVERY OF HERBAL EXTRACTS FOR IMPROVED DERMAL PENETRATION AND PHOTOAGING PREVENTION

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Chronic ultraviolet (UV) exposure is a major contributor to photoaging, causing oxidative stress, collagen degradation, and pigmentation disorders. The present study aimed to design and optimize an advanced vesicular delivery system of a polyphenol-rich herbal extract with established photoprotective properties, to enhance dermal penetration and anti-photoaging efficacy. The extract exhibited high phenolic (202.42 ± 1.78 mg GAE/g) and flavonoid (135.56 ± 2.21 mg TAE/g) content, strong antioxidant activity ($IC_{50}$ ≈ 19 µg/mL), and a significant in vitro SPF value (29.47 ± 0.02), suggesting broad-spectrum UV absorption. Transethosomes were formulated using thin-film hydration followed by probe sonication and optimized for key parameters, yielding vesicles of 120–160 nm with a narrow polydispersity index (<0.3), zeta potential of −30 mV, and entrapment efficiency exceeding 80%. In vitro permeation studies revealed a ~1.7-fold improvement in skin deposition compared to the free extract, with preserved antioxidant activity post-encapsulation. These findings highlight the potential of vesicular nanoformulations as a safe and effective strategy for delivering bioactive herbal actives for photoprotection and prevention of UV-induced skin aging, paving the way for future cosmeceutical applications.

**Keywords:** herbal nanoformulation, transethosomes, photoprotection, skin deposition, antioxidant, anti-photoaging

**PT-377**

## ANALGESIC AND ANTI-INFLAMMATORY POTENTIALS OF BOENNINGHAUSENIA ALBIFLORA: A HIMALAYAN MEDICINAL HERB

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Boenninghausenia albiflora is a herbaceous perennial, belonging to the Rutaceae family. This plant has small, pale white flowers with an unpleasant odour from its leaves and is mostly found in the temperate region of the Himalaya, popularly known as Pissu Mar, and is indigenous to the traditional system of medicine, because of its documented insecticidal, flea repellent, analgesic, antiseptic, anti-inflammatory, and calcium channel blocking activities. To provide an example of evidence for these traditional uses, the present study analyzed the analgesic and anti-inflammatory activities, in addition to the phytochemical profile of the plant extract. Analgesic potential of the plant extract was determined by using the hot plate and tail-flick method and its ability to relieve pain was substantial, indicating that it has pain-relieving potential, while anti-inflammatory activity was performed by using carrageenan-induced paw edema, where the plant extract exerted a significant reduction in paw swelling in a dose and time-dependent manner. These results were also confirmed by in vitro studies by performing the protein denaturation method. Therefore, the findings show that B. albiflora has strong analgesic and anti-inflammatory properties, supporting its traditional use and pointing to its potential as a natural source of new medicinal compounds.

**Keywords:** Boenninghausenia albiflora, Analgesics, anti-inflammatory.

**PT-378**

## HERBAL MUCOADHESIVE GEL OF OCIMUM SANCTUM (TULASI): A PROMISING TREATMENT FOR MOUTH ULCERS

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Aphthous ulcers are painful oral sores that reduce quality of life, and existing treatments frequently provide only brief relief with significant adverse effects. Ocimum sanctum (Tulasi) is a medicinal herb noted for its anti-inflammatory, antibacterial, and wound-healing effects. The purpose of this study was to create and test a herbal mucoadhesive gel derived from Ocimum sanctum for the treatment of mouth ulcers. The gel was created using appropriate mucoadhesive polymers and tested for physicochemical properties, spreadability, viscosity, mucoadhesion, in vitro drug release, and stability. The gel had an adequate pH, excellent viscosity, good spreadability, and strong mucoadhesive strength, resulting in a regulated release of active ingredients. In vivo tests revealed faster ulcer healing and a considerable reduction in ulcer size compared to the control. Ocimum sanctum mucoadhesive gel is a safe and effective herbal formulation that provides sustained release and improved mucosal retention, making it a promising alternative for the treatment of mouth ulcers.

**Keywords**: Ocimum sanctum, Tulasi, mucoadhesive gel, mouth ulcers, herbal formulation, oral ulcers.

**PT-379**

## ASSESSMENT OF ANTIMICROBIAL ACTIVITY OF VARIOUS EXTRACTS OF LEUCAS BIFLORA LEAVES AND GREEN SYNTHESIS OF SILVER NANOPARTICLES OF ACTIVE EXTRACT

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The plant Leucas biflora (Vahl), Robert Brown. family Lamiaceae commonly known as two-flowered Leucas is a diffuse perennial herb used traditionally for the treatment of skin diseases, headache, nose bleeding, conjunctivitis and white discharge in women. The current study focuses on to assess the antimicrobial activity and minimum inhibitory concentration of various extracts of Leucas biflora leaves and the manufacture of eco-friendly silver nanoparticles of most active extract. The leaves extraction was carried out by successive soxhlation extraction method using a various of solvents, likes petroleum ether, ethyl acetate, acetone, ethanol and lastly maceration with alcohol and water. The phytochemical screening of the extracts shown the presence of tannins, flavonoids, alkaloids, carbohydrates, steroids, and saponins. The various extracts were tested for their antimicrobial activity and MIC by using agar well diffusion method and broth dilution method on the gram-positive Bacillus subtilis, Staphylococcus aureus, and on the gram-negative Pseudomonas aeruginosa, Klebsiella pneumoniae, Escherichia coli, Proctus vulgaris and fungi Candida albicans. The ethanolic, ethyl acetate and hydroalcoholic shown more significant antimicrobial activity. Silver nanoparticles of aboves three extracts were prepared using green synthesis and the antimicrobial activity was assessed. The results indicated that the silver nanoparticles of ethanolic extract of Leucas biflora leaves exhibited favourable antimicrobial activity.

**Keywords**: Leucas biflora leaves, extract, silver nanoparticles, green synthesis, antimicrobial activity.

**PT-380**

## ANTIFUNGAL PROPERTIES OF BOERHAVIA DIFFUSA AGAINST DERMATOPHYTES: A COMPREHENSIVE PHYTOCHEMICAL AND MOLECULAR STUDY

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Dermatophytic infections remain an important global health challenge, with rising antifungal resistance highlighting the urgent need for safer and more effective alternatives. Natural products are increasingly explored as potential solutions, and Boerhavia diffusa, a plant long valued in traditional medicine, represents a promising candidate due to its rich profile of bioactive compounds. The present study evaluated the antifungal activity of ethanolic extracts obtained from the leaves and roots of B. diffusa against clinically relevant dermatophytes including Trichophyton rubrum, Microsporum canis, Epidermophyton floccosum. Antifungal assays using the disk diffusion method demonstrated that the leaf extract exhibited greater inhibitory potential than the root extract, producing zones of inhibition that ranged from 14 to 16 mm, values comparable to the standard drug clotrimazole (17–19 mm). Determination of the Minimum Inhibitory Concentration (MIC) and Minimum Fungicidal Concentration (MFC) further confirmed the superior efficacy of the leaf extract. It demonstrated potent inhibition of T. rubrum (MIC: 1.0 mg/mL) and M. canis (MIC: 1.5 mg/mL), while its activity against E. floccosum was moderate. Synergistic evaluation with fluconazole revealed a significant enhancement of activity, particularly against T. rubrum, as demonstrated by a fractional inhibitory concentration (FIC) index of 0.35, indicating strong synergism. Microscopic observations further showed structural deformities in fungal hyphae, compromised cell walls, and abnormal conidial development, providing morphological evidence of antifungal action. In conclusion, these findings scientifically validate the traditional application of B. diffusa and highlight its potential as a natural antifungal therapy, whether used independently or in combination with existing drugs.

**Keywords:** Boerhavia diffusa, Dermatophytes, Antifungal activity, Phytochemical analysis, Synergistic effects

**PT-381**

## IN-VITRO ANTIOXIDANT EFFICACY AND PHYTOCHEMICAL CHARACTERISATION OF MORINGA OLEIFERA LEAF EXTRACT

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In a recent study, there has been a growing interest in researching and developing new agents with various biological activities. In view of this, we have conducted a phytochemical and biological evaluation of Moringa Oleifera. Pharmacognostic parameters of powder determined by the determination of organoleptic, morphological & microscopical properties of Moringa Oleifera (leaves). Physiochemical investigation done by determining water-soluble extractives (26.41±0.39% w/w), alcohol soluble extractives (14.3±0.20 % w/w), total ash value (6.0±0.25% w/w), acid-insoluble ash value (3.4±0.12% w/w), and water-soluble ash value (1.6±0.20 % w/w) & moisture content (LOD) (1.21±0.03 % w/w). Preliminary phytochemical screening finished. The alcoholic extract reveals the presence of active phytoconstituents, including




ISBN: 978-81-980623-8-3

glycosides, phenols, flavonoids, and tannins. The phytochemical characterisation of the plant extract performed using advanced techniques, including TLC, HPTLC, and HR-LCMS. We have carried out pre-formulation studies on the hydroalcoholic extract of Moringa Oleifera (leaves) using parameters such as Angle of Repose (29.00±0.12), Bulk density (0.43±0.01), tapped density (0.64±0.012), particle size (MF), Carr's index (18.61±0.122) & Hausner's ratio (1.21±0.05). We have carried out an in-vitro study of hydro alcoholic extract Moringa Oleifera (leaves) total phenolic content by Folin- Ciocalteau method, 500ug/ml shows maximum concentration of Phenols (33.932 mg/GAE/g), flavonoid content by the Aluminium Chloride Colourimetric method, 1mg/ml, shows (46.29mg/QC/g) maximum concentration of flavonoids. The in vitro radical scavenging potential was assessed using the DPPH method and the NO method. A 1mg/ml sample concentration shows (56.34% and 57.608 %) radical scavenging activity, respectively.

**Keywords**: Pharmacognostic, Pre-formulation, Antioxidant study, Total phenolic contents & total flavonoid contents

**PT-382**

## ENDOPHYTES AT WORK: EXPLORING BOERHAVIA DIFFUSA ROOT MICROBIOME FOR HEPATOPROTECTIVE POTENTIAL

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The liver is a vital organ involved in metabolism and detoxification. Endophytes, symbiotic microorganisms residing in plants, are known to produce bioactive metabolites with therapeutic potential. To isolate and characterize endophytic bacteria from Boerhavia diffusa roots and evaluate the hepatoprotective potential of their chloroform (CBD) and ethyl acetate (EABD) fractions. Endophytes were isolated and identified by PCR analysis. Crude fractions (CBD & EABD) were tested for antioxidant activity (DPPH, hydroxyl radical, lipid peroxidation) and hepatoprotective activity in $CCl_4$-induced hepatotoxic rats. Serum biomarkers (SGOT, SGPT, SALP, bilirubin, cholesterol, protein), endogenous antioxidants (SOD, CAT, GSH), liver weight, and histopathology were assessed. $CCl_4$ treatment induced oxidative stress and liver injury. Administration of CBD and EABD fractions significantly normalized biochemical markers, improved liver histology, and restored antioxidant levels. Flavonoid-rich metabolites from Bacillus cereus strain endophytes likely contributed to the hepatoprotective effect. Endophytic fractions of Boerhavia diffusa roots exhibit strong antioxidant and hepatoprotective activity, suggesting their potential as alternative therapeutic sources.

**Keywords:** Boerhavia diffusa, Endophytes, Bacillus cereus, Antioxidant, Hepatoprotective

**PT-383**

## ANTI-INFLAMMATORY POTENTIAL OF SECHIUM EDULE LEAF EXTRACT: AN IN-VITRO STUDY

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Inflammation plays a crucial role in the pathogenesis of various chronic disorders such as arthritis, cardiovascular, and neurological diseases, and medicinal plants remain an important source of bioactive compounds with therapeutic potential. Sechium edule (chayote), a member of the Cucurbitaceae family, is traditionally employed in folk medicine, but limited studies have been conducted to explore its anti-inflammatory potential. The present study was designed to evaluate the in-vitro anti-inflammatory activity of S. edule leaf extract. Fresh leaves were collected from Kamrup district, Assam, shade-dried, and extracted successively using Soxhlet with petroleum ether, chloroform, and ethanol. The ethanolic extract was subjected to preliminary phytochemical screening, which confirmed the presence of flavonoids, alkaloids, tannins, phenols, and terpenoids. The anti-inflammatory activity was assessed using the Human Red Blood Cell (HRBC) Membrane Stabilization Test and the Egg Albumin Denaturation Assay, employing Diclofenac as the reference standard. Results revealed that the ethanolic extract exhibited significant inhibition of protein denaturation and effective membrane stabilization activity, which were comparable to those of Diclofenac, thereby validating its traditional medicinal use. The findings suggest that the anti-inflammatory activity of S. edule may be attributed to the presence of bioactive secondary metabolites, and thus, the plant shows promise as a potential source for developing phytopharmaceuticals or herbal formulations for the management of inflammatory conditions. However, further in-vivo studies, isolation of active constituents, and mechanistic evaluations are warranted to establish its therapeutic efficacy and safety profile.

**Keywords:** Sechium edule, chayote, anti-inflammatory activity, HRBC membrane stabilization, protein denaturation, phytochemicals

**PT-384**

## HERBAL BIOACTIVE AS NOVEL LEADS FOR THE MANAGEMENT OF NEURODEGENERATIVE DISORDERS: RECENT CHALLENGES AND FUTURE DIRECTIONS

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Neurodegenerative disorders (NDs) are characterized by the progressive loss of structure and function of neuron. NDs including Alzheimer's disease, Parkinson's disease, and Huntington's disease, are among the leading causes of disability and mortality worldwide. Their progressive nature, limited therapeutic efficacy of current drugs, and associated adverse effects highlight the urgent need for alternative strategies. Phytoconstituents, derived from medicinal plants, have emerged as promising candidates due to their multitargeted mechanisms, neuroprotective properties, and favorable safety profiles. Numerous classes of phytochemicals, such as alkaloids, flavonoids, terpenoids, saponins, and polyphenols, demonstrate antioxidant, anti-inflammatory, anti-amyloidogenic, and cholinesterase inhibitory activities that directly address the pathological hallmarks of neurodegeneration. Additionally, advancements in phytopharmacology and nanotechnology-based delivery systems have further enhanced their bioavailability and therapeutic potential. Current preclinical and clinical studies suggest that phytoconstituents not only alleviate symptoms but also modulate disease progression, offering a holistic approach to management. These highlights the relevance of phytoconstituents as potential therapeutic agents in neurodegenerative disorders, emphasizing their role in bridging the gap between traditional knowledge and modern pharmacological interventions.

**Keywords:** Phytoconstituents, Neurodegenerative disorders, nanotechnology-based delivery systems, Neuroprotection, Herbal therapeutics.

**PT-385**

## IV-VITRO ANTIOXIDANT APPROACH: TO EVALUATE THE CAPABILITY OF FICUS EXASPARATA LEAVES EXTRACT FOR MITIGATING OXIDATIVE STRESSES

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Reactive Oxygen Species contributes to peptic ulcer formation by directly damaging the gastric mucosal cells through lipid peroxidation, protein, DNA damage and by inducing an inflammatory response that exacerbates this damage. The depletion of antioxidant defenses and the presence of H. pylori or NSAIDs amplify the impact of reactive oxygen species leading to the development and progression of peptic ulcers. Ficus exasperata exhibits various pharmacological actions utilized in various medical conditions like antiulcer, antidiabetic, antimicrobial, anti-inflammatory, anxiolytic, antipyretics, anticonvulsant, antihypertensive, hypolipidemic, stomach pain, hemorrhoids, antiarthritic, antioxidants and hypoglycaemic. Antioxidant Assays was done by four different invitro methods using UV Spectrophotometer 1. DPPH Assay of Ficus exasperata Extracts 2. Ferric Reducing Antioxidant Power (FRAP) assay 3. Superoxide Anion Radical Scavenging Activity Assay 4. Hydroxyl radical scavenging activity The results indicate that Ficus exasperata possesses significant free radical scavenging potential, which could contribute to its antioxidant properties. This activity suggests the presence of bioactive compounds capable of mitigating oxidative stress, highlighting its potential use as a natural antioxidant source in therapeutic and nutraceutical applications. The radical scavenging activity (% RSA) of the plant extract (PE) and standard was




ISBN: 978-81-980623-8-3

evaluated, showing dose-dependent activity. The PE demonstrated moderate antioxidant potential, with % RSA increasing from 11.25% at 10 µg/ml to 61% at 50 µg/ml, achieving an IC50 of 40.11 µg/ml. From above cited results we can conclude that the extract of ficus exasperata having significant antioxidant potential so that it can be used for further studies of pharmacological evaluation of antiulcer activities.

**Keywords:** Antioxidant, Ficus exasperata, reactive oxygen species, peptic ulcer.

**PT-386**

**EVALUATION OF HERBAL FORMULATION CONTAINING INDIGENOUS MEDICINAL PLANTS FOR ANTIOXIDANT AND PHYTOCHEMICAL PROPERTIES**

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Herbal medicines have been traditionally used for centuries in India due to their therapeutic potential and minimal side effects. Combining multiple medicinal plants in a single formulation may enhance their pharmacological activity. This study was designed to evaluate the phytochemical profile and antioxidant properties of a polyherbal formulation. The formulation was prepared using extracts of Ocimum sanctum (Tulsi), Withania somnifera (Ashwagandha), and Curcuma longa (Turmeric). Preliminary phytochemical screening was performed to identify the presence of secondary metabolites. Antioxidant activity was assessed using DPPH and ABTS free radical scavenging assays. Phytochemical analysis revealed the presence of alkaloids, flavonoids, phenolics, tannins, and terpenoids in the formulation. Both DPPH and ABTS assays demonstrated significant free radical scavenging activity, suggesting strong antioxidant potential of the herbal mixture. The combined formulation showed greater activity compared to individual extracts reported in literature. The study highlights that the synergistic combination of Tulsi, Ashwagandha, and Turmeric enhances antioxidant activity, supporting their traditional use in healthcare. Integration of phytochemical screening with antioxidant assays provides scientific validation for indigenous herbal formulations and their potential therapeutic benefits.

**Keywords:** Pharmacognosy, herbal formulation, phytochemistry, antioxidant activity, indigenous plants

**PT-387**

**ANTIOXIDANT AND ANTI-TUMOUR ACTIVITIES OF VARIOUS EXTRACTS OF SPECIES OF THE APOCYNACEAE FAMILY**

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The prevalence of cancer is on the rise globally. Thus, there is a need for newer, effective agents to treat cancer. Plants constitute the major source of anticancer principles and have been in practice since ancient times. There is a great need to discover the therapeutic potential of medicinal plants as a number of species yet remain unexplored. The present study aims to identify the antioxidant and anti-tumor potential of various extracts of Wrightia tinctoria. Proven anticancer activity of the species of Apocynaceae family and documented evidence of its usage in ayurvedic medicine provided us an insight to explore the activity of this plant. The bark of Wrightia tinctoria was collected, dried and powdered. An ethanolic extract was prepared, subjected to successive extraction with petroleum ether, chloroform and acetone. An aqueous extract was also prepared. All extracts were assessed for antioxidant activity by in vitro and ex vivo assays. The scavenging of DPPH, ABTS and hydroxyl radicals was assessed, alkaline DMSO method was used to assess scavenging of superoxide radicals. The extracts were also studied for their ability to inhibit ferrous sulphate stimulated lipid peroxidation. For in vivo antitumor activity, the Ehrlich's Ascitic Carcinoma model in mice was employed wherein 2.5x106 cells/ml of tumor suspension was injected intraperitoneally and activity of the extracts was compared against standard cisplatin at 3.5mg/kg i.p. All haematological parameters and levels of endogenous antioxidant enzymes were assayed using the liver homogenate. The extracts of Wrightia tinctoria were found to possess satisfactory antioxidant property. They reversed the cancer associated haematological changes in EAC mice. The antitumor activity was confirmed by the Ehrlich's Ascitic Carcinoma model. The antioxidant potential and antitumor activity of Wrightia tinctoria has been demonstrated. Further investigation to explore the anti cancer principles of the medicinal plant is essential.

**PT-388**

**HERBAL EXTRACT LOADED PYTOSOMES FOR TREATING DENGUE: FORMULATION AND EVALUATION**

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In the present study phytosomes were prepared from Carica papaya leaf extract by solvent evaporation method .Phytosomes are novel vesicular drug delivery systems which are used as carriers of herbal extracts that are enveloped and bound by lipids. The traditional medicine to treat dengue fever in papaya leaf juice as it increases platelet count.The phytosomes prepared in the present study were found to be spherical in shape with rough surface having a particle size of 179nm which is within the limit .The zeta potential was found to be -41.4mv. the phytosomal preparation showed maximum drug release than from the pure leaf extract thus it can be concluded that carica papaya phytosomes can be benefial and effective in the treatment of dengue fever due to increased release.

**Keywords:** Phytosomes, dengue, Carica papaya

**PT-389**

**NEUROPROTECTIVE HERBS FOR THE MANAGEMENT OF ALZHEIMER'S DISEASE ASAVARI A. RANGARI, PRANALI SHASTRAKAR**

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Alzheimer's disease (AD) is a chronic neurodegenerative disease characterized by cognitive impairment, memory loss, and behavioral changes, with its primary etiology linked to amyloid-β deposition, tau hyperphosphorylation, oxidative stress, and neuroinflammation. Pharmacological treatments presently can provide only symptomatic improvement, and this has stimulated the investigation of neuroprotective natural products as adjuvant treatments. A variety of herbs and phytochemicals possess potential in reducing AD pathology. Withania somnifera (Ashwagandha) activates its active compound withaferin A, increasing synaptic function, lowering oxidative stress, and enhancing neuronal regeneration. Curcumin from Curcuma longa has strong anti-inflammatory and antioxidant properties, prevents amyloid aggregation, and modulates tau pathology. Resveratrol, a grape polyphenol, stimulates sirtuin-1 pathways, reduces oxidative stress, and enhances mitochondrial function. Sulforaphane in cruciferous vegetables induces phase II detoxifying enzymes, lowers neuroinflammation, and enhances neuronal survival. Epigallocatechin gallate (EGCG) from green tea suppresses amyloid fibril formation, is neuroprotective against excitotoxicity, and increases synaptic plasticity. N-acetylcysteine (NAC), a glutathione precursor, restores redox homeostasis, prevents mitochondrial failure, and minimizes neuroinflammatory reactions. Omega-3 fatty acids, especially docosahexaenoic acid (DHA), are essential to preserve neuronal membrane integrity, decrease amyloid load, and facilitate synaptic signaling. Together, these phytoconstituents work through multifaceted mechanisms such as antioxidant defense, anti-amyloidogenic actions, modulation of neurotransmission, and stimulation of neurogenesis. While preclinical and clinical trials exhibit promising results, issues persist regarding bioavailability, optimization of dosage, and clinical validation at the large scale. Standardized formulation and combinational approaches need to be stressed in future research. Neuroprotective herbs and phytoconstituents thus form a good adjunct in the therapy of Alzheimer's disease.

**Keywords:** Alzheimer's disease, Neuroprotection, Herbal medicine, Phytochemicals, Ashwagandha, Withaferin A, Curcumin, Resveratrol, Sulforaphane, EGCG, N-acetylcysteine, Omega-3 fatty acids

**PT-390**




ISBN: 978-81-980623-8-3

**DEVELOPMENT OF POLYHERBAL CANDY FORMULATION FOR DYSMENORRHEA**

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Dysmenorrhea is one of the most common gynecological disorders, presenting with cyclic pelvic pain and systemic symptoms that impair daily activities in women of reproductive age. Conventional therapies such as non-steroidal anti-inflammatory drugs (NSAIDs) are effective but often associated with adverse effects during long-term administration. In this context, herbal formulations are gaining attention as safer alternatives. The present study focuses on the development of a polyherbal candy formulation utilizing Zingiber officinale (ginger), Beta vulgaris (beetroot), Emblica officinalis (amla), Foeniculum vulgare (fennel), and Ziziphus mauritiana (Indian jujube). Each ingredient was selected based on its reported pharmacological activities relevant to dysmenorrhea: Ginger – analgesic, anti-inflammatory, and antispasmodic properties. Beetroot – hematinic effect and improved nitric oxide bioavailability.Amla – antioxidant and immunomodulatory actions reducing oxidative stress. Fennel – phytoestrogenic, antispasmodic, and carminative activities. The candy-based delivery system was chosen for its palatability, patient acceptability, and potential to enhance compliance compared with traditional herbal preparations. This formulation is anticipated to exert synergistic action in relieving menstrual pain, correcting anemia-related fatigue, and improving quality of life. Further preclinical and clinical investigations are warranted to evaluate pharmacological efficacy, safety, and stability of the formulation.

**PT-391**

**PHYSICOCHEMICAL PARAMETERS AND ANTIFUNGAL ACTIVITY OF ETHYL ACETATE EXTRACT OF WHOLE PLANT MOMORDICA CYMBALARIA.LINN COLLECTED FROM SURROUNDING OF BIDAR (KARNATAKA)**

Shaheen Fatima ifrah, Zeba Tabassum, Mallikarjun Malipatil

Antifungal activity of whole plant of Momordica Cymbalaria Linn has been studied by agar cup plate diffusion method. Significant antifungal activity was shown by Ethyl acetate extract and plant belongs to family Cucurbitaceae. The present study mainly concentrates on evaluation of morphological characteristics, physico-chemical parameters of whole plant and preliminary phytochemical characterization of the Ethyl Acetate extract of whole plant of Momordica Cymbalaria Linn was performed.

**Keywords:** Momordica cymbalaria Linn, ethyl acetate extract, physic-chemical parameters, antifungal activity, candida albicans.

**PT-392**

**HERBAL INNOVATION IN DERMATOLOGY: HORSE GRAM-BASED TRANSDERMAL PATCHES FOR ACNE THERAPY**

Aakifah Zaib. I, Sumaiya Yasmeen B.I, Snigdha S Babu

Acne vulgaris is among the most common skin disorders, often leading to physical scarring and emotional distress. Conventional therapies such as antibiotics and retinoid, though effective, are limited by side effects, high cost, and antibiotic resistance. This study aimed to develop and evaluate herbal transdermal patches using horse gram (Macrotyloma uniflorum), a legume valued for its antibacterial, antioxidant, and anti-inflammatory activities. Methanolic extracts of horse gram seeds were prepared using Soxhlet extraction and incorporated into patches formulated by solvent casting method with methanol as solvent, HPMC and PVP K-30 as polymers, glycerol as plasticizer and PEG-400 as a permeation enhancer. The prepared patches were evaluated for physicochemical properties, in-vitro release and anti-bacterial activity. Results showed desirable uniformity, weight variation and surface pH, along with effective drug release and skin permeation. Notably, a clear zone of inhibition against Staphylococcus aureus was observed for the extract, powder, and formulated patches, confirming their antimicrobial potential against acne. These results suggest that horse gram–based patches represent a safe, eco-friendly, and cost-effective approach to acne management by combining traditional herbal therapy with modern transdermal drug delivery.

**Keywords:** Horse gram, Herbal patches, Acne vulgaris, Antibacterial activity.

**PT-393**

**BIOLOGICAL ACTIVITIES OF BUTEA MONOSPERMA LEAF**

Shivaprasad V S

To investigate antioxidant and antimicrobial activities of Butea monosperma leaf (L). The 17% of rural population were depending on traditional based components and were using for various treatment of disorders. In present scenario the synthetic analogues lead abundant, drastic tragedies exhibits who are consuming the analogues, especially chemotherapeutic analogues over elicits more severe adverse effects rather than clinical value. The developed countries like Japan so far not depending on allopathic medicine because of genomic alterations and leads defect on immunity. By considering all these facts we decided that, bio analogues are excellent, safe, economically cheap and comfortable for human kinds hence the present study is focused on anti-oxidant and anti-microbial activity Butea monosperma. The rise of drug-resistant pathogens poses a major challenge in treating infectious diseases, highlighting the need for alternative therapies. Plant extracts, long used in traditional medicine, are valuable sources of antimicrobial and antioxidant compounds. Butea monosperma, widely recognized for medicinal properties, was investigated in this study. The ethanolic leaf extract was evaluated for antimicrobial activity and in vitro antioxidant potential. Antioxidants are vital in protecting against reactive oxygen species (ROS)-induced damage linked to cancer, aging, and chronic diseases. Since synthetic antioxidants like BHA and BHT raise safety concerns, natural alternatives such as Butea monosperma offer promising therapeutic and food preservation applications.

**Keywords:** Butea monosperma leaf (L), Antioxidant, DPPH, Antimicrobial

**PT-394**

**PHARMACOGNOSY AND PHYTOCHEMISTRY OF LEAVES OF TEPHROSIA UNIFLORA**

SAHANA HC

The need for and significance of pharmacognostic analysis of leaves extracts of Tephrosia uniflora are discussed in the current research. The various extracts like petroleum ether, chloroform, alcohol,and aqueous leaves extracts of Tephrosia uniflora was prepaared and studied the Organoleptic characteristics, macroscopic, powder microscopic, physicochemical analysis , phytochemical analysis, and fluorescence analysis of Tephrosia uniflora .The physicochemical evaluation shows, loss on drying was found to be 0.14% w/w,total ash value 6.94% w/w, acid insoluble ash value 3.16%w/w and extractive value of petroleum ether extract shows 3.2% w/w,chloroform extrcats was found to be 3.9% w/w,alcohol extracts was found to be 4%w/w,aqueous extracts was found to be 4.8%w/w.Phytochemical analysis shows the presence of carbohydrates, phenols,flavonoids,alkaloids, and tannins. These are just a few of the parameters that need to be evaluated for a pharmacognostic study of Tephrosia uniflora.

**Keywords:** Tephrosia uniflora, pharmacognostic study, physicochemical analysis,phytochemical study, and fluorescence analysis.

**PT-395**

**FORMULATION AND EVALUATION OF HERBAL GEL CONTAINING ALOE VERA FOR ANTI-INFLAMMATORY ACTIVITY**

Chaitanya Jamdade

The present study focuses on the formulation and evaluation of a herbal topical gel containing Aloe vera for its potential anti-inflammatory activity. Aloe vera, a well-known medicinal plant, possesses a wide range of pharmacological effects, including anti-inflammatory, antioxidant, and wound-healing properties. In this study, a gel was formulated using carbopol 940 as the gelling agent, glycerin as a humectant, and appropriate preservatives. The gel was evaluated for key physicochemical parameters such as pH, viscosity, spreadability, and homogeneity. The results also demonstrated that the formulation was stable, non-irritant, and had acceptable organoleptic properties. This study suggests that Aloe vera-based herbal gels can serve as a safe and effective alternative to synthetic topical anti-inflammatory agents with minimal side effects.

**Keywords:** Herbal formulation, Aloe vera, anti-inflammatory, topical gel, evaluation




ISBN: 978-81-980623-8-3

**PT-396**

**ANTI-ACNE HERBAL FACE CREAM – A NATURAL APPROACH TO CLEARER SKIN**

Kazi aadil

Acne vulgaris is a prevalent dermatological condition affecting individuals of all age groups, particularly adolescents and young adults. The excessive use of synthetic drugs such as benzoyl peroxide and retinoids often leads to side effects like skin irritation, dryness, and resistance development. This has spurred the demand for safer, herbal alternatives with minimal side effects and long-term benefits.To formulate and evaluate a topical anti-acne herbal face cream using scientifically validated plant extracts known for their antimicrobial, anti-inflammatory, and sebostatic properties. The cream was formulated using herbal ingredients including Azadirachta indica (Neem), Ocimum sanctum (Tulsi), Curcuma longa (Turmeric), and Aloe vera gel as the base. These herbs were selected for their proven efficacy against acne-causing bacteria (Propionibacterium acnes), antioxidant activity, and soothing effects. The formulation was prepared using the oil-in-water emulsion method. Evaluation parameters included pH, viscosity, spreadability, stability, antimicrobial activity, and skin irritation studies.The herbal cream exhibited a pH range of 5.5–6.0, making it compatible with skin. The formulation showed good spreadability, excellent stability under accelerated conditions, and significant antibacterial activity against P. acnes and Staphylococcus aureus. No signs of irritation were observed in patch testing on human volunteers.

**Keywords:** Herbal formulation, Anti-acne cream, Neem, Tulsi, Aloe vera, Natural skincare, Acne vulgar

**PT-397**

**STANDARDIZATION OF HERBAL MEDICINE**

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In recent years, there has been a significant global surge in the demand for natural and plant-based remedies due to their perceived safety, affordability, and cultural acceptance. However, one of the major challenges in integrating herbal medicine into mainstream healthcare is the lack of proper standardization. Standardization ensures consistent quality, efficacy, and safety of herbal products across different production batches. Unlike synthetic drugs that contain a single active compound, herbal formulations consist of numerous bioactive constituents, making them inherently complex and variable. This complexity is further influenced by factors such as plant species, geographical location, harvesting time, processing methods, and storage conditions. To address these challenges, advanced analytical techniques such as High-Performance Liquid Chromatography (HPLC), Gas Chromatography (GC), and Mass Spectrometry (MS) are used for identifying and quantifying active ingredients. Additionally, quality-control protocols include screening for microbial contamination, heavy metals, pesticides, and other adulterants. Standardization also involves developing proper labeling, dosage guidelines, and usage instructions to ensure consumer safety and promote rational use. Regulatory agencies like the World Health Organization (WHO) and national drug authorities play a vital role in establishing and enforcing standards and protocols. Overall, standardization enhances the credibility and safety of herbal medicines and supports their scientific evaluation and acceptance in evidence-based medical systems.

**Keywords**: Herbal medicine, Standardization, Quality control, Bioactive compounds, HPLC, GC, MS, Traditional medicine, Regulatory frameworks, WHO guidelines, Dosage, Contamination, Natural products.

**PT-398**

**PLANT-DERIVED ANTIMICROBIALS: A SUSTAINABLE ALTERNATIVE**

Safa Salahuddin Fakji

The global escalation of antimicrobial resistance (AMR) has become a pressing concern in public health, necessitating the exploration of alternative and sustainable antimicrobial strategies. Plant-derived antimicrobials (PDAs) have emerged as promising candidates due to their structural diversity, biodegradability, and bioactivity. These naturally occurring compounds—such as alkaloids, flavonoids, terpenoids, saponins, and tannins—possess potent antibacterial, antifungal, and antiviral properties. They act through various mechanisms, including disruption of microbial membranes, inhibition of enzyme activity, and interference with nucleic acid synthesis. India, with its vast biodiversity and deep-rooted tradition in herbal medicine, offers a rich source of medicinal plants that can be harnessed for antimicrobial drug development. Plants such as Azadirachta indica (Neem), Ocimum sanctum (Tulsi), Curcuma longa (Turmeric), and Allium sativum (Garlic) have demonstrated broad-spectrum efficacy against multidrug-resistant pathogens. Moreover, advancements in extraction techniques, phytochemical analysis, and nanotechnology are enhancing the efficacy, stability, and delivery of these compounds. This underscores the potential of integrating ethnobotanical knowledge with modern pharmaceutical sciences to develop plant-based antimicrobials that are both effective and environmentally sustainable. PDAs not only reduce reliance on synthetic antibiotics but also align with global initiatives promoting green chemistry and eco-friendly therapeutics. Continued research, standardization, and clinical validation are crucial to transition these natural compounds into mainstream medical applications and address the growing AMR crisis.

**Keywords:** Plant-derived antimicrobials, phytochemicals, antimicrobial resistance (AMR), medicinal plants, ethnobotany, herbal medicine, green therapeutics, sustainable pharmaceuticals, Neem, Tulsi, Curcumin, natural antibiotics, Indian traditional medicine.

**PT-399**

**NATURAL SUNSCREEN**

Aliya ansari, Swapnil dounde

Excessive exposure to ultraviolet (UV) radiation from the sun can lead to various skin problem, including sunburn, premature aging and increased risk of skin cancer. While synthetic sunscreens are widely available, they often contain chemical ingredients that may cause skin irritation or environmental harm. As a result, the demand for natural, plant- based sunscreens is increasing due to their safety, biocompatibility, and eco-friendliness.This study focuses on the formulation and evaluation of a herbal ingredients such as Aloe vera, Turmeric (Curcuma longa), Green tea extract (camellia sinensis), and Coconut oil, which are known for their UV-protective, antioxidant, and skin-soothing properties. The formulation was tested for Sun Protection Factor (SPF) value using spectrophotometric analysis, along with physical stability, spreadability, and skin compatibility. The results revealed that the natural sunscreen exhibited significant SPF value and was well-tolerated on the skin indicating its effectiveness as a safe and eco-friendly alternative to commercial sunscreens.

**Keywords:** Natural sunscreen, UV protection, Herbal formulation, SPF, Skincare

**PT-400**

**FORMULATION AND EVALUATION OF HERBAL HAND SANITIZER**

AMIR HAMZA KARIM SHAIKH

As a concern about the potential side effects and environmental impact of synthetic chemicals in hand sanitizers increases, there is a growing demand for natural, herbal alternatives. This research focuses on the formulation and evaluation of a novel herbal hand sanitizer, aiming to provide an effective yet gentle solution for hand hygiene. Herbal extracts are known for their rich abundance of bioactive compounds such as flavonoids, tannins, and essential oils, which possess significant antimicrobial and antiseptic properties. The extract for this formulation is typically made by water or hydro alcohol solutions, ensuring the retention of these beneficial compounds. The research aims to develop a hand sanitizer that effectively reduces microbial load while being mild on the skin, minimizing dryness and irritation often associated with conventional sanitizers. The herbal sanitizer acts as a natural agent providing effective disinfection, addressing the rising need for sustainable and natural hygiene solutions.

**Keywords**: Herbal Extracts, natural sanitizer, antimicrobial, hand hygiene, skin-friendly

**PT-401**

**HERBAL FORMULATIONS IN MODERN MEDICINE**

Aaliya Badgujar, Rajat Sayyed

Herbal formulations have been an integral part of traditional medicine for centuries, but today they are gaining renewed attention due to their safety, minimal side effects, and therapeutic effectiveness. As a second-




ISBN: 978-81-980623-8-3

year B.Pharmacy student, I have always been fascinated by how Nature-derived compounds can offer powerful remedies for a wide range of diseases. The growing demand for natural and organic healthcare products has led to the integration ofherbal ingredients in modern pharmaceutical formulations such as creams, gels, lotions, syrups,and even capsules. Extracts from plants like neem, tulsi, aloe vera, turmeric, and ashwagandhaare now commonly used in products designed to treat conditions ranging from skin infections to digestive disorders and stress management.In our academic curriculum and lab sessions, I have gained hands-on experience in preparing and analyzing such herbal products. Through these formulations, I've learned about the significance of standardization, extraction techniques, stability testing, and ensuring patient compliance. The combination of traditional wisdom with modern scientific approaches makes herbal formulations a promising area for future research and innovation. I aspire to further explore this field and contribute to the development of safe, effective, and affordable herbal-based therapeutics that can serve global health needs while preserving natural resources.

**PT-402**

**AYURVEDIC MEDICINE FOR SKIN TREATMENT**

SWAPNIL DOUNDE, B. MOUNIKA YADAV

Ayurveda, one of the world's oldest holistic healing systems, originated in India over 5,000 years ago. Based on the principle of balance between the body, mind, and spirit, Ayurveda offers a natural and deeply rooted approach to treating various health conditions—including skin-related disorders. In contrast to modern dermatological treatments that often focus on symptom suppression using synthetic chemicals, Ayurvedic skin care emphasizes long-term healing by addressing the root causes of imbalances in the body. According to Ayurvedic philosophy, the skin is a mirror that reflects te internal state of the body. Issues like acne, eczema, psoriasis, pigmentation, dryness, premature aging, and rashes are often manifestations of an imbalance in the three doshas: Vata (air and space), Pitta (fire and water), and Kapha (earth and water). These imbalances may be caused by poor diet, lifestyle habits, hormonal shifts, emotional stress, or seasonal changes. The Ayurvedic approach to skin treatment is multidimensional. It includes internal detoxification, herbal formulations, external therapies, dietary regulations, and mental wellness practices. One of the core concepts is to purify the blood and digestive system (Agni) since many skin conditions stem from internal toxins (Ama). The traditional Panchakarma therapy is often used for detoxification. It involves a series of cleansing procedures that eliminate toxins from the body, leading to better skin clarity and overall health. A wide range of natural herbs and plant-based ingredients form the backbone of Ayurvedic skin treatments. Neem is widely known for its antibacterial and antifungal properties; Turmeric is a powerful anti-inflammatory and antioxidant agent; Aloe vera is used for its soothing and healing effects; Manjistha acts as a blood purifier and helps manage pigmentation and acne; Sandalwood cools the skin and adds radiance; and Tulsi (Holy Basil) aids in detoxifying and cleansing. These ingredients are prepared into various forms such as herbal oils, powders, pastes, decoctions, and creams depending on individual dosha analysis. External treatments like Abhyanga (herbal oil massage), Ubtan (herbal scrubs), lepas (face packs), and steam therapy help improve circulation, remove toxins, nourish the skin, and promote a healthy glow. These are often combined with dietary guidelines that recommend fresh fruits, green leafy vegetables, whole grains, warm water, and herbal teas to support healthy skin from the inside. Moreover, Ayurveda strongly emphasizes mental and emotional balance as a part of skin health. Practices like yoga, pranayama, and meditation help reduce stress levels which are often linked to skin breakouts and inflammation. One of the greatest strengths of Ayurvedic medicine is that it is natural, gentle, sustainable, and largely free from side effects. As awareness grows around chemical-free skincare and holistic wellness, Ayurvedic practices are gaining renewed importance both in India and globally.

**PT-403**

**ALOE VERA-BASED TOPICAL FORMULATION FOR THE MANAGEMENT OF SUNBURN**

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Sunburn is a common inflammatory skin response resulting from overexposure to ultraviolet (UV) radiation. Conventional treatments often rely on corticosteroids and synthetic cooling agents, which may cause skin sensitivity and long-term side effects. Aloe vera, a well-known medicinal plant, is rich in vitamins, polysaccharides, and antioxidants, making it an excellent natural agent for soothing and healing sun-damaged skin.To formulate and evaluate a topical Aloe vera-based gel for the effective management of sunburn, aiming to provide natural skin relief with minimal irritation and optimal healing potential.Freshly extracted Aloe vera gel was used as the primary active ingredient, combined with natural cooling agents like menthol and rose water, along with gelling agents such as Carbopol 940. The formulation was prepared using the cold homogenization method. The gel was evaluated for pH, viscosity, spreadability, skin irritation, stability, and in-vitro antioxidant activity (DPPH assay).The Aloe vera-based gel showed a pH of 5.6, ideal for skin application. It exhibited smooth texture, excellent spreadability, and no signs of irritation in patch tests. The formulation remained physically and chemically stable under accelerated storage conditions. The DPPH assay confirmed the presence of strong antioxidant activity, supporting the gel's potential to neutralize UV-induced free radicals. The formulated Aloe vera-based gel provides a safe, soothing, and effective treatment for sunburn, combining natural healing properties with antioxidant protection. This herbal approach can serve as a gentle and eco-friendly alternative to synthetic topical agents for sunburn relief.

**Keywords:** Aloe vera, Sunburn, Herbal gel, Topical formulation, Natural skincare, UV protection, Antioxidant.

**PT-404**

**FORMULATION OF POLYHERBAL HAND SANITIZER**

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The global rise in infectious diseases has heightened the demand for effective and skin-friendly hand hygiene products. This study aims to formulate and evaluate a polyherbal hand sanitizer using extracts of Azadirachta indica (Neem), Ocimum sanctum (Tulsi), and Citrus limon (Lemon), known for their potent antimicrobial and antioxidant properties. Ethanolic extracts were incorporated into a gel base free from synthetic alcohol. The formulation was assessed for pH, viscosity, spreadability, skin compatibility, and antimicrobial activity against Escherichia coli and Staphylococcus aureus. The results demonstrated notable antimicrobial efficacy, comparable to standard sanitizers, with excellent skin tolerability and no reported irritations. The study supports the use of polyherbal formulations as a natural, effective, and safer alternative to conventional hand sanitizers, especially in healthcare and community settings. This approach not only promotes herbal medicine but also supports sustainability and reduced chemical exposure.

**Keywords:** Herbal sanitizer, Neem, Tulsi, Antimicrobial, Natural formulation

**PT-405**

**FORMULATION AND DEVELOPMENT (F&D) OF AN AYURVEDIC FACEWASH: A POLYHERBAL SEMI-SOLID DOSAGE (SSD) APPROACH WITH QUALITY CONTROL (QC) EVALUATION**

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The formulation of an Ayurvedic facewash integrates traditional herbal knowledge with modern pharmaceutics to develop a stable, safe, and effective topical preparation. The facewash was designed as a semi-solid dosage form (SSD), intended for routine facial cleansing with therapeutic and cosmetic benefits. Key active pharmaceutical ingredients (APIs) included Azadirachta indica (Neem), Curcuma longa (Turmeric), and Ocimum sanctum (Tulsi), selected for their antimicrobial, anti-inflammatory, and antioxidant properties. The excipients used comprised a suitable surfactant base (e.g., SLS – Sodium Lauryl Sulfate), humectants like Glycerin (GLY), thickeners such as Carbopol 940 (CBP), and preservatives (e.g., MP – Methylparaben, PP – Propylparaben) to ensure microbiological stability. The formulation was developed using the QS (quantum satis) method to achieve desired viscosity, pH, and sensorial attributes. The final pH was adjusted to match skin compatibility (pH 5.5–6.5) using Triethanolamine (TEA). The F&D (formulation and development) process included mixing, homogenization, and quality control (QC) checks for parameters like spreadability, consistency, microbial load, and stability under accelerated conditions (ICH guidelines). This study demonstrates that




ISBN: 978-81-980623-8-3

Ayurvedic facewash can be effectively formulated using standard pharmaceutics practices to meet both traditional and modern skincare needs.

**Keywords:** Semi Solid Dosage, Sodium Lauryl Sulfate [SLS], Triethanolamine [TEA], Ayurvedic Formulation,Carbopol 940[CBP].

**PT-406**

**FORMULATION AND DEVELOPMENT (F&D) OF AN AYURVEDIC FACEWASH: A POLYHERBAL SEMI-SOLID DOSAGE (SSD) APPROACH WITH QUALITY CONTROL (QC) EVALUATION**

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**Keywords:** Semi Solid Dosage, Sodium Lauryl Sulfate [SLS], Triethanolamine [TEA], Ayurvedic Formulation,Carbopol 940[CBP].

**PT-407**

**AYURVEDIC BHASMA PARIKSHA REVISITED: CORRELATING TRADITIONAL PARAMETERS WITH PHYSICOCHEMICAL AND SPECTROSCOPIC DATA OF YASHADA BHASMA**

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Yashada Bhasma, an Ayurvedic zinc-based herbo-metallic formulation, is traditionally used to treat diabetes, skin conditions, respiratory issues, and wounds. Despite its significance, standardisation and quality assessment of commercial products remain challenging. This study compares two Yashada Bhasma products from Dhootpapeshwar and Bharadwaj Pharmaceuticals, combining traditional Ayurvedic methods with modern analysis. Classical tests like Varitaratva, Rekhapurnata, Nirdhuma, and Apunarbhava assessed traditional quality standards. Additionally, physicochemical tests (loss on drying, ash values, pH) and advanced techniques such as SEM, FTIR, AAS, Zeta Potential, and DLS were used. Results showed that both samples met basic Ayurvedic criteria, but the Bharadwaj formulation demonstrated better compliance- finer particles (100–300 nm), greater stability (Zeta Potential: –34.5 mV), clearer ZnO FTIR spectra, and fewer impurities in ash analysis. This research confirms traditional tests with modern science and emphasises the need for integrated quality control. It highlights the value of combining disciplines to improve the credibility, safety, and global acceptance of Ayurvedic metallic formulations.

**Keywords:** Yashada Bhasma, Zinc Calx, Ayurveda, Bhasma Pariksha, SEM, FTIR, AAS, Zeta Potential, Standardisation, Comparative Study.

**PT-408**

**NEEM EXTRACT VS SALICYLIC ACID: EXPLORING ANTIACNE EFFICACY IN FACIAL SERUM FORMULATIONS**

ANU S

Serums are emerging topical drug delivery systems that target the epidermal layer of the skin.This study focuses on formulating and evaluating natural and synthetic anti-acne serumsusing neem (Azadirachta indica) and salicylic acid as active ingredients, respectively.Neem, known for its antimicrobial and anti-inflammatory properties, has long been used in skincare for treating acne and soothing irritation.Salicylic acid, a beta-hydroxy acid (BHA), is effective in exfoliating skin, unclogging pores,and reducing acne. Niacinamide complements this by minimizing inflammation, regulating sebum, and enhancing skin barrier function. Neem extract was obtained using ethanol viaSoxhlet extraction. The natural serum was formulated with neem, Tween 60, Span 80,honey, and aloe vera gel, while the synthetic serum incorporated salicylic acid, propylene glycol, and niacinamide. Both formulations were optimized and evaluated for pH, viscosity, spreadability, clarity, antimicrobial activity, and in vitro drug release.

**PT-409**

**INNOVATIVE TRANSDERMAL HERBAL ACTIVES; A NOVEL STRATEGY IN PHYTOPHARMACEUTICAL**

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Transdermal drug delivery systems (TDDS) have emerged as a promising alternative to oral drug administration due to their ability to bypass first-pass metabolism, maintain steady drug levels, and improve patient compliance. In this study, a transdermal herbal patch was formulated using selected medicinal plant extracts known for their anti-inflammatory and analgesic properties. The herbal extract, derived from Curcuma longa (turmeric) and Boswellia serrata, was incorporated into a matrix-type patch using natural polymers such as chitosan and gelatin as film-forming agents.The patches were prepared by solvent casting method and evaluated for various physicochemical parameters including thickness, weight uniformity, folding endurance, surface pH, moisture content, and drug content uniformity. In vitro drug release studies were carried out using Franz diffusion cells, and the results indicated a sustained release profile over 24 hours. Skin permeation studies confirmed adequate transdermal flux, and the patches exhibited satisfactory mechanical strength and flexibility.The study concludes that herbal transdermal patches can be a safe, non-invasive, and effective system for the delivery of phytoconstituents, especially for chronic conditions like arthritis, back pain, or muscle inflammation. Further in vivo studies and clinical trials are recommended to validate therapeutic efficacy and safety.

**PT-410**

**IN VITRO ANTI-INFLAMMATORY EVALUATION OF ETHANOLIC ROOT EXTRACT OF ALKANNA TINCTORIA**

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Alkanna tinctoria, a member of the Boraginaceae family, has been traditionally valued for its medicinal properties. The present study evaluated the in vitro anti-inflammatory activity of its ethanolic root extract. The roots were collected, authenticated, shade-dried, and ground to a coarse powder. The powdered roots were sieved and stored in airtight containers. Ethanolic extraction was performed using a Soxhlet apparatus, where ethanol was continuously circulated through the root powder, and the solvent was evaporated to yield the crude extract. Qualitative phytochemical screening confirmed the presence of tannins, quinones, and flavonoids, known contributors to anti-inflammatory effects. The extract was assessed using heat-induced hemolysis and protein denaturation assays. It showed significant, dose-dependent inhibition of hemolysis (up to 64.56% at 1000 µg/mL) and protein denaturation (up to 70.8% at 1000 µg/mL) compared to Diclofenac sodium as the standard, though activity was slightly lower than the reference drug. The IC50 values were 398.9 µg/mL for hemolysis and 269.6 µg/mL for protein denaturation.These results support the use of Alkanna tinctoria root in managing inflammation, presenting an effective and less toxic alternative to conventional nonsteroidal anti-inflammatory drugs.




ISBN: 978-81-980623-8-3

**Keywords:** Alkanna tinctoria, anti-inflammatory, ethanolic extract, hemolysis inhibition, protein denaturation.

**PT-411**

## EXPLORING THE ROLE OF BERGINIA CILIATA RHIZOME IN PROMOTING TISSUE REGENERATION AND WOUND HEALING ACTIVITY

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Wound healing is a complex biological process that involves inflammation, proliferation and remodeling phases, ultimately restoring the integrity and function of damaged tissue. Despite advances in modern medicine, the management of chronic and infected wounds remains a significant clinical challenge. This is has renewed scientific interest in medicinal plants, many of which are known to accelerate tissue repair through their antioxidant, antimicrobial, and anti-inflammatory properties. Berginia ciliata, belonging to the family saxifragaceae, is a perennial herb distrubuted in the Himalayan regions of India, Nepal, Bhutan, and china. Commonly known as “pashanbheda”in ayurveda, the plants rhizome has been traditionally used for the treatment of kidney stones, urinary disorders, cough, fever, and various skin ailments. Phytochemical investigations of Berginia ciliata rhizomes have revealed the presence of diverse bioactive compounds, including bergenin, gallic acid, catechin, tannins and flavanoids, which contribute to its pharmacological potential. The present study investigates the wound healing potential of Berginia ciliata rhizome extract using in-vitro and in-vivo models. Topical formulations prepared with hydroalcoholic rhizome extract were evaluated for wound contraction, epithelialization time, collagen content and histopathological changes in excision and incision wound models. It possesses wound healing activity and may serve as a natural therapeutic agent for the development of herbal wound–care formulations.

**Keywords:** Berginia ciliata, rhizome extract, wound healing, collagen synthesis, tissue regeneration.

**PT-412**

## DESIGN AND EVALUATION OF HERBAL NAIL LACQUER- A NATURAL ANTIFUNGAL APPROACH AGAINST ONYCHOMYCOSIS

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Onychomycosis also referred to as dermatophytic onychomycosis or Tinea unguium, is a fungal nail infection primarily caused by dermatophytes (like Trichophyton rubrum), yeasts (like Candida albicans), and non-dermatophytic moulds. In this study, an effort was made to develop a herbal medicated antifungal nail lacquer using Caesalpinia bonducella seeds. The objective was to enhance clinical efficacy while improving patient compliance. Authenticated C. bonducella seeds were extracted and formulated into nail lacquers using suitable excipients, including film-forming agents, plasticizers, solvents, penetration enhancers, and resins. The prepared formulations were evaluated for various physicochemical and biological parameters such as smoothness, glossiness, non-volatile content, drug content, adhesion, diffusion, and antifungal activity (zone of inhibition). FTIR analysis confirmed drug–excipient compatibility by retaining characteristic peaks. Among the formulations, F5 was identified as the optimized batch and subjected to accelerated stability testing under ICH guidelines at 37 ± 2 °C for one month. The results showed no significant changes in its initial characteristics, while the formulation maintained excellent antifungal activity. Overall, the developed antifungal nail lacquer demonstrated safety, stability, and effectiveness, suggesting its potential as a novel dosage form for the treatment of dermatophytic nail infections such as onychomycosis. Its use may significantly improve therapeutic outcomes and patient adherence compared to conventional therapies.

**Keywords:** Onychomycosis, Antifungal nail lacquer, Caesalpinia bonducella, Dermatophytes, Diffusion studies.

**PT-413**

## A NOVEL NANO HERBAL ORAL SUSPENSION OF CURCUMA AMADA ROXBURGH FOR TARGETED DIGESTIVE AND HEPATOPROTECTIVE ACTIVITY

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Traditional herbal medicines still play an important role in modern healthcare, but their limited solubility and poor absorption often reduce their effectiveness. The present study aims to develop a new nano herbal oral suspension, using Curcuma amada Roxburgh (Mango Ginger), a valuable herb from the Zingiberaceae family. Curcuma amada is widely used to digestive, and hepatoprotective actions, but scientific formulation work in nano form has not yet been well explored. The Zing Nano suspension was successfully fabricated using a high-shear emulsification technique to produce stable nanoparticles. Comprehensive characterization confirmed a narrow particle size distribution, with an average size consistently below 100 nm, coupled with an optimal zeta potential indicating high stability. Curcuma amada nano-formulation strategy is crucial for increasing the surface area and promoting enhanced dissolution and absorption across the gastrointestinal tract. The therapeutic efficacy was rigorously evaluated using in-vitro assay of chemically-induced liver injury and digestive impairment. In the hepatoprotective study, treatment with Curcuma amada Roxburgh resulted in a significant reduction in elevated liver enzymes and a marked decrease in oxidative stress markers compared to the standard crude extract. The suspension demonstrated superior activity in stimulating digestive enzyme secretion and improving overall gut motility. The findings confirm that the nano-suspension approach effectively overcomes the bioavailability hurdle of Curcuma amada Roxburgh. Zing Nano formulation presents a highly potent and stable delivery system, offering a promising and clinically viable product for managing various digestive disorders and safeguarding liver health.

**Keywords:** Curcuma amada Roxburgh, Nano herbal Suspension, Hepatoprotective, Digestive stimulant.

**PT-414**

## EXPLORING OF TOLBUTAMIDE IN THE TREATMENT OF DIABETES MELLITUS

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Tolbutamide was the earliest and most widely adopted oral sulfonylurea introduced in the 1950s for managing type 2 diabetes mellitus (T2DM). Over the past seventy years, its therapeutic value, safety considerations, and overall position in diabetes treatment have been reassessed as newer medications became available. This review explores the chemical characteristics and pharmacological actions of tolbutamide, its mechanism of action, key historical studies such as the University Group Diabetes Program (UGDP), concerns related to hypoglycaemia and potential cardiovascular effects, as well as its pharmacokinetic behaviour and metabolic pathways. The evolution of its clinical use is also discussed to highlight its relevance in contemporary diabetes management. By integrating both classic and modern literature, the review evaluates tolbutamide’s contribution to current therapeutic practices. Although concerns especially regarding hypoglycaemia and early indications of cardiovascular risk led to declining use and stricter regulatory oversight, the drug served as a foundation for oral antidiabetic therapy. As newer sulfonylureas with improved profiles and alternative drug classes became available, tolbutamide was gradually replaced in many healthcare settings. Despite this decline, its role in shaping the history and development of diabetes pharmacotherapy remains substantial.

**Keywords**: Tolbutamide; Oral Hypoglycemic agents; KATP channels; Cardiovascular risk; Evolution of Antidiabetic therapy; Clinical trials

**PT-415**

## HERBAL & NATURAL PRODUCT INTERACTIONS WITH PRESCRIPTION MEDICATIONS

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The growing use of herbal medicines alongside prescription drugs has raised significant concerns about herb-drug interactions, which can compromise the safety and effectiveness of therapies. Although many herbs are promoted for their health benefits, combining them with conventional medications may lead to adverse effects. For example, herbs such as ginkgo, garlic, and dong quai can increase bleeding risk when taken with anticoagulants like warfarin. St. John's wort, a well-known enzyme inducer, can reduce the efficacy of several drugs, including antidepressants, immune suppressants, and oral contraceptives. Additionally, herbs like ginseng, garlic, and St. John's wort may interfere with anesthetics, potentially causing bleeding, blood pressure fluctuations, or central nervous system complications during surgery. A significant concern is that many patients do not disclose their use of herbal supplements to healthcare providers, increasing the risk of preventable adverse events. Professional bodies, such as the American Society of Anesthesiologists, recommend discontinuing herbal supplements at least one to two weeks before elective procedures. The mechanisms underlying herb-drug interactions vary depending on dosage and individual patient factors and often involve changes in drug metabolism, absorption, or pharmacodynamic effects. In some cases, combining certain herbs with psychiatric medications may even trigger serotonin syndrome. Reducing these risks requires multiple strategies, including improving labeling standards, fostering open communication between patients and healthcare professionals, and providing comprehensive patient education. These initiatives are essential to ensure the safe and effective integration of herbal and conventional therapies, protecting patients from preventable complications while maximizing therapeutic benefits.

**Keywords:** Herbal medicine, herb-drug interaction, pharmacodynamic, pharmacokinetic interactions.

**PT-416**

## FORMULATION AND EVALUATION OF POLY HERBAL HEALTH CANDY FOR ANTIOXIDANT AND IMMUNOMODULATORY ACTIVITY

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The present study aims to develop and evaluate a polyherbal health candy made with medicinal plant extracts known for their antioxidant and immune-boosting properties. The formulation includes Zingiber officinale (ginger), Ocimum sanctum (tulsi), Cinnamomum zeylanicum (cinnamon), Eugenia caryophyllus (clove), Mentha piperita (peppermint), Cymbopogon flexuosus (lemongrass), Piper nigrum (black pepper), and Glycyrrhiza glabra (liquorice). These herbs contains bioactive compounds such as gingerol, eugenol, cinnamic acid, menthol, piperine, and glycyrrhizin, which are known for their health benefits. The herbal extracts were precisely weighed, mixed with sugar syrup, and shaped into solid candies using standard candy-making techniques. The final product was tested for physical and quality aspects, including taste, weight variation, friability, and dissolution studies; all results met acceptable pharmacopeial standards. Preliminary phytochemical screening confirmed the presence of secondary metabolites like tannins, phenols, terpenoids, glycosides, saponins, and volatile oils, which support the product's health effects. The in -vitro antioxidant potential was assessed using the DPPH free radical scavenging test, showing significant radical inhibition and indicating strong antioxidant activity. The study shows that the polyherbal candy offers a new and consumer-friendly way to provide natural antioxidants and compounds that support the immune system. This product presents a promising nutraceutical option that combines traditional herbal knowledge and modern candy-making, creating a convenient way to promote overall health and well-being.

**Keywords:** Herbal candy, Antioxidant, Immunomodulatory

**PT-417**

## ASSESSMENT OF ANTIMALARIAL ACTIVITY AND CYTOTOXICITY OF CLAUSENA AUSTROINDICA (RUTACEAE) CHLOROFORM EXTRACT: AN IN VITRO STUDY

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The increasing resistance of malarial parasites to currently available drugs, coupled with the scarcity of effective medications, constitutes a significant challenge in the management of malaria. Malaria continues to be a highly prevalent disease; there is an urgent need to develop more efficacious alternative drugs. Among the five Plasmodium species that cause malaria in humans, P. falciparum has become resistant to available medications, including artemisinin derivatives. Consequently, the primary aim of the study is to assess the in vitro antimalarial activity and cytotoxicity of the chloroform extract from the leaves of Clausena austroindica (CAU). The investigation also included preliminary phytochemical screening and quantitative evaluation of various extracts to identify the most active extract. Both quantitative and qualitative phytochemical analyses showed chloroform extract as the most active one, thus selected for the study. Antimalarial efficacy was evaluated against chloroquine-sensitive (PF3D7) and resistant strains (K1) of P. falciparum using a SYBR-Green I fluorescence-based assay. The cytotoxic activity of chloroform extract was also assessed on VERO (monkey kidney epithelial cells) cells using the MTT assay. The chloroform extract demonstrated promising antiplasmodial activity, with IC50 values of 7.5 ± 1.5 µg/ml and 5.8 ± 0.8 µg/ml against PF3D7 and K1 respectively, compared to standard chloroquine (IC50 value 5.0 ±2 nM). The extract exhibited minimal cytotoxicity to VERO cells (CC50 54 µg/ml) versus standard podophyllotoxin (CC50 3.5 µM). Therefore, the chloroform extract of CAU holds potential as a promising candidate for further in vivo and phytochemical research.

**Keywords:** Antimalarial activity, Cytotoxicity, Clausena austroindica, Rutaceae.

**PT-418**

## EXTRACTION, ISOLATION, AND PRELIMINARY PHYTOCHEMICAL ANALYSIS OF -PARTHENIUM HYSTEROPHORUS

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The extraction, isolation, and preliminary phytochemical analysis of Parthenium hysterophorus involve drying and powdering the plant material, followed by solvent extraction using methanol, ethanol, water, acetone, and other solvents through Soxhlet or maceration techniques. The crude extracts are subjected to qualitative tests to identify the presence of alkaloids, flavonoids, steroids, tannins, phenols, glycosides, saponins, terpenoids, and other secondary metabolites, although coumarins may be absent. Extraction methods such as decoction and ultrasound-assisted extraction, combined with solvent partitioning using solvents of increasing polarity—n-hexane, chloroform, ethyl acetate, and methanol—allow isolation of specific phytochemical groups. These compounds contribute to diverse biological activities like antimicrobial, anti-inflammatory, and enzyme inhibition effects. This preliminary phytochemical screening provides a foundation for further isolation, characterization, and exploration of therapeutic bioactive compounds from Parthenium hysterophorus, highlighting its potential in natural product research and drug development. The study confirms the plant's role as a valuable source of bioactive secondary metabolites with promising pharmacological applications

**Keywords**: Parthenium hysterophorus contains important bioactive phytochemicals such as alkaloids, flavonoids, steroids, tannins, phenols, glycosides, saponins, and terpenoids, which contribute to its antimicrobial, antioxidant, anti-inflammatory, and enzyme inhibitory activities.

**PT-419**

## PHYTOCHEMICAL PROFILING, HPLC-MS FINGERPRINTING, AND ANTIOXIDANT POTENTIAL OF TRIBULUS TERRESTRIS FLOWERS

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Tribulus terrestris L., a widely distributed medicinal plant, has been traditionally used in various systems of medicine for its therapeutic potential, including aphrodisiac, diuretic, hepatoprotective, and anti-inflammatory activities. The present study aimed to extract and characterize the phytochemical constituents of T. terrestris flowers to establish a basis for its pharmacological properties. Dried and powdered flower material was subjected to successive solvent extraction using solvents of increasing polarity such as hexane, ethyl acetate, methanol, and water through Soxhlet extraction. The obtained extracts were concentrated and analyzed for the presence of major phytochemical groups, including alkaloids, flavonoids, saponins, tannins, steroids, terpenoids, and phenolic compounds using standard qualitative and quantitative methods. The methanolic extract yielded the highest amount of bioactive compounds, indicating its effectiveness in extracting polar phytochemicals. Quantitative estimation revealed significant levels of total phenolics and flavonoids, suggesting strong antioxidant potential. Further characterization using UV-Visible, FTIR, and HPLC-MS analysis confirmed the presence of characteristic functional groups and molecular fingerprints associated with bioactive constituents. The study highlights T. terrestris as a rich source of phytochemicals with potential pharmacological relevance. The findings provide scientific validation for its traditional uses and suggest that the methanolic extract of T. terrestris flowers can serve as a promising candidate for further bioassay-guided isolation and identification of active compounds for therapeutic applications.

**Keywords:** Tribulus terrestris, phytochemical profiling, HPLC-MS, Soxhlet extraction, methanolic extract, bioactive compounds, flavonoids, phenolics, FTIR spectroscopy, antioxidant activity.

**PT-420**

## FORMULATION OF HERBAL HAND-WASH WITH POTENTIAL ANTIBACTERIAL ACTIVITY

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A plant has medicinal, pharmaceuticals, cosmetic potential, using it many innovative products can be prepared useful for human. In recent study herbal hand wash was formulated using soxhlet fractions of different plants ocimum tenuiflorum (Tulasi), cassia cinnamom (cinnamon) sapindus mukorossi (Reetha), Tridax procumbens (coatutton), Azadirchta indica (Neem) and citrus limonium (Lemon).These pants are traditionally known to possess different medicinal properties. Herbal hand wash was prepared by reetha fruit extracts and different plant extracts. The Antibacterial activity of formulated herbal hand wash and individual plant extracts were examined using agar well diffusion method. Among the plant extracts used, sapindus mukorossi (reetha) and citrus fruits showed potent antibacterial activity against skin pathogens Staphylococcus aureus, E. coli, Pseudomonas aeruginosa, Candida albicans and Salmonella typhimurium. The herbal hand-wash sowed antibacterial activity higher than commercially available standard solution of Dettol. Quality enhanced herbal hand wash with unique aroma and potential antibacterial activity was formulated.

**Keywords:** Herbal hand wash, Reetha extracts, Skin pathogens, Staphylococcus aureus, Pseudomonas aeruginosa.

**PT-421**

## ANTIDIABETIC POTENTIAL OF CARISSA OPACA FRUIT: ROLE OF CHLOROGENIC ACID IDENTIFIED BY UPLC ANALYSIS

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Carissa opaca is an endemic plant of Himalayan region of India which is traditionally used as for curing diabetes. The present study focuses on the phytochemical analysis and antidiabetic activity of the hydro-methanolic extract of Carissa opaca fruit. The extract was subjected to Ultra-Performance Liquid Chromatography (UPLC) for the identification and quantification of major bioactive compounds. The UPLC profile revealed the presence of several polyphenolic constituents, among which chlorogenic acid was identified as the predominant compound. Chlorogenic acid is a well-known bioactive molecule with significant antioxidant and glucose-modulating properties, which may contribute to the antidiabetic potential of the extract. The in-vitro assays such as alpha-amylase and alpha-glucosidase showed significant activity when compared to the acarbose at 200 µg/ml concentration. The findings suggest that the hydromethanolic extract of Carissa opaca fruit possesses promising antidiabetic properties, largely attributed to its high chlorogenic acid content and associated phytochemicals.

**Keywords:** Carissa opaca; Hydro-methanolic extract; Anti-diabetic; Chlorogenic acid.

**PT-422**

## HEPATOPROTECTIVE EFFECT OF FLAVONOID RICH FRACTION OF SESBANIA GRANDIFLORA: RESULTS OF IN VIVO, IN VITRO, AND MOLECULAR DOCKING STUDIES

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Phytochemicals and their derivatives have long been explored as therapeutic agents for a wide range of diseases. This study evaluated the pharmacological and hepatoprotective potential of a flavonoid-rich fraction of the ethanolic extract of Sesbania grandiflora (SG) using in vivo, in vitro, and in silico approaches. The research aimed to assess the cytoprotective properties of SG extracts and to elucidate the molecular interactions between isolated flavonols and peroxisome proliferator-activated receptor alpha (PPARα) target proteins implicated in hepatic disorders. The entire SG plant was extracted using ethanol via Soxhlet extraction, followed by fractionation to isolate flavonoids. Cytoprotective and hepatoprotective properties were investigated using HepG2 cell lines and rat models. Hepatotoxicity markers including SGOT, SGPT, total bilirubin, triglycerides, and total protein were measured to evaluate hepatic function. SG treatment notably reduced elevated levels of SGOT, SGPT, bilirubin, and triglycerides in vivo, indicating significant hepatoprotection, while untreated groups exhibited pronounced hepatic injury. The flavonoid fraction demonstrated an IC50 value of 190.28 µg/ml against HepG2 cells, confirming moderate cytotoxicity and safety. Histopathological analysis revealed restored hepatocyte architecture following treatment. Molecular docking of SG-derived flavonoids with PPARα (PDB ID: 3VI8) using MOE software demonstrated strong binding affinities, supporting potential interaction with hepatic metabolic pathways. Collectively, these findings suggest that flavonoids from Sesbania grandiflora possess potent hepatoprotective and cytoprotective properties and represent promising lead compounds for developing therapeutics against drug-induced hepatotoxicity and related liver disorders.

**Keywords:** Sesbania grandiflora, Flavonoids, Hepatoprotection, Molecular docking, PPARα

**PT-423**

## THE RESEARCH ON PHARMACOLOGY, TOXICOLOGY AND PRESENT IN ERYTHRINA VARIEGATA PLANT LEAVES USED FOR URINARY TRACT INFECTION

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The morphology, pharmacological activity, and phytochemical screening of Erythrina variegata are the briefly outline in the study. A substitute term for Erythrina variegata is also know as Erythrina indica. The plant is capable of reaching an average height of between fifty and sixty feet. Many phytoconstituents, which includes alkaloid substance, tannins, flavonoids, and other resin, protein, saponins and glycosides, have been identified. Terpenoids, triterpenoids, steroids, and phenols are a few examples of secondary metabolites. According to Soxhlet techniques, there are five unique solvent system: methanol, hexane, ethyl acetate, dichloromethane, chloroform, and aqueous solution. Various parts of this plant have been used in traditional medicinal for their analgesic, nervine-calming, antiseptic, antacid antiepileptic, anti-asthmatic, and anti-inflammatory properties. Erythrina variegata plant parts of leaves are used to treat infections produced by bacteria that inhibit or eradicate pseudomonas and Escherichia (E. coli) bacteria. Its further block both




ISBN: 978-81-980623-8-3

grammeme-positive and grammeme- negative bacteria. Erythrina variegata leaf bark is the main treatment for urinary tract infections in medical systems like siddha (Ayurveda), Unani medicine, and Homoeopathy.

**Keywords:** Physio chemical properties, phytoconstituents, pharmacological activity in Erythrina variegata leaves.

**PT-424**

**EXTRACTION OF PHYTOCHEMICAL CHARECTARIZATION OF CEREUS JAMACARU**

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Cereus jamacaru, commonly known as the "mandacaru cactus," is a traditional medicinal plant native to arid regions of Brazil and widely recognized for its therapeutic potential. The present study focuses on the extraction and phytochemical characterization of Cereus jamacaru stem to identify its bioactive constituents that contribute to its pharmacological properties. The plant material was shade-dried, powdered, and subjected to successive solvent extraction using solvents of increasing polaritypetroleum ether, chloroform, ethanol, and water by Soxhlet extraction method. The obtained extracts were concentrated under reduced pressure and evaluated for phytochemical constituents through standard qualitative tests. The ethanol extract exhibited a rich presence of alkaloids, flavonoids, tannins, saponins, glycosides, terpenoids, and phenolic compounds, indicating its strong bioactive potential. Quantitative analysis further confirmed significant levels of total phenolic and flavonoid contents, suggesting antioxidant capacity. The preliminary screening supports the ethnomedicinal use of C. jamacaru in treating inflammatory and infectious conditions. The results highlight that ethanol is the most efficient solvent for extracting polar phytoconstituents from the plant. This study provides a scientific basis for the traditional applications of Cereus jamacaru and establishes a foundation for further pharmacological and bioactivity studies, including antioxidant, antimicrobial, and cytotoxic evaluations. The findings contribute to the growing interest in cactus species as potential sources of natural therapeutic agents and support the conservation and sustainable utilization of Cereus jamacaru in modern phytopharmaceutical research.

**Keywords:** Cereus jamacaru, mandacaru cactus, Soxhlet extraction, phytochemical screening, ethanol extract, flavonoids, phenolic compounds, alkaloids, traditional medicine, pharmacological potential, bioactive constituents.

**PT-425**

**FORMULATION OF SUNSCREEN CREAM FROM RESOURCES OF UNANI MEDICINE WITH IN VITRO & SAFETY EVALUATION**

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Exposure to solar ultraviolet (UV) radiation is a major factor in skin aging, pigmentation disorders, and carcinogenesis. While synthetic sunscreens offer protection, their adverse effects and limited biocompatibility encourage a shift toward natural alternatives. The Unani System of Medicine (USM) is rich in botanicals possessing antioxidant, anti-inflammatory, and photoprotective properties. This study aimed to formulate an Unani sunscreen cream (USC) and evaluate its physicochemical characteristics, stability, safety and in vitro efficacy. Eight batches were prepared using hydroalcoholic extracts and fixed oils of selected Unani drugs with permissible excipients. The optimized batch cream was chosen based on organoleptic characteristics, pH, spreadability, viscosity, extrudability, and thermodynamic stability. Optimized batch was analysed for further physicochemical properties, qualitative and quantitative phytochemical screening, and chromatographic fingerprinting (HPTLC, HPLC, and GC–MS) and quantitative estimation of bioactive incorporation. In vitro antioxidant potential was determined using DPPH and ABTS assays, and photoprotective efficacy by SPF, PA, and Boot star rating methods. A stability study was performed for 3 months at 25 °C and 37 °C±70% RH (accelerated). Safety was assessed by MTT assay and a 14-day cumulative skin irritation study on healthy volunteers. F8 batch was selected as optimized USC contains Asl-us-Soos (Glycyrrhiza glabra Linn.), Poste Turanj (Citrus medica Linn.), Chob Zard (Curcuma longa Linn.), Tukhme Jirjeer (Eruca sativa Mill.), Irsa (Iris ensata Thunb.), Tukhme Khurfa (Portulaca oleracea Linn.), Turb oil (Raphanus sativus Linn.), Khurfa oil, Jirjeer oil, Raughane Zaitoon (Olea europaea Linn.) Mom (Cera alba), Safeda Kashgari (Zinc oxide). It was a stable o/w emulsion showing desirable texture, non-greasy consistency, homogeneity, and compatible pH with skin (5.47 ± 0.18). USC exhibited TPC and TFC concentrations of 6.6 and 170 µg/mL, respectively. HPTLC, HPLC, and GC-MS fingerprint data of USC were set with quantitative estimation of Quercetin (0.79 mg/g), Kaempferol (0.94 mg/g), and Ferulic acid (1.0 mg/g) by HPLC. USC displayed moderate SPF (22.96), PA++++, and a 4-star Boot rating, confirming broad-spectrum UV protection, along with strong antioxidant potential ($IC_{50}$: DPPH = 673.92 µg/mL; ABTS = 38.31 µg/mL).

**Keywords:** Antioxidant activity; Safety; Sunscreen Cream; Ultraviolet Radiation; Unani Medicine.

**PT-426**

**SOWA-RIGPA AS A HOLISTIC TRADITION: DIAGNOSTIC APPROACHES, HERBAL FORMULATIONS, AND MODERN RECOGNITION**

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"Sowa-Rigpa," commonly known as the Amchi system of medicine, is one of the oldest, living, and well-documented medical traditions in the world. The term Sowa-Rigpa means "Knowledge of Healing" and originates from the Bhoti language. It is widely practiced in Tibet, Mongolia, Bhutan, parts of China, Nepal, Himalayan regions of India, and some areas of the former Soviet Union. In India, it is especially prevalent in Ladakh, Himachal Pradesh (Spiti and Lahoul), Jammu & Kashmir, Darjeeling, Arunachal Pradesh, and Sikkim, contributing significantly to holistic and preventive healthcare. Sowa-Rigpa shares philosophical and diagnostic similarities with Ayurveda. It is based on Jung-wa-nga (Panchamahabhutas: Prithvi, Jal, Agni, Vayu, Akash) and Ngepa-Sum (Tridosha: Vata, Pitta, Kapha), emphasizing internal balance, harmony with nature, and mental well-being. Diagnosis involves pulse examination, urine analysis, tongue inspection, and patient questioning to detect elemental and doshic imbalances. Treatments aim to restore equilibrium through personalized diet, lifestyle adjustments, herbal medicines, and detoxification procedures.Herbal formulations are central to therapy. Key plants include Terminalia chebula (Haritaki) for detoxification, Emblica officinalis (Amla) for rejuvenation, Tinospora cordifolia (Guduchi) for immunity, Nardostachys jatamansi (Jatamansi) for calming the mind, and Saussurea lappa (Kuth) for respiratory and digestive issues. Some classical medicines also use minerals, precious stones, and purified animal products. Preparations include decoctions, powders, pills, medicated butter, herbal pastes, and Rinchen Rilbu (precious pills). Today, Sowa-Rigpa is preserved as cultural heritage and officially recognized by the Government of India (since 2010) as a traditional medical system.

**Keywords:** Sowa -Rigpa, Amchi, Himalaya, Ladhak, Haritaki

**PT-427**

**PREPARATION AND EVALUATION OF HERBAL LOLLIPOPS FOR COUGH AND THROAT INFECTIONS**

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Cough and throat infections are prevalent respiratory conditions commonly triggered by microbial infections, environmental pollutants, and seasonal fluctuations. Conventional therapeutic options such as syrups, tablets, and lozenges often contain synthetic additives that may cause undesirable side effects, making them less suitable for sensitive populations. Herbal medicines, with their proven antimicrobial, anti-inflammatory, and soothing actions, provide a safer and natural alternative for symptomatic relief. This study focuses on the preparation and evaluation of herbal lollipops formulated using selected herbal extracts traditionally used in the treatment of cough and throat irritation. Ingredients such as Tulsi (Ocimum sanctum), Ginger (Zingiber




ISBN: 978-81-980623-8-3

officinale), Liquorice (Glycyrrhiza glabra), and Clove (Syzygium aromaticum) were incorporated into a sugar-based lollipop matrix. The formulated lollipops were evaluated for organoleptic properties, hardness, weight variation, pH, microbial load, and in-vitro dissolution. The results indicated that the herbal lollipops possessed acceptable physicochemical characteristics, pleasant taste, and good stability. Additionally, the active herbal components demonstrated promising antimicrobial activity, supporting their traditional therapeutic use. The study concludes that herbal lollipops represent a novel, palatable, and patient-friendly dosage form for managing cough and throat infections, particularly suitable for pediatric and geriatric populations.

**Keywords:** Herbal lollipops, Cough and throat infection, Phytomedicine, Antimicrobial activity, Lollipops

**PT-428**

## FORMULATION AND EVALUATION OF POLYHERBAL MOSQUITO REPELLENT CREAM

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Mosquito-borne diseases such as malaria, dengue, chikungunya, and filariasis continue to pose major public health challenges worldwide. Conventional mosquito repellents generally contain synthetic agents such as N,N-diethyl-3-methylbenzamide (DEET) and N,N-diethylphenylacetamide (DEPA), which are non-biodegradable and associated with undesirable side effects including skin irritation, allergies, and dizziness. To overcome these limitations, the present study was undertaken to formulate and evaluate a polyherbal mosquito repellent cream using safe, natural ingredients. Various herbal extracts and essential oils were screened for repellent efficacy, fragrance, and skin compatibility. Based on the results, essential oils from Cinnamon, Tulsi, Tagetes (Marigold), and Eucalyptus were selected for formulation due to their proven insect-repellent and antimicrobial properties. The cream was prepared using suitable emulsifying and stabilizing agents to achieve optimal consistency and spreadability. The developed formulation was evaluated for parameters such as pH, viscosity, homogeneity, stability, and duration of repellency using laboratory assays against Aedes and Anopheles mosquitoes. The results demonstrated excellent repellent activity and good physicochemical stability. The formulated polyherbal cream offers an effective, eco-friendly, and skin-safe alternative to conventional synthetic mosquito repellents.

**Keywords:** Polyherbal formulation, Mosquito repellent cream, Essential oils, Herbal extracts, Eco-friendly alternative

**PT-429**

## THE ROLE OF 'OMICS' IN MODERN PHARMACOGNOSY: A REVIEW

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Pharmacognosy, the study of medicines from natural sources, has been fundamentally transformed by the advent of high-throughput 'omics' technologies. This review outlines the pivotal roles of genomics, transcriptomics, proteomics, and metabolomics in modern natural product science. These approaches have shifted the paradigm from a classical, descriptive discipline to a predictive and high-throughput field. Genomics decodes the biosynthetic blueprints for natural products; transcriptomics reveals which blueprints are actively used under specific conditions; proteomics identifies the enzymatic machinery at work; and metabolomics provides a comprehensive snapshot of the final chemical products. The true power, however, lies in their integration. This "multi-omics" or "systems biology" approach allows researchers to connect genes to molecules, elucidate complex biosynthetic pathways, discover novel bioactive compounds, and develop robust quality control measures for herbal medicines. This review explores the function of each 'omics' layer and illustrates their collective impact on accelerating drug discovery and standardizing natural medicines.

**Keywords:** Omics, standardizing, biosynthetic pathway, transcriptomics, proteomics.

**PT-430**

## WASTE TO HEALTH: THE HERBAL GRANULE WITH ANTIDIABETICS POTENTIAL

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Diabetes is the primary metabolic disorder listed among the top 10 death-causing diseases. The complete cure of diabetes is impossible, but the prevention and maintenance of glucose levels can reduce the diabetes severity.The present study focuses on the formulation and evaluation of antidiabetic granules using pharmaceutical ingredient (API). Banana peels, a natural byproduct rich in bioactive phytoconstituents such as flavonoids, phenolics, and dietary fibres, exhibit significant antidiabetic potential by enhancing glucose metabolism and reducing oxidative stress. In this formulation, Guar Gum, a natural polysaccharide, is utilized as a binder and filler to provide desirable granule cohesion and flow characteristics, ensuring uniformity and stability. Stevia, a natural sweetening agent derived from Stevia rubidian, is incorporated to enhance palatability without elevating blood glucose levels, making the formulation suitable for diabetic patients

**Keywords:** Banana peel, chiku peel, Gaur gum, Antidiabetics granule.

**PT-431**

## PHYTOCHEMICAL FINGERPRINTING, IN VITRO ANTIOXIDANT EVALUATION, AND NETWORK PHARMACOLOGY OF LITSEA CORIACEA BARK: AN INTEGRATIVE PHARMACOGNOSTIC APPROACH

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In the present study, aqueous and ethanolic bark extracts of Litsea coriacea (Lauraceae) were investigated for their phytochemical profile, in vitro antioxidant potential, and antioxidant-associated molecular mechanisms through network pharmacology. The extracts were prepared by cold maceration and Soxhlet extraction, respectively, and analyzed for phytochemical constituents. Carbohydrates, flavonoids, glycosides, steroids, terpenoids, and saponins were detected, with greater diversity in the ethanolic extract. Quantitative analysis revealed higher total phenolic (951.3 mg GAE/g) and flavonoid (47.20 mg QE/g) contents in the ethanolic extract compared to the aqueous extract (795.5 mg GAE/g and 35.31 mg QE/g). In vitro antioxidant assays (DPPH and superoxide radical scavenging) showed dose-dependent activity. At 500 µg/mL, the ethanolic extract exhibited stronger activity (DPPH = 64.57 ± 0.32%; superoxide = 61.40 ± 0.20%) compared to the aqueous extract (DPPH = 62.47 ± 0.21%; superoxide = 57.47 ± 0.31%), comparable to vitamin C. HPTLC confirmed the presence of quercetin, β-sitosterol, and stigmasterol, while LC–MS/MS identified bioactives such as boldine and kaempferol. Network pharmacology identified 235 antioxidant-related targets, with key hub proteins including SRC, EGFR, AKT1, ESR1, and JAK2. Gene Ontology and KEGG analyses suggested involvement in oxidative stress, immune modulation, and hormone-mediated signaling. The results conclude that the ethanolic bark extract of L. coriacea possesses potent, multifunctional antioxidant potential, supporting its role in herbal drug development and standardization.

**Keywords:** Litsea coriacea, phytochemical fingerprinting, in vitro antioxidant, flavonoids, network pharmacology.

**PT-432**

## PHYTOCHEMICAL CONSTITUENTS OF VINCA ROSEUS (CATHARANTHUS ROSEUS)

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Catharanthus roseus (syn. Vinca rosea), commonly known as Madagascar periwinkle, is a medicinally important plant belonging to the family Apocynaceae. It is well recognized for its diverse range of bioactive phytochemical constituents that contribute to its wide therapeutic potential. The plant contains more than 130 types of alkaloids, which are the major class of compounds responsible for its pharmacological activities. Among these, vincristine and vinblastine are notable anticancer alkaloids extensively used in the treatment of leukemia, lymphoma, and other cancers. Other significant alkaloids such




ISBN: 978-81-980623-8-3

as ajmalicine, reserpine, catharanthine, and vindoline possess antihypertensive and central nervous system–active properties. Besides alkaloids, C. roseus also contains flavonoids (kaempferol, quercetin, and rutin), tannins, phenolic acids (Gallic, caffeic, ferulic acids), saponins, terpenoids, and glycosides, which contribute to its antioxidant, anti-inflammatory, antimicrobial, and antidiabetic activities. The synergistic effect of these phytoconstituents enhances the plant's medicinal value and supports its traditional use in treating diabetes, hypertension, infections, and cancer. Owing to the presence of these potent secondary metabolites, Catharanthus roseus continues to be a focus of extensive phytochemical and pharmacological research aimed at isolating and developing novel therapeutic agents. Thus, the plant serves as a valuable source of natural compounds with significant potential in modern drug discovery and development.

**Keywords**. Catharanthus roseus, Vinca rosea, alkaloids, vincristine, vinblastine, phytochemical constituents, antioxidant activity, pharmacological potential, medicinal plants, secondary metabolites, drug discovery.

**PT-433**

## FORMULATION OF ANTIOXIDANT-RICH HERBAL SUNSCREEN CREAM

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The sunlight consists of harmful radiations which affect the skin. To protect our skin from ultraviolet radiation, sunscreen formulations are used that either absorb, scatter, or reflect the radiation. The present research work focuses on the development and evaluation of a topical photoprotective formulation containing antioxidant, wound-healing, anti-inflammatory, and photoprotective polyphenols (flavonoids) such as quercetin, lycopene, rutin, and catechin, extracted from Allium cepa, Solanum lycopersicum, Citrus aurantium Linn., and Camellia sinensis, respectively. During evaluation, the formulations (F1, F2, and F3) showed pale white to peach colouration with a pleasant odour, good consistency, and fine texture. Their pH values were 7.01, 5.41, and 6.98, respectively, while viscosity ranged between 14210–17212 cps. F2 demonstrated the best spreadability, whereas F1 and F3 were comparatively less spreadable. All three formulations exhibited excellent thermal stability with no phase separation and produced no skin irritation. Thus, the research provides a stable natural photoprotective formulation with antioxidant potential, high SPF, and uniform UVA/UVB protection.

**Keywords:** Sunscreen, Rutin, Lycopene, Quercetin, SPF.

**PT-434**

## PHYTOCHEMICAL PROFILE OF ETHANOL EXTRACT, FRACTIONS AND COMMERCIAL PRODUCTS OF PAPAYA (CARICA PAPAYA L.) LEAF BY VALIDATED HPLC METHOD

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Papaya (Carica papaya L.) leaves are widely recognized for their therapeutic potential, particularly in enhancing platelet count and exhibiting anti-inflammatory, antioxidant, and anti-cancer properties. However, the phytochemical composition of commercial papaya leaf formulations often varies, affecting their therapeutic consistency. The present study aimed to identify and quantify major flavonoids and phenolic acids in papaya leaf extract and fractions prepared by column chromatography, followed by comparison with marketed products using a validated high-performance liquid chromatography (HPLC) method. Ethanolic extract of papaya leaves and its fractions were analyzed using Waters HPLC system (e2695 separation module, C18 column: 5 µm, 4.8 × 150 mm) with a 2998 PDA detector by gradient elution of mobile phase consisting of methanol, water (1 % acetic acid) and acetonitrile at 1 mL/minute. The method developed for simultaneous estimation of four phenolic acids (gallic, ferulic, chlorogenic, and caffeic acids) and four flavonoids (rutin, quercetin, myricetin, and kaempferol) was validated in accordance with ICH Q2 (R2) guidelines. Among these eight key phytoconstituents, HPLC analysis revealed the presence of three compounds - ferulic acid (0.67 mg/g), caffeic acid (0.47 mg/g), rutin (5.53 mg/g) in ethanol extract, while these key constituents level were enriched in fractions obtained from ethanol extract (ferulic acid - 11.39 mg/g, caffeic acid - 2.51 mg/g, rutin - 65.28 mg/g) along with fourth compound kaempferol (0.31 mg/g). However, in one of the marketed products only the flavonoid rutin was detected (59.50 mg/g). These results highlight significant variations in the phytochemical profile of commercial papaya leaf products, underscoring the need for their standardization and quality control. It is important to ensure the consistency in the phytochemical profile of papaya leaf-based products for maximum therapeutic benefits.

**Keywords**: Carica papaya, HPLC, Flavonoids and phenolic acids, Phytochemical standardization, Herbal formulations

**PT-435**

## Reviewing The Antimicrobial Potential Of Natural Products For Overcoming Antibiotics Resistance

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Antimicrobial resistance (AMR) is being recognised as one of the most serious global health concerns, affecting the therapeutic effect of existing antibiotics and leading to the development of multidrug-resistant (MDR) and extensively drug-resistant (XDR) bacteria. With the advancement of antibiotics lacking and resistance quickly increasing, there is an urgent need for novel approaches to therapy. Natural products (NPs), noted for their structural diversity and multi-target effects, have emerged as attractive options for AMR prevention.This review looks at the antimicrobial properties of naturally occurring compounds derived from plants, fungi, bacteria, marine organisms, and mammal species. Alkaloids, flavonoids, terpenoids, tannins, essential oils, and polyphenols act through a variety of mechanisms, including membrane disruption, inhibition of resistance enzymes, efflux pump suppression, interference with nucleic acid synthesis, and biofilm prevention. Many natural compounds also have synergistic effects with conventional antibiotics, helping to restore drug sensitivity and reduce therapeutic doses. Piperine (Piper nigrum), catechins (Camellia sinensis), allicin (Allium sativum), cinnamaldehyde (Cinnamomum zeylanicum), and berberine (Berberis spp.) are well-known synergistic compounds. A good example is Artemisia annua, where whole-plant preparations have been proven to delay the development of artemisinin resistance and provide higher antimalarial performance when compared to purified drug therapy. This is due to enhanced bioavailability and the combined effect of many flavonoids and terpenoids found in the plant. Overall, natural products provide a sustainable, renewable, and clinically relevant platform for the development of next-generation antimicrobials and resistance-modifying drugs. Integrating natural product research with cutting-edge technologies like Nanodelivery systems, metabolomics, and synthetic biology could speed up the development of effective solutions to the worldwide AMR epidemic.

**Keywords:** Antimicrobial resistance (AMR); Multidrug resistance (MDR); Antibiotic synergy; Efflux pump inhibition; Artemisia annua.

**PT-436**

## HERBAL ANTIOXIDANTS FOR NEURODEGENERATION DISORDER

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Neurodegenerative disorders are a major global health concern characterized by the progressive and irreversible loss of neuronal structure and function, seen in diseases like Alzheimer's, Parkinson's, Huntington's, and amyotrophic lateral sclerosis. Oxidative stress, caused by excessive reactive oxygen species and weakened antioxidant defences, plays a key role in neuronal damage. Herbal antioxidants have gained attention as potential therapies due to their safety, multi-targeted action, and strong neuroprotective effects. Herbs such as Withania somnifera, Curcuma longa, Ginkgo biloba, and Bacopa monnieri contain phytochemicals like flavonoids, phenolic acids, alkaloids, terpenoids, and curcuminoids, which show antioxidant, anti-inflammatory, and anti-apoptotic properties in studies. However, challenges such as poor blood-brain barrier permeability, low




ISBN: 978-81-980623-8-3

bioavailability, instability, and variations in phytochemical content due to plant source and extraction techniques limit their clinical use. Advanced delivery systems like solid lipid nanoparticles, liposomes, and nanoencapsulation can enhance solubility, stability, and targeted brain delivery. Future research should focus on standardized extraction methods, improved formulations, and nanotechnology-based systems, supported by clinical trials to ensure long-term efficacy and safety of herbal antioxidant therapies for neurodegenerative diseases.

**Keywords:** Neurodegenerative disorders, Parkinson's disease, Nanotechnology based delivery system

**PT-437**

**NATURAL ANTIOXIDANT EYE CARE: FORMULATION AND EVALUATION OF UNDER-EYE GEL WITH CREPE JASMINE AND MANGO LEAF EXTRACTS.**

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In today's increasingly digital world, eye strain has become a common problem for people who spend long hours focusing on screens or driving in poor lighting conditions. Professions that require prolonged visual concentration, such as software development and truck driving, can cause headaches, blurry or double vision, dryness, irritation, and light sensitivity. Over time, these symptoms may lead to more serious complications such as cataracts, retinal damage, age-related macular degeneration, and sleep disorders. The skin around the eyes is especially delicate and prone to dark circles caused by blood pooling beneath the surface or increased melanin production, also known as periorbital hyperpigmentation. While rest and cold compresses can provide temporary relief, there is a growing interest in natural, long-term solutions that address both the visible and uncomfortable symptoms of eye strain. This study focuses on creating an herbal under-eye gel with Tabernaemontana divaricata (crepe jasmine flower) and Mangifera indica (mango leaf). These plants are known for their traditional medicinal uses and have anti-inflammatory, antioxidant, and skin-soothing properties. The goal is to develop a gentle, plant-based product that can relax the eye area, reduce puffiness and dark circles, and alleviate symptoms caused by prolonged screen exposure or driving. This formulation is designed to naturally support eye wellness, particularly for people who work in visually demanding jobs. The formulation includes Mango leaf extract, crepe jasmine flower extract including Carbopol 940 (gelling agent), Methyl paraben (preservative), Glycerin (humectant). evaluation Parameters include Organoleptic and , Physicochemical properties such as Spreadability, pH Measurement, Washability, Viscosity.

**Keywords**: antioxidant, periorbital hyperpigmentation, crepe jasmine, mango leaf.

**PT-438**

**DEVELOPMENT EVALUATION AND PHYTO-CHEMICAL STUDIES OF POLY-HERBAL FORMULATION FOR ANTI-ALLERGIC ACTIVITY**

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In the current research, successfully developed and evaluated plant-based anti- allergic formulations, showing that natural extracts from medicinal plants can be effectively used to create stable and effective topical treatments. The formulations demonstrated good physico-chemical properties, high drug content and significant anti-inflammatory activity in in vivo studies. Further qualitative phytochemical tests were carried out to identify the presence of various compounds such as glycosides, flavonoids, tannins, alkaloids, and phenolic compounds, all of which contribute to the plants' medicinal properties. Physico- chemical properties such as moisture content, ash values, and pH of the plant extracts were also examined. The total ash value, water-soluble ash, and acid-insoluble ash were measured to assess the quality and purity of the plant extracts, The evaluation of the formulated gels and ointments was conducted through a series of tests to determine their pH, spreadability, viscosity, drug content, and stability. The FTIR analysis of four plant extracts Aegle marmelos (Leaf), Annona squamosa (Leaf), Acacia arabica (Bark), and Butea monosperma (Bark) along with a combined spectral analysis. It lists wavenumber ranges, corresponding functional groups, and peak values observed in each sample. This demonstrates that the formulation is effective in delivering the active compounds over an extended period, which is essential for sustained anti-allergic activity. The study suggests that with further optimization and clinical trials, these plant-based formulations could provide an alternative to conventional anti-allergic treatments, offering a natural, safe, and effective solution for managing allergic conditions.

**Keywords:** FTIR, HPTLC, TLC, Medicinal Herbs, Anti- Allergic Activity.

**PT-439**

**FORMULATION AND EVALUATION OF HERBAL DHOOP PREPARED FROM TEMPLE WASTE FLOWERS FOR MOSQUITO-REPELLENT ACTIVITY**

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Mosquito-borne diseases remain a persistent global public health challenge, contributing to high morbidity and mortality through infections such as dengue, malaria, chikungunya, and yellow fever. Conventional mosquito-repellent products widely available in the market are predominantly chemical-based and may pose environmental hazards, cause respiratory irritation, or contribute to insect resistance. In alignment with sustainable waste-management principles—Recycle, Reuse, and Recover—this study explores the valorization of temple waste flowers, particularly Tagetes erecta (marigold), for the development of a natural herbal dhoop formulation with mosquito-repellent potential.In this work, dried marigold flowers and complementary natural ingredients were processed to formulate herbal dhoop sticks. The formulations were subjected to a series of physicochemical and biological evaluations, including mosquito-repellent activity, microbiological quality assessment, moisture content, consistency, burning time, ash value, color, odor, and skin-irritation potential. The study emphasizes environmental sustainability and proposes herbal dhoop as an eco-friendly alternative to synthetic mosquito-repellent products. The results suggest that the formulated herbal dhoop demonstrates effective mosquito-repellent activity while being cost-efficient, non-toxic, and environmentally benign. This approach not only utilizes temple waste efficiently but also offers a promising route toward commercial, sustainable mosquito-control solutions. The formulation's natural composition minimizes health risks and mitigates the development of insect resistance, supporting its potential as a viable substitute for conventional chemical-based repellents.

**Keywords:** Herbal dhoop; mosquito repellent; marigold (Tagetes erecta); temple waste; microbiological evaluation; eco-friendly formulation

**PT-440**

**PHYTOCHEMICAL EVALUATION AND SCREENING OF ANTIDIABETIC POTENTIAL OF METHANOLIC EXTRACT OF ACHYRANTHES ASPERA**

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To evaluate the antidiabetic potential of the methanolic extract of aerial parts of Achyranthes Aspera Linn, a plant identified for its immunomodulatory, anti diabetic, anti hyperlipidemic, anti oxidant, hepatoprotective, wound healing acitvities etc. The whole plant powder of Achyranthes Aspera Linn were extracted with methanol using soxhlet apparatus.The prepared methanolic extract was tested for its hypoglycemic activity at doses of 250 and 500 mg/kg.Studies were conducted on acute normoglycemic and alloxan-induced hyperglycemic rats. Experiments included oral glucose tolerance tests and a 28-day chronic study, using glibenclamide as the standard drug.Body weight and serum blood glucose levels were measured in the treated hyperglycemic rats.Antimicrobial activity of the extract was assessed in




ISBN: 978-81-980623-8-3

vitro, comparing the extract's zone of inhibition (ZOI) to standard gentamicin. After final treatment i.e. 28-days, animals were evaluated for fasting blood glucose levels, which concludes there was a significant decrease in the fasting blood glucose levels in AA extract High dose (**p<0.01) and Standard Control treated animals (***p<0.001) when compared to Diabetic control group. Improvement in glucose tolerance was also observed ($p < 0.05$). Treated rats showed favorable body weight gain and improved biochemical parameters over 28 days. The plant extract exhibited notable antimicrobial activity (5 cm ZOI) compared to gentamicin (6 cm ZOI).The study confirms that the whole plant of Achyranthes Aspera Linn possess significant antidiabetic and antimicrobial activities, supporting its traditional use.

**Keywords:** Achyranthes Aspera Linn, phytochemistry, Anti diabetic activity, phytochemical investigation, therapeutic potential, traditional medicine

**PT-441**

## EXTRACTION AND PHYTOCHEMICAL CHARECTARIZATION OF BOUGAINVILLEA

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Extraction and phytochemical characterization of Bougainvillea involves isolating bioactive compounds from its flowers or leaves using various solvent extraction methods such as hydroalcoholic, methanol, chloroform, or acetone solvents. Optimized extraction techniques include Soxhlet extraction, ultrasonic-assisted extraction, and maceration, often followed by concentration and purification steps. Phytochemical screening of Bougainvillea species typically reveals the presence of secondary metabolites including alkaloids, flavonoids, phenolics, terpenoids, tannins, glycosides, saponins, and anthocyanins. These compounds contribute to the plant's known pharmacological activities such as antibacterial, antioxidant, anti-inflammatory, anticancer, antidiabetic, and antihyperlipidemic effects. Characterization methods like Thin Layer Chromatography (TLC), UV-Visible spectroscopy, FTIR, and GC-MS are commonly used to identify and profile the extracted phytoconstituents. The comprehensive study of Bougainvillea extracts highlights their potential for therapeutic and industrial applications, making them a promising natural resource for developing novel bioactive agents and natural dyes. This research emphasizes the importance of optimizing extraction procedures to maximize yield and efficacy of active compounds for pharmaceutical or cosmetic use.

**Keywords:** Bougainvillea, Extraction, Phytochemical characterization, Bioactive compounds, Secondary metabolites, Spectroscopic analysis

**PT-442**

## EVALUATION OF ANDROGRAPHIS PANICULATA FOR HEPATOPROTECTIVE EFFECT - AN IN-SILICO STUDY

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The present study is aimed to carry out In-silico network Pharmacology of Andrographis paniculata for its hepatoprotective effect.Plant based medicines have played a critical role in treatment of various ailments due to their ability to bind and modulate cellular targets involved in disease. Medicinal plants contain a variety of bioactive compounds for the treatment of multiple disorders. The less adverse effects, affordability, and easy accessibility highlight their potential in traditional remedies. Before preclinical research it is always good to identify pharmacological targets from active ingredients of medicinal plants. The present study is planned to see the different targets of Andrographis paniculata on oral pathogens by Network Pharmacology. In-silico network pharmacology study was carried out. The phytoconstituent of Andrographis paniculata were identified, target gene involved in the pathology of Hepatotoxicity were retrieved to construct a network. The In-silico study predicted the interaction of phytoconstituents of Andrographis paniculata with several pathological targets of Hepatotoxicity. The protein sequence of these targets was predicted and the protein - protein interaction found that many constituents are helpful to produce hepatoprotective effect.

**Keywords:** Andrographis paniculata, In-silico, hepatoprotective.

**PT-443**

## ANTIBACTERIAL AND ANTHELMINTIC ACTIVITY EVALUATION OF LIPOSOMAL FORMULATION OF TINOSPORA CORDIFOLIA (MIERS)

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Tinospora Cordifolia (Miers) or Guduchi, is well-known for its multifaceted therapeutic effects, including anti-cancer activity, chiefly due to its bioactive compound berberine. The clinical efficacy of these phytochemicals is constrained by their inadequate water solubility, volatility, and diminished bioavailability. Liposomal encapsulation has proven to be a viable method for addressing these issues by increasing solubility, safeguarding sensitive chemicals, and promoting cellular absorption. This work sought to formulate a liposomal version of Tinospora Cordifolia (Miers) extract and assess its antibacterial and anthelmintic properties relative to the crude extract and some marketed formulations. Liposomal vesicles were synthesised via the thin-film hydration technique, and thereafter subjected to sonication to get homogenous nanoscale particles. The formulation was analysed for particle size, encapsulation effectiveness, zeta potential, and shape using zeta analysis and transmission electron microscopy (TEM). The antibacterial efficacy was evaluated against Gram-positive (Staphylococcus aureus) and Gram-negative (Escherichia coli, Pseudomonas aeruginosa) bacterial strains via agar well diffusion and minimum inhibitory concentration (MIC) assays. The anthelmintic activity was assessed using Pheretima posthuma as a model organism, analysing the paralysis and mortality times of worms subjected to different concentrations of the liposomal formulation and crude extract.The liposomal formulation of Nigella sativa had markedly superior antibacterial efficacy, evidenced by larger inhibition zones. It reduced MIC values relative to the crude extract, signifying greater penetration and prolonged release of active metabolites. Likewise, the formulation exhibited significant anthelmintic efficacy, resulting in a more rapid onset of paralysis and mortality in a concentration-dependent fashion. The research endorses the advancement of liposome-based herbal therapies and offers a solid foundation for additional pharmacological and in vivo studies.

**Keywords:** Tinospora Cordifolia, liposomal formulation, Anti-bacterial, anthelmintic.

**PT-444**

## FORMULATION AND EVALUATION OF MILLET-BASED CHURNA FOR GUT HEALTH

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The present study involved the successful formulation and characterization of a millet-based churna fortified with natural bioactive ingredients known for promoting digestion and gut health. Pearl millet (Pennisetum glaucum), a small-seeded grain popularly known as nutri-cereals, rich in dietary fiber, resistant starch, polyphenols, and essential micronutrients, exhibits prebiotic properties that can help to maintain a healthy gut microbiota and improve bowel regularity. The objective of the research was to formulate a millet-based churna incorporating selected herbal ingredients and evaluate its organoleptic characteristics, physicochemical properties, and potential benefits for gut health. Herbal ingredients mentioned in the formula were cleaned and dried properly. The formulation was prepared by dry mixing and sieving through a mesh to obtain a uniform powder. The churna was evaluated for organoleptic, physical, physicochemical, phytochemical properties, and crude fiber content. Microbial content and digestive properties were also determined. The millet-based churna showed acceptable sensory characteristics; physicochemical parameters showed desirable values for ash value, moisture content 6%, and pH of 7, indicating the churna's stability, purity, and shelf-life compatibility. The formulated churna was finally subjected to microbiological evaluation, confirming the absence of Escherichia coli. The digestive activities – amylolytic, proteolytic, and lipolytic activities of the churna showed promising gut health–




ISBN: 978-81-980623-8-3

supportive properties. Thus, the findings suggested that millet-based churna can be developed as a nutraceutical for promoting gut health.

**Keywords:** Millet, Churna, Gut health, Prebiotic, Nutraceuticals

**PT-445**

## INNOVATIVE UTILIZATION OF MAKHANA FOR DEVELOPMENT OF NUTRIENT-ENRICHED NUTRACEUTICALS

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Makhana (fox nuts), derived from the aquatic plant Euryale ferox, is gaining recognition as a superfood due to its rich nutritional composition and health benefits. Makhana bars Balls as value-added products harness these benefits, serving as convenient, nutrient-dense snacks. Typically, a 100g serving of makhana provides approximately 338 to 362 kcal, with notable macronutrients including 13 to 15 grams of protein, 64 to 77 grams of carbohydrates, low fat content (~0.2 to 2 grams), and high dietary fiber (~12.5 to 14 grams). Additionally, makhana is abundant in essential minerals such as magnesium, potassium, calcium, phosphorus, and iron, contributing to bone health, cardiovascular support, and metabolic functions. The antioxidant flavonoid kaempferol in makhana bars imparts anti-inflammatory and cardioprotective properties. Makhana bars offer gluten-free, low-fat, and low sodium alternatives suitable for weight management, diabetes control, and digestive health. Their slow glucose release aids in blood sugar stabilization while promoting satiety. Incorporation of makhana in snack bars combines traditional snack appeal with modern nutraceutical functionality, making it an ideal healthier choice for consumers seeking functional foods that support chronic disease prevention and overall wellness. Ongoing research into formulation optimization and bioactive enhancement continues to elevate the profile of makhana bars in the nutraceutical market. This positions makhana bars as promising contributors to health-oriented food innovation and sustainable nutrition solutions.

**Keywords:** Makhana, Value added, Nutrition bars, Dietary fibers, Anti-inflammatory, Weight management.

**PT-446**

## A NOVEL HERBAL CREAM CONTAINING BRYOPHYLLUM PINNATUM: EXTRACT FOR MANAGING DIABETIC SKIN INFLAMMATION AND WOUNDS

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Effective and skin-friendly topical treatments are necessary because people with diabetes frequently experience chronic skin inflammation, dryness, and slow wound healing. The medicinal herb Bryophyllum pinnatum**,** sometimes referred to as the "life plant," is abundant in natural substances such as luteolin, rutin, and quercetin, which are flavonoids with potent anti-inflammatory effects. A 5% B. pinnatum extract gel has been demonstrated in numerous studies to dramatically accelerate wound healing by lowering levels of harmful cytokines such as TNF-α and IL-1β, promoting blood vessel growth through VEGF activation, and reducing inflammation. Its antimicrobial properties also aid in protecting against bacteria that are frequently present in wound infections. The use of ghee (clarified butter), which is frequently combined with honey in herbal preparations, has been used to treat diabetic and chronic wounds in order to promote skin regeneration and soothe the skin because of its healing and moisturizing properties. We propose in this study to develop a ghee-based cream that contains Bryophyllum pinnatum extract. This method offers a promising route toward natural, efficient skin care for diabetic patients by bridging the gap between traditional herbal knowledge. Additional laboratory and clinical research is required to validate the cream's efficacy and safety.

**Keywords**: Bryophyllum pinnatum, flavonoids, Anti-inflammatory property, Diabetic patients, Microbial activity.

**PT-447**

## IMPORTANCE OF HERBAL DRUGS IN MODERN MEDICINE

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Herbal drugs remain an integral component of modern medicine, linking traditional healing practices with contemporary scientific understanding. Their growing acceptance is driven by increasing interest in natural, safe, and holistic therapies that complement or enhance conventional treatment approaches. Medicinal plants serve as valuable sources of bioactive compounds, many of which have contributed to the development of important modern pharmaceuticals. Recent advancements in phytochemistry, analytical standardization, and clinical research have strengthened the scientific foundation of herbal medicines. These developments have improved the quality, safety, and efficacy of herbal formulations, supporting their incorporation into evidence based healthcare. Herbal drugs offer therapeutic benefits in managing chronic diseases, enhancing immunity and promoting overall well-being, often with fewer side effects compared to synthetic alternatives. Despite their potential, challenges such as variability in raw materials, standardization issues, herb–drug interactions, and regulatory differences across regions must be addressed to ensure consistent quality and reliability. Continued research, innovation in formulation technologies, and harmonized regulations are essential for integrating herbal drugs more effectively into mainstream medical practice. Overall, the evolving relevance of herbal drugs underscores their enduring significance in global healthcare and their promising role in the future of modern medicine.

**Keywords:** Herbal, Phytochemistry, Bioactives, Standardization, Therapeutics.

**PT-448**

## PHYTOCHEMICALS AND THEIR APPLICATIONS IN CURRENT NEUROLOGICAL DISORDER THERAPIES: A COMPREHENSIVE REVIEW

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Neurological disorders, including Alzheimer's disease, Parkinson's disease, multiple sclerosis, and epilepsy, represent a significant global health challenge due to their progressive nature, complex pathophysiology, and the limitations of current therapeutic approaches. In recent years, phytochemicals—bioactive compounds derived from plants—have garnered attention for their neuroprotective potential and ability to address critical mechanisms underlying these disorders. This review explores the diverse chemical structures and biological activities of phytochemicals, highlighting their antioxidant, anti-inflammatory, anti-apoptotic, and neuroregenerative properties. Key phytochemicals such as curcumin, resveratrol, quercetin, and huperzine A are examined for their roles in mitigating oxidative stress, reducing neuroinflammation, and promoting neuronal survival and repair. Their specific applications in Alzheimer's disease (targeting amyloid-beta plaques and tau proteins), Parkinson's disease (preserving dopaminergic neurons), multiple sclerosis (modulating immune responses and supporting myelin repair), and epilepsy (exerting anticonvulsant effects) are discussed. The review also evaluates the current status of clinical trials investigating phytochemicals in neurological disorders, emphasizing challenges such as bioavailability, standardization, and safety concerns. While these compounds demonstrate promising therapeutic potential, translating preclinical findings into effective clinical interventions requires overcoming hurdles related to dosage optimization, long-term safety, and regulatory approval. Looking forward, advancements in delivery systems, synergistic combinations, and personalized medicine could enhance the clinical applicability of phytochemicals. This review underscores the need for rigorous research and multidisciplinary approaches to fully harness the potential of phytochemical-based therapies in addressing the growing burden of neurological disorders.

**Keywords:** Neurological Disorders, Phytochemicals, Alzheimer's disease, Parkinson's disease, Epilepsy

**PT-449**




ISBN: 978-81-980623-8-3

**CULTIVATING QUALITY HERBS: ROLE OF GOOD AGRICULTURAL AND COLLECTION PRACTICES IN ENSURING HERBAL PRODUCT QUALITY**

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The global demand for herbal medicines, cosmetics, and nutraceuticals has significantly increased due to growing consumer interest in health, wellness, and the advantages of plant-based products. However, with this rising demand comes an increasing concern over the quality, safety, and efficacy of herbal raw materials. The present study was undertaken to evaluate the regulatory frameworks on the cultivation, collection, and quality control of herbal raw materials in India, China, the USA, Europe, and Japan. Data were collected from various global guidelines and regulations on the cultivation, collection, and quality control of herbal raw materials. The herbal raw materials are often susceptible to contamination by microbial agents, heavy metals, pesticides, and adulteration, compounded by inconsistent cultivation, harvesting, and post-harvest processes. To address these challenges, the World Health Organization (WHO) established Good Agricultural and Collection Practices (GACP) as a global framework aimed at ensuring the quality and safety of medicinal plant materials. There are differences in regulatory rigor between developed and developing countries, highlighting the well-established guidelines in the USA and Europe versus the evolving regulatory frameworks in nations like India, where traditional herbal medicines still face less stringent controls, resulting in variability in product quality. The study findings underscore the critical role of GACP, Good Agricultural Practices, and Good Manufacturing Practices in standardizing quality, mitigating contamination risks, and fostering better international trade opportunities. The study advocates for the harmonization of global regulations to ensure the safety and efficacy of herbal products and to enhance their integration into the global marketplace.

**Keywords:** GACP, GMP, herbal medicine, quality, raw material, regulations.

**PT-450**

**IN-VITRO ANTIOXIDANT AND ANTIDIABETIC ACTIVITY OF STEM BARK OF NOTHOPEGIA RACEMOSA DALZ**

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The stem bark of Nothopegia racemosa was collected from Dandeli, Tinaighat, and Malsang forests in Karnataka, identified by a taxonomist, shade-dried, powdered, and successively extracted with solvents of increasing polarity. Extracts were screened for phytochemicals and evaluated for antioxidant activity (DPPH and hydroxyl radical scavenging) using ascorbic acid and gallic acid as standards, and for antidiabetic potential (α-amylase and α-glucosidase inhibition) using acarbose as the standard. All assays were performed in triplicate, and $IC_{50}$ values were determined. Results: Phytochemical analysis confirmed tannins, steroids, flavonoids, glycosides, and polyphenols. Antioxidant assays showed that ethanolic and aqueous extracts exhibited better activity in both DPPH ($IC_{50}$ = 172.36 and 71.18 µg/ml) and hydroxyl radical scavenging ($IC_{50}$ = 169.35 and 89.9 µg/ml), though less potent than standards ($IC_{50}$ ≈ 20 µg/ml). Ethyl acetate extract showed moderate activity. Antidiabetic assays revealed that ethanolic and aqueous extracts displayed marked inhibition of α-amylase ($IC_{50}$ = 22.53 and 18.03 µg/ml) and α-glucosidase ($IC_{50}$ = 2.642 and 1.961 µg/ml), compared to acarbose ($IC_{50}$ = 3.039 and 0.316 µg/ml). Among all, the aqueous extract showed the highest potency in both enzyme inhibition and antioxidant assays. Conclusion: The study highlights the significant antioxidant and antidiabetic potential of N. racemosa, attributed mainly to its phenolic and flavonoid constituents. The aqueous extract shows better activity, supporting its traditional use and indicating promise as a natural therapeutic source for managing oxidative stress and postprandial hyperglycemia.

**Keywords:** Nothopegia racemosa, antioxidant, DPPH, hydroxyl radical scavenging, α-amylase, α-glucosidase.

**PT-451**

**FORMULATION AND EVALUATION OF GUMMIES PREPARED FROM MAYURCHANDRIKA BHASMA**

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Antiemetic drugs which prevents or minimizes nausea and vomiting; used to treat a variety of conditions like motion sickness, the side effects of medications like chemotherapy, and post-operative nausea. Antiemetics acts by blocking specific neurotransmitters in the brain that trigger the vomiting reflex. Gummies are small, like a jelly baby and prepared from the reduction of sugar and addition of healthier herbal ingredients like mayurchandrika bhasma. Mayurchandrika bhasma or Piecha bhasma (calx of peacock feather) is widely used in Ayurveda to treat vomiting commonly observes in pregnancy, hiccough and respiratory disorders. The aim of present study was to develop and formulate gummy jellies using herbal or natural ingredient honey, as sweetening agent. Presently in market available Mayurchandrika Bhasma patient hesitates to take. So to increase palatability gummies were prepared as a modified dosage forms. Bhasma, Agar, cocoa powder, honey were contents of optimized formula along with flouring agent. Gummies were found stable and evaluation tests organoleptic, moisture content and protein were within limits. Patient compliance of gummies will be more than other forms of medicine so gummies are effective and playful way to treat major problem which is increasing more rapidly in mankind due to changing lifestyle of the mankind.

**Keywords:** Gummies, Mayurchandrika Bhasma, antiemetic, calx, agar

**PT-452**

**PHYTOCHEMICAL-DRIVEN FORMULATION AND FUNCTIONAL ASSESSMENT OF HIBISCUS ROSA-SINENSIS HERBAL HAIR-NOURISHING OIL**

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Hibiscus rosa-sinensis, also called the Chinese hibiscus, is a flowering plant that comes from East Asia and is part of the Malvaceae family. It is often grown because of its big, colorful flowers that are used in gardens and landscaping. This plant has been used for a long time in traditional medicine, and its leaves, flowers, and extracts are thought to have many health benefits. These include fighting free radicals, reducing inflammation, and killing harmful bacteria. It is also believed to help with blood pressure and skin health. Hibiscus rosa-sinensis grows best in warm, tropical or subtropical areas and is still studied for its many healing qualities. The flowers and leaves of this plant contain different types of active ingredients that can help with hair growth and making hair healthier. In this research, along with Hibiscus rosa-sinensis, other herbal ingredients like amla, curry leaves, coconut oil, and fenugreek are used to make a special herbal oil.

**PT-453**

**FORMULATION AND EVALUATION OF ACNE HERBAL TOPICAL GEL**

Prathibha B M

This study focuses on the formulation of herbal acne topical gels using a hemp seed mixture as a key component, alongside other natural ingredients. Herbal gels are designed to manage acne by leveraging anti-inflammatory, antimicrobial, and astringent properties of plant extracts, while minimizing side effects compared to synthetic drugs. The hemp mixture, rich in proteins, aids in reducing skin irritation, preventing bacterial infections, and promoting healing, making it suitable for sensitive skin and long-term use. The formulation process involved selecting appropriate gelling agents, optimizing active ingredient concentrations, and ensuring stability and skin penetration. Evaluation parameters such as pH, viscosity, spreadability, swelling index, extrudability, skin irritation, and stability were assessed. Antimicrobial activity was tested using agar well diffusion against Propionibacterium acnes, and stability studies were performed under environmental




ISBN: 978-81-980623-8-3

conditions. Demonstrated that the hemp-based gel exhibited excellent antimicrobial activity, good spreadability, stability, and compatibility with no irritation. Among the three formulations, the first (F1) showed optimal pH (7.2), better spreadability, extrudability, washability, and overall performance. The gel remained stable without significant changes in physical or chemical properties over time. This formulation provides a promising, natural, and safe alternative for acne management, with synergistic effects of hemp and other herbal ingredients offering effective treatment and minimal side effects. Further clinical studies are recommended to confirm its therapeutic potential.

**PT-454**

**Evaluation Of Antioxidant And Anti-Urolithiatic Activities Of A Formulated Polyherbal Tablet**

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The present study aimed to formulate and evaluate polyherbal tablet for its phytochemical, antioxidant, and anti-urolithiatic potential. Preliminary phytochemical screening revealed the presence of flavonoids, alkaloids, saponins, tannins, glycosides, and terpenoids. TLC profiling confirmed the presence of quercetin, a major flavonoid known for potent antioxidant and nephroprotective effects. The antioxidant activity was determined using the DPPH radical scavenging method, showing a concentration-dependent increase with 99.2% inhibition at 400 µg/mL, comparable to ascorbic acid (82.9%). The formulation exhibited strong linear correlation ($R^2$ = 0.896 for test and 0.905 for standard) and low $IC_{50}$ (88.38 µg/mL), confirming effective free radical neutralization. Anti-urolithiatic activity, evaluated through an in vitro egg membrane diffusion model, demonstrated 32.84% and 55.27% dissolution of calcium oxalate and phosphate crystals, respectively, compared to 55.56% and 98.32% for the standard. Microscopic observation showed reduced aggregation and deformation of crystals, indicating inhibition at nucleation and growth stages. Overall, the results establish that the formulated polyherbal tablet possesses significant antioxidant and anti-urolithiatic efficacy, attributed mainly to quercetin and synergistic phytoconstituents, supporting its role as a safe, natural therapeutic for oxidative stress and kidney stone management.

**Keywords:** Polyherbal tablet, TLC, quercetin, antioxidant, anti-urolithiatic activity, DPPH assay, calcium oxalate.

**PT-455**

**FORMULATION AND EVALUATION OF HERBAL LIPSTICK**

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Herbal lipsticks are color and protection giving to lips using natural ingredients like herbal extracts,natural colorants and essential oils.The herbal lipstick is devoid of side effects and nourishes the lips with the additives. In the present study, we aimed to prepare a lipstick with natural colorants and essential oils and evaluated by color, pH, skin irritancy test, melting point, breaking point, spreadability test, aging stability and smudge test.The present study concluded that the use of natural ingredients in herbal lipstick have no side effects and more consumer acceptance.

**Keywords:** Herbal lipstick, colorants, essential oils

**PT-456**

**IN SILICO ASSESSMENT OF REPORTED PHYTOCHEMICALS IN HOT AQUEOUS EXTRACT OF HERBAL INGREDIENTS IN 'PATHYAADI KWATH': AN INQUIRY INTO PROBABLE MECHANISM OF ACTION OF REPORTED PHARMACOLOGICAL ACTIVITIES**

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'Pathyaadi Kwath' is an Ayurvedic polyherbal aqueous decoction. It is claimed to be effective in migraine headache, diabetes, cholestatic jaundice and others. It is a traditional Ayurvedic Formulation with original monograph mentioned in Sharangdhara Samhita. Terminalia chebula, Terminalia bellerica, Emblica officinalis, Azadirachta indica, Tinospora cordifolia, Adhatoda vasica, Picrorrhiza kurroa, Berberis aristata, Cyperus rotundus, Santalum album, and Glycyrrhiza glabra are the crude drug ingredients used for the said decoction formulation. The antioxidant, anti-inflammatory and antimicrobial activities of this formulation have already been reported previously by this researcher. However, to have more meaningful insights into probable mechanisms of the said activities shown by this formulation, this in silico study was initiated. Since, little comprehensive phytochemical data is reported, phytochemical constituents from hot aqueous extracts and aqueous decoctions of individual herbs within this formulation reported previously have been selected for the present in silico study. Only specific phytoconstituents have been selected instead of common secondary metabolites reported. Bisacurone, Tumeronol A, Nimbin, Tinocordiside, Ellagic Acid, Punigluconin, Gentianine, Syringine, Chebulinic Acid and Cardifoliside – A were ten reported phytoconstituents selected while the targets selected are anti-inflammatory (Cyclo-oxygenase-2, Nuclear Factor Kappa B, PPARᵞ, MMP-9, MMP-2, Leucocyte Elastase), antibacterial (Penicillin Binding Protein, Topoisomerase IV, DNA Polymerase III, LPX – C, RNA Polymerase B) and antidiabetic (Aldose Reductase). PDB database was used to access protein targets while SWISS ADME tools were used for assessing drug-likeliness. PyRx, Discovery Studio Visualizer and PyMOL softwares were used for Molecular Docking of the selected ligands and protein targets.

**Keywords:** Pathyaadi Kwath, MMP-9, MMP-2, PBP, DNA Polymerase III, RNA Polymerase B, Aldose Reductase

**PT-457**

**SYNERGISTIC DEVELOPMENT OF POLYHERBAL & ALKALINE WATER FORMULATION FOR IMMUNE HEALTH IMPROVEMENT**

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Groundwater is contaminated by many substances from the land's surface. Drinking contaminated groundwater can have serious health effects. The present study was carried out to confirm the effectiveness of polyherbal formulation on ground water and laboratory waste water. The main objective 1 of this work was to evaluate the antimicrobial activity and efficiency of a natural absorbent from plants to treat ground water. During this study, laboratory waste water and ground water samples were collected for treatment by a polyherbal powder mixture, resulting in an effective natural clarification agent for highly turbid and untreated pathogenic water. Various doses of polyherbal formulation viz. 100 and 150 mg/l were taken and checked for the efficiency dose on raw water. After treatment of polyherbal powder with water samples were analyzed for parameters like pH, antimicrobial action..

**Keywords:** Polyherbal mixture, water treatment, ground water

**PT-458**

**EVALUATION OF HERBAL FORMULATION CONTAINING INDIGENOUS MEDICINAL PLANTS FOR ANTIOXIDANT AND PHYTOCHEMICAL PROPERTIES**

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Herbal medicines have been traditionally used for centuries in India due to their therapeutic potential and minimal side effects. Combining multiple medicinal plants in a single formulation may enhance their pharmacological activity. This study was designed to evaluate the phytochemical profile and antioxidant properties of a polyherbal formulation. The formulation was prepared using extracts of Ocimum sanctum (Tulsi), Withania somnifera (Ashwagandha), and Curcuma longa (Turmeric). Preliminary phytochemical screening was performed to identify the presence of secondary metabolites. Antioxidant activity was assessed using DPPH and ABTS free radical scavenging assays. Phytochemical analysis revealed the presence of alkaloids, flavonoids,




ISBN: 978-81-980623-8-3

phenolics, tannins, and terpenoids in the formulation. Both DPPH and ABTS assays demonstrated significant free radical scavenging activity, suggesting strong antioxidant potential of the herbal mixture. The combined formulation showed greater activity compared to individual extracts reported in literature. The study highlights that the synergistic combination of Tulsi, Ashwagandha, and Turmeric enhances antioxidant activity, supporting their traditional use in healthcare. Integration of phytochemical screening with antioxidant assays provides scientific validation for indigenous herbal formulations and their potential therapeutic benefits.

**Keywords:** Pharmacognosy, herbal formulation, phytochemistry, antioxidant activity, indigenous plants

**PT-459**

**AERVA LANATA IN DENTAL CARE**

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The future of dental care research in Aerva Lanata: New insights, mechanisms and clinical prospects. In dentistry, the use of Aerva Lanata in dental care is unique because of its targeted use and antimicrobial/anti-inflammatory properties over its long history. This study is focused on solving fundamental dental issues by preventing oral pathogens, such as Streptococcus mutans, and decreasing the chronic inflammation associated with periodontal disease, providing a natural remedy for the challenge of resisting antibiotics and biofilm formation. The process involves rigorous in vitro mechanistic studies, and the first step is to standardize the active phytochemicals, including flavonoids and phenolic compounds, through HPLC/GC-MS. To verify the antioxidant and anti-inflammatory activity against pro–Inflammation markers, these analyses are followed by specific assays such as Minimum Inhibitory Concentration (MIC) and Anti-biofilm asses (Crystal Violet). Applications are focused on developing new, bioactive dental products such as herbal mouthwashes, anti-plaque toothpastes and localised sustained-release gels for periodontal pockets. To ensure targeted delivery and stability within the mouth, future perspectives require the use of nano-formulations to optimize efficacy.

**Keywords:** Antimicrobial (or Anti-inflammatory), Biofilm, Standardization (or HPLC/GC-MS), Nano-formulations, RCTs (or Clinical Validation)

**PT-460**

**PHYTOCHEMICAL ANALYSIS, IN-SILICO AND IN-VITRO STUDY OF CYNODON DACTYLON (PERS.) LEAVES EXTRACT FOR INSECT REPELLENT ACTIVITY**

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Cynodon dactylon (Pers.), commonly known as Bermuda grass, is a widely distributed medicinal plant belonging to the family Poaceae. The present study aims to explore the insect repellent potential of C. dactylon leaf extract through phytochemical, in-silico, and in-vitro investigations. Preliminary phytochemical screening confirmed the presence of bioactive compounds such as alkaloids, flavonoids, tannins, and terpenoids, which are known for their biological activities. In-silico molecular docking studies were performed to evaluate the interaction of key phytoconstituents with insect olfactory receptor proteins, predicting their possible mechanism of repellent action. The in-vitro assays assessed the repellency and protection time against common mosquito species, validating the computational findings. Overall, the study suggests that C. dactylon possesses significant insect repellent potential, making it a promising candidate for the development of safe, natural, and eco-friendly alternatives to chemical repellents. This research also supports its role in sustainable pest management strategies.

**Keywords:** Cynodon dactylon, In-silico study, In-vitro assay, Insect repellent activity, Natural insecticide

**PT-461**

**COMPARATIVE EVALUATION OF ANTI-MICROBIAL ACTIVITY OF BETWEEN COMBINATION OF EXTRACT OF POGAMIA PINNATA WITH CAFFEINE AND POGAMIA PINNATA: IN VITRO APPROACH**

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The antimicrobial activity of a novel combination of plant-based extracts of Pogamia pinnata and caffeine, as determined by in vitro studies, is investigated in this study. Since antimicrobial resistance is becoming a major public health concern, there is a growing interest in investigating alternative antimicrobial agents. Pogamia pinnata have long been known to have antimicrobial properties, and caffeine has emerged as a potential enhancer of antimicrobial efficacy. However, the synergistic antimicrobial effects of combining Pogamia pinnata with caffeine are still not well understood. In this study, we carried out a comparative evaluation of anti microbial properties in vitro experiments, between extract of Pogamia pinnata with caffeine and extract of Pogamia pinnata (in vitro). In this study we are investigated that Pogamia pinnata (10% EESPP) has antimicrobial activity against S. aureus (gram +ve), E. coli (gram -ve), S. Typhi (gram -ve), and P. aeruginosa (gram -ve). However, when caffeine is combined with Pogamia pinnata 10% EESPP (50 µl), the combination exhibits greater inhibitory activity against microorganisms than Pogamia pinnata 10% EESPP (50 µl) alone. The study shows caffeine increases antimicrobial activity of the ethanolic extract of Pongamia pinnata.

**PT-462**

**BAMBOO SALT IN TOOTHPASTE: THE ANCIENT REMEDY FOR MODERN DENTAL CARE**

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Bamboo salt, traditionally known as Jukyeom, is a Korean medicinal salt produced through a unique high-temperature roasting process. Developed over a thousand years ago by Buddhist monks, bamboo salt is prepared by filling raw sea salt into bamboo tubes sealed with mineral-rich yellow clay. The tubes are then roasted at temperatures ranging from 1,000°C to 1,500°C. This process may be repeated up to nine times, resulting in a highly alkaline salt enriched with various minerals. The final product, often dark-colored and fine-textured, is believed to possess enhanced therapeutic properties including anti-inflammatory, detoxifying, and antibacterial effects. Bamboo salt is used in both culinary and traditional medicinal applications. Its preparation method significantly alters its chemical composition, contributing to its potential health benefits. However, while traditionally revered, more scientific research is needed to substantiate its clinical efficacy.

**Keywords:** Bamboo salt, Toothpaste, Herbal.

**PT-463**

**FORMULATION AND EVALUATION OF ANTI-MICROBIAL AND ANTI-FUNGAL GEL CREAM OF TRIDAX PROCUMBENS FOR SCALP DISORDER**

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The present research focuses on the formulation, development, and evaluation of a novel hair gel-cream using Tridax procumbens (coat buttons), a widely used medicinal herb. The primary objective of this formulation is to reduce white hair, prevent fungal infections, and control hair loss. Phytochemical screening of Tridax procumbens leaf extracts revealed the presence of tannins, flavonoids, and saponins, which contribute to its antioxidant and antimicrobial activities. The extract exhibited effective antimicrobial activity against E. coli, Pseudomonas aeruginosa, Bacillus subtilis, and Staphylococcus aureus. Additionally, mineral analysis confirmed its potential nutritional value. The stability studies of the formulated hair gel-cream indicated uniform viscosity, low moisture content, and no significant variation during the test period. A patch test demonstrated that the product caused no irritation or redness, proving its safety for topical application. Overall, the study concludes that it is feasible to develop a stable, effective, and safe herbal hair gel-cream from Tridax procumbens with promising cosmetic and therapeutic benefits.




ISBN: 978-81-980623-8-3

**Keywords:** Formulation, Development, Evaluation, Hair gel-cream, Tridax procumbens ,Phytochemical screening

**PT-464**

**EXPLORATION OF ANTIGOUT POTENTIAL IN BOUGAINVILLEA SPECTABILIS THROUGH METABOLITE PROFILING, IN-SILICO STUDY, AND IN-VITRO EVALUATION**

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Gout is an inflammatory arthritis caused by the deposition of monosodium urate (MSU) crystals in joints, driven by elevated uric acid levels. This study investigates the inhibition of MSU crystallization using Bougainvillea spectabilis, which showed significant, dose dependent anti-gout effects in a spectrophotometric assay (200–300 nm). Molecular docking and in vitro studies revealed xanthine oxidase (XO) inhibition, surpassing standard drug Allopurinol. Identified bio actives with antioxidant and anti-inflammatory properties were evaluated for xanthine oxidase inhibition using PASS prediction and ADMET profiling. Molecular docking and in vitro assays confirmed xanthine oxidase inhibitory activity, suggesting broad therapeutic potential.

**Keywords :** Gout, Bougainvillea spectabilis, Xanthine oxidase inhibition, Molecular docking

**PT-465**

**NOVEL THIAZOLIDINE-2,4-DIONES DERIVATIVES AS ANTIDABETIC AGENTS: DESIGN, SYNTHESIS AND IN VIVO STUDIES**

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Diabetes mellitus is a metabolic disorder characterized by elevated blood sugar levels and related complications. This study focuses on harnessing and integrating fragment-based drug design and virtual screening techniques to explore the antidiabetic potential of newly synthesized thiazolidine-2,4-dione derivatives. The research involves the design of novel variations of thiazolidine-2,4-dione compounds by Fragment-Based Drug Design. The screening process involves pharmacophore based virtual screening through docking algorithms, and the identification of newly twelve top-scoring compounds. The molecular docking analysis revealed that compounds SP4e, SP4f showed highest docking scores of -9.082 and -10.345. The binding free energies of the compounds SP4e, SP4f and pioglitazone was found to be -19.9, -16.1 and -13 respectively, calculated using the Prime MM/GBSA approach. The molecular dynamic study validates the docking results. Furthermore, In the Swiss albino mice model, both SP4e and SP4f exhibited significant hypoglycaemic effects, comparable to the reference drug pioglitazone. Furthermore, these compounds demonstrated favourable effects on the lipid profile, reducing total cholesterol, triglycerides, and LDL levels while increasing HDL levels. In mice tissue, the disease control group showed PPAR-γ expression of 4.200±0.24, while compound SP4f displayed higher activation at 7.84±0.431 compared to compound SP4e with an activation of 7.68±0.65. In zebrafish model, SP4e and SP4f showed significant reductions in blood glucose levels and lipid peroxidation, along with increased glutathione levels and catalase activity. These findings highlighted the potential of SP4e and SP4f as antidiabetic agents, warranting further exploration for therapeutic applications.

**Keywords:** Thiazolidine-2,4-dione; virtual screening; R-group enumeration; MM-GBSA; Zebrafish diabetic model

**PT-466**

**FORMULATION AND EVALUATION OF POLY-HERBAL SOAP**

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The present study aims to formulate and evaluate a poly-herbal soap using extracts of Neem (Azadirachta indica), Tulsi (Ocimum tenuiflorum), Shikakai (Acacia concinna), and Reetha (Sapindus mukorossi) for their combined antibacterial, antifungal, and cleansing properties. Ethanolic extracts of these herbal ingredients were incorporated into a glycerin base to prepare two formulations (F1 and F2). The soaps were evaluated for pH, foam height, foam retention, irritancy, and microbial activity. Both formulations showed an acceptable pH (6.9–7.2), good foaming characteristics, and no irritancy or microbial contamination, confirming safety for skin use. The results demonstrate that poly-herbal soap offers a natural, effective, and eco-friendly alternative to conventional chemical soaps, suitable for maintaining personal hygiene and promoting healthy skin.

**Keywords:** Poly-herbal soap, Neem, Tulsi, Shikakai, Reetha

**PT-467**

**VALUE ADDED PRODUCT OF MORINGA SEED OIL FOR ANTI-AGING CREAM**

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Among its various parts, the seeds are rich in a light, non-drying oil known as moringa seed oil, which possesses excellent stability and potent nutrient content. Due to these Moringa oleifera, commonly known as the “miracle tree,” is rich in bioactive compounds with exceptional nutritional and medicinal properties. Moringa seed oil, often referred to as Ben oil, contains high levels of oleic acid, tocopherols (Vitamin E), sterols, and phenolic compounds that exhibit strong antioxidant and moisturizing effects. The study focuses on developing a value-added anti-aging cream using moringa seed oil as the primary active ingredient. The cream was prepared using a standard oil-in-water (O/W) emulsion method, combining the oil phase (moringa oil, stearic acid, cetyl alcohol, beeswax) with the aqueous phase (rose water, glycerin). The prepared formulation was subjected to various physicochemical evaluations including pH, viscosity, spreadability, appearance and stability. The skin hydration and texture analysis were performed to determine cosmetic performance. The results indicated that the moringa-based cream exhibited excellent texture, easy spreadability, non-greasiness and high antioxidant potential due to its phenolic and tocopherol content. It has an acceptable pH (close to skin pH 5.5–6.0), smooth consistency and high antioxidant potential. The tocopherols and phenolic compounds in moringa oil effectively neutralized free radicals, preventing oxidative stress in skin cells. Regular application helps in reducing fine lines, improving elasticity and enhancing skin texture, confirming its anti-aging efficacy. Therefore, moringa seed oil can be effectively utilized as a value-added natural ingredient in the formulation of herbal anti aging cream.

**Keywords:** Moringa oleifera, Ben oil, Anti-aging cream, Anti-oxidant, value addition.

**PT-468**

**ISOLATION, CHARACTERIZATION AND EVALUATION OF ANTITUBURCULAR ACTIVITY FROM PEDALIUM MUREX**

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This study focuses on the isolation, characterization, and evaluation of the antitubercular potential of bioactive compounds derived from Pedalium murex, a medicinal herb known for its traditional therapeutic applications. Extraction of the plant material was performed using solvents such as ethyl acetate and methanol to obtain phytochemical-rich fractions, which were then subjected to chromatographic and spectroscopic techniques including FTIR, UV-Vis, and GC-MS for detailed characterization. Phytochemical analysis revealed the presence of diverse secondary metabolites including flavonoids, polyphenols, and terpenoids, compounds often implicated in antimicrobial activities. The antitubercular efficacy of these extracts was assessed against Mycobacterium tuberculosis using in vitro assays to determine minimum inhibitory concentrations (MIC) and bactericidal activity. Results demonstrated significant inhibition of bacterial growth, suggesting that Pedalium murex has potent activity against tuberculosis-causing strains. The study also explored the modulation of bacterial enzyme activities and gene expression related to virulence factors, providing insight into potential mechanisms of action. Furthermore, cytotoxicity assessments indicated that the extracts exhibit selective toxicity toward bacterial cells with minimal harm to normal mammalian cells, emphasizing their




ISBN: 978-81-980623-8-3

therapeutic potential. This research substantiates the use of Pedalium murex as a promising natural source for antitubercular drug development. Future research is recommended to isolate specific active compounds and elucidate their molecular interactions with Mycobacterium tuberculosis targets. The present findings contribute valuable knowledge toward natural product-based therapeutic strategies against tuberculosis, a global health challenge requiring novel and effective treatments.

**Keywords:** Pedalium murex, Antitubercular activity, Bioactive compounds, Extraction, Characterization, Mycobacterium tuberculosis, Minimum inhibitory concentration, Phytochemicals, Flavonoids, Spectroscopic techniques.

**PT-469**

## ANTIOXIDANT AND CYTOTOXIC POTENTIAL OF SELECTED AYURVEDIC HERBS: A COMPARATIVE IN VITRO STUDY

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The present study explores and compares the antioxidant and cytotoxic potential of ethanolic extracts derived from three widely recognized Ayurvedic herbs—Withania somnifera (Ashwagandha), Calotropis procera (Sodom apple), and Semecarpus anacardium (Marking nut). Owing to their rich phytochemical composition, these plants have been traditionally employed in the management of various disorders, yet systematic comparative data on their bioactivities remain limited. In this investigation, antioxidant capacity was evaluated using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging method and total phenolic content (TPC) estimation, while cytotoxic potential was examined through the MTT assay against selected tumor cell lines. The findings revealed marked differences among the extracts. S. anacardium and C. procera demonstrated significantly higher cytotoxic activity with very low $IC_{50}$ values (1.4–1.6 µg/mL), suggesting strong antiproliferative effects. In contrast, W. somnifera displayed moderate cytotoxicity but exhibited notable antioxidant potential, supported by phenolic content and induction of apoptosis with reactive oxygen species (ROS) generation in A549 lung carcinoma cells. These results highlight the dual pharmacological roles of the herbs, where S. anacardium and C. procera emerge as potent cytotoxic agents, while W. somnifera shows a balanced profile with chemopreventive relevance. This comparative approach underscores the importance of natural products as promising leads in drug discovery and cancer chemoprevention. The study provides a basis for future research to isolate active compounds, validate mechanisms of action, and establish safety through in vivo models. Overall, the findings strengthen the ethnopharmacological value of these Ayurvedic herbs and suggest their potential integration into complementary therapeutic strategies.

**Keywords:** Ayurvedic herbs, Ethanolic extracts, Withania somnifera, Calotropis procera, Cytotoxic.




ISBN: 978-81-980623-8-3

**RA-01**

## THE NEW CHEMISTRY, MANUFACTURING, AND CONTROLS (CMC) REGULATIONS IN CHINA

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An overview of the revised drug regulations, application process, and the requirements for the post-approval CMC amendments in China is presented in this article. The National Medical Products Administration (NMPA) is the regulatory authority in China that is responsible for evaluation of the new drug registration applications and the amendments during the life cycle of the drug. NMPA launched the revised Drug Registration Regulations (DRR) in July 2020 and continued through 2024. This is the first major revision of the drug regulations in China since 2007 and has significant impact on how the new drug registration applications and life cycle amendments are filed and evaluated by the NMPA. China's adaptation to ICH and a comparison with US FDA, EMA, and PMDA regulations is discussed. The article provides an overview of the revised drug regulations, application process, and the requirements for the post-approval CMC amendments in China is presented. This is consistent with the recently published "Opinion" document (December 30, 2024) by China's General Office of the State Council which promises to deepen drug and medical device regulations, quality, and efficiency of the review and approval processes by 2027. The article provides an overview of the revised drug regulations, application process, and the requirements for the post-approval CMC amendments in China.

Keywords: China, NMPA, Drug registration regulation (DRR), post-approval CMC amendments, drug registration, regulatory approval process in China.

**RA-02**

## EXPLORING THE POTENTIAL CHALLENGES FOR DEVELOPING GENERIC ORPHAN DRUGS FOR RARE DISEASES: A SURVEY OF US AND EUROPEAN MARKETS

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The US Food and Drug Administration in 1983 and the European Union's European Medicines Agency in 2000 implemented the orphan drug development program for rare diseases. The study aimed to find the potential challenges encountered by generic companies in developing generics for rare diseases. We performed a thematic analysis, which consists of qualitative and quantitative research. For data analysis of approved orphan drugs, we used statistical methods, and for the industrial case study, we selected 14 generic companies and conducted semi structured interviews related to 10 critical areas of drug development. The orphan drug approvals were classified into 4 categories: the number of orphan approvals, pediatric claims, formulation, and therapeutic areas. We analyzed the approvals from 2001 to 2021; the Food and Drug Administration approved 815 drugs and European Medicines Agency approved 258 drugs. The pediatric orphan approvals were analyzed from 2010 to 2021; the average percentage of orphan drugs claim pediatric exclusivity during this period was found to be 31.8%. In formulation, we found the highest percentage of drugs belong to small molecules at 71%. In the therapeutic class, oncology drugs have a majority of approvals at 25%. The industrial case study responses revealed that the major challenge for drug development is the complexity of the disease at 21%, followed by the limited market at 17%. There is a high need for generic orphan drugs in the developing countries. The generic companies can use the opportunities provided by health authorities for the benefit of both the company and the patient perspective.

**RA-03**

## A CRITICAL REVIEW OF PCI DRAFT B. PHARM SYLLABUS 2025 IN THE CONTEXT OF NEP 2020

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The Pharmacy Council of India (PCI) has introduced the Draft B.Pharm Syllabus 2025 with the stated aim of aligning pharmacy education with the principles of the National Education Policy (NEP) 2020. The new framework incorporates progressive reforms such as skill enhancement courses, integration of artificial intelligence and modern analytical tools, mandatory internships, and undergraduate research projects. These changes represent a significant improvement over previous rigid structure. However, despite these advancements, the draft syllabus does not fully meet the vision of NEP 2020. One major shortcoming is the absence of a multiple entry–exit framework, as the B. Pharm program continues as a fixed four-year degree without provisions for certificate or diploma awards at intermediate stages. Furthermore, although multidisciplinary exposure is emphasized, the syllabus remains predominantly Pharmacy-centric, limiting opportunities to pursue electives in non-pharmaceutical domains such as humanities, management, or law. The curriculum also continues to be English-exclusive, lacking regional language integration encouraged by NEP. While skill enhancement is mentioned, the credit distribution remains heavy for theory, and entrepreneurship or vocational training receives limited weightage. Similarly, undergraduate research is confined to the Pharmacy domain, with little focus on innovation labs, incubation, or start-up culture. Digital learning, blended credit transfer, and international exchange provisions are minimally addressed. Holistic aspects of NEP—such as integration of arts, culture, sports, and ethics—are also largely absent. Thus, although the PCI 2025 Draft is a step toward modernization, further reforms are required to achieve complete alignment with NEP 2020.

**RA-04**

## REDEFINING PHARMACEUTICAL REGULATION IN THE UNITED KINGDOM: A POST-BREXIT PERSPECTIVE

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The United Kingdom's withdrawal from the European Union has significantly transformed its pharmaceutical regulatory framework. Following Brexit, the Medicines and Healthcare products Regulatory Agency (MHRA) assumed full responsibility for the evaluation, approval, and oversight of medicines and medical devices in Great Britain, moving away from reliance on the European Medicines Agency. This transition created both challenges and opportunities, requiring the UK to design independent, agile, and innovation-driven regulatory mechanisms. This work draws upon a in-depth analysis of regulatory documents, policy updates, and published literature to outline key developments in the UK's evolving framework. These include the International Recognition Procedure (IRP), which facilitates faster approvals through reliance on trusted international regulators, and the Innovative Licensing and Access Pathway (ILAP), designed to accelerate access to medicines addressing high unmet needs. In addition, reforms in clinical trial regulations and the introduction of the Windsor Framework for Northern Ireland illustrate the complexities of balancing national autonomy with international alignment. Comparative analysis of pre- and post-Brexit regulatory landscapes reveals major challenges such as regulatory divergence, dual compliance burdens, and disruptions in pharmaceutical supply chains. At the same time, opportunities have emerged, including faster approval timelines, strengthened collaboration with global regulatory partners, and enhanced support for innovation. The MHRA's Data Strategy (2024-2027) further highlights the UK's forward-looking commitment to leveraging data, digital technologies, and real-world evidence to support regulatory decision-making. Overall, the post-Brexit UK regulatory framework illustrates a deliberate shift towards independence and innovation, while addressing the need to safeguard public health, ensure patient access, and sustain global competitiveness.

**Keywords:** MHRA, post-Brexit UK, Innovative Licensing and Access Pathway, International Recognition Procedure, Windsor Framework.




ISBN: 978-81-980623-8-3

**RA-05**

## SUCCESS OF PRODUCING A 21ST CENTURY SKILLED TECHNICAL GRADUATE PHARMACIST TO MEET THE CHALLENGES OF THE INDUSTRY

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The scenario of industry in the 21st Century has oriented highly upon mechanized, automated physical resources and intellectually sound skillful human resources. However host of factors including theory oriented curriculum (85%), over-valued and repetitive practical experiences (65%), lack of exposure of students to learning under industry environment (5%), inability to provide teachers with appropriate teaching-learning qualities (30%) and most important being the absence of good assessment tools (15%) has brought in a big void in the demand supply situation with regard to making availability of skilled pharmacist acceptable by industry with due respect commensurate with consideration and privileges. Industry-ready skills are a combination of soft skills and technical (hard) skills that make a professional valuable to employers and highly effective in their roles. Key skills include communication, teamwork, problem-solving, adaptability, time management, and leadership. Domain-specific technical skills are data analytics, AI/Machine Learning, or programming languages such as Python. Gaining practical experience through internships, workshops, and networking is crucial for developing these skills and becoming industry-ready. Employers seek a blend of both to find candidates who are not only technically proficient but also capable of collaborating, learning, and contributing effectively in the workplace. Emphasis of this presentation is to highlight the need of dynamic and Curriculum with relevance. Relevance refers to how well an educational program connects with and serves the needs of its various stakeholders, including students, industry, and society. It means that the curriculum is applicable, practical, and up-to-date, helping learners understand real-world challenges, develop relevant skills for their future careers, and contribute meaningfully to society. Pharmacopoeia has been used as a fingerprint in this study to enable the understanding of technological revolution in industry requirements and coping up of the requirements by graduating pharmacy students. Curriculam study by students without extended learning during their final year hasnot brought a transition from 20th Century technical pharmacist to a 21st Century technical pharmacist.

**Keywords:** Pharmacy education, Industry, Curricula, Pharmacopoeia, Technology

**RA-06**

## BENEFITS OF REGULATORY APPROVALS ON FOOD CHAINS IN INDIA

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Before the 21st century, India's food sector was governed by multiple laws with different standards for additives, preservatives, colours, contaminants, and labelling, causing overlap and confusion. To address this, the Food Safety and Standards Authority of India (FSSAI) was established under the Ministry of Health & Family Welfare through the Food Safety and Standards Act, 2006. This Act consolidated earlier legislations like the Prevention of Food Adulteration Act, 1954, Food Product Order (FPO), and the Vegetable Oil Products Order, 1998, creating an integrated framework known as "One Nation, One Food Law." FSSAI lays down science-based standards for food and regulates its manufacture, storage, distribution, sale, and import to ensure safe and wholesome food for consumers. It also shifted the responsibility of food safety onto food businesses, ensuring accountability across the food chain. The main objectives of FSSAI are to protect public health, ensure uniform food standards, and facilitate safe, nutritious, and quality food for all.

**Keywords:** FSSAI, Authorities, Additives, Preservatives, FPO, Adulteration.

**RA-07**

## A COMPARATIVE STUDY ON PRICING OF BRANDED AND GENERIC ORAL AND INJECTABLE ANTIBIOTICS

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Generic antibiotics play an important role in healthcare by offering a cost-effective alternative to brand- name antibiotics while maintaining the same safety and efficacy standards. The objective of this study is to analyze the price variation of different antibiotic brands available in Indian market. This is a cross-sectional study based on a questionnaire. A total of 50 shops have been involved in this study. The methodology used here is individual survey of Chemist and Druggist Shop and Pradhan Mantri Bhartiya Jan Aushadhi Kendra. The study was conducted by collecting sales data and price data of the above listed drugs and drug combinations along with its marketed company and price. The secondary data was collected from some verified websites and reviewing some literature and articles. It was found that generic drugs were found 50% - 83% less expensive compared to branded drugs. Norfloxacin + Tinidazole found to be highest followed by Cefixime and Clavulanate, whereas sales of branded version of injectable antibiotics Amoxicillin was found to be the highest selling drug. It can be concluded that a maximum of 90% and minimum of about 34% prices can be reduced by switching to generic drugs, which in turn can be used for other patients' requirement like nutrition, comfort and better quality of life.

**Keywords:** Antibiotics, Amoxicillin, Generic, Branded

**RA-08**

## COMPARATIVE STUDY OF INVESTIGATIONAL NEW DRUG APPROVAL PROCESS IN INDIA AND USA

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The Investigational New Drug (IND) approval process plays a pivotal role in ensuring the safety, efficacy, and quality of pharmaceuticals before they reach the market. This study presents a comparative analysis of the regulatory frameworks governing IND applications in India and the United States, emphasizing similarities, differences, and implications for global drug development. In India, the process is regulated by the Central Drugs Standard Control Organization (CDSCO) under the Drugs and Cosmetics Act, 1940, whereas in the United States, the Food and Drug Administration (FDA) oversees the IND process as outlined in the Federal Food, Drug, and Cosmetic Act. Both frameworks focus on rigorous preclinical and clinical evaluations, ethical safeguards, and patient safety. However, the U.S. system demonstrates a more structured and predictable pathway, incorporating expedited programs such as Fast Track, Breakthrough Therapy, and Priority Review, which encourage innovation and accelerate patient access to life-saving drugs. In contrast, India's framework, though evolving rapidly, still faces challenges in transparency, efficiency, and global harmonization. The findings highlight that while both countries share the common goal of safeguarding public health, differences in timelines, application requirements, and regulatory infrastructure affect multinational drug development strategies. Harmonization of processes, adoption of international best practices, and strengthening of ethical and pharmacovigilance frameworks can enhance India's regulatory landscape. This comparative study underscores the importance of regulatory convergence to reduce redundancies, streamline multinational trials, and foster innovation, thereby contributing to the global availability of safe, effective, and affordable medicines.

**Keywords:** Investigational New Drug (IND), Drug Approval Process, CDSCO, FDA, NDCTR 2019, Clinical Trials, Regulatory Framework, Comparative Study, Drug Development, Ethics Committee.

**RA-09**

## A PROSPECTIVE OBSERVATIONAL STUDY ON ANESTHETIC DRUG UTILIZATION AND SAFETY PROFILE AND COST ANALYSIS IN TERTIARY CARE HOSPITAL

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Anesthesia is a state of controlled, temporary loss of sensation or awareness. Depending on the requirement, it may induce analgesia, muscle relaxation, amnesia, or complete unconsciousness. Beyond its therapeutic role, rational use of anesthetics is crucial to enhance patient safety and reduce healthcare costs. To evaluate the utilization pattern of anaesthetics and assess their economic implications in a tertiary care teaching hospital. A six-month prospective observational study was conducted on 230 surgical cases where anesthesia was administered. Data on anesthetic type, patient demographics, drug combinations, and wastage were systematically recorded and analysed. Out of 230 cases, 64% received spinal, 31% general, and 5% local anesthesia, with 62% males. Common agents included propofol, sevoflurane, midazolam, thiopentone, glycopyrrolate, vecuronium, bupivacaine, lignocaine, and chlorprocaine. Bupivacaine wastage was 176.6 ml (₹2,913.9). Adverse effects included hypotension, bradycardia, nausea, delirium, and chills. Spinal anesthesia with bupivacaine, typically 3–4 ml, was the most common and effective technique. While anesthetics ensured safe surgical outcomes, the study highlights the need for better strategies to minimize wastage and optimize resource utilization. Rational monitoring of anesthetic practices can improve patient safety and healthcare efficiency.

**Keywords:** Anesthetics, utilization pattern, pharmacoeconomics, drug wastage, side effects.

**RA-10**

## BARRIERS TO ADOPTION OF QCI ACCREDITATION AMONG PHARMACY INSTITUTIONS: AN ANALYTICAL PERSPECTIVE

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Accreditation serves as an essential mechanism for enhancing educational standards, institutional accountability, and stakeholder confidence. The Quality Council of India (QCI), through its accreditation frameworks, provides structured guidelines for ensuring quality assurance in higher education, including pharmacy institutes. Despite its benefits, a significant hesitation persists among pharmacy institutions to pursue QCI accreditation. This study examines the underlying reasons for such reluctance. Findings indicate that the primary barriers include limited awareness regarding the processes and long-term benefits of accreditation, perceived complexity of documentation, and financial constraints associated with meeting infrastructural and compliance requirements. Furthermore, inadequate training and support for faculty in adopting outcome-based education models and quality assurance practices contribute to institutional apprehension. Smaller private colleges, in particular, view accreditation as resource-intensive, with uncertainty about tangible returns on investment. Additionally, fear of external scrutiny and exposure of institutional shortcomings discourages active participation. Resistance to change, lack of administrative commitment, and insufficient alignment between regulatory mandates and institutional priorities further exacerbate hesitation. These challenges highlight the need for capacity-building initiatives, awareness programs, and financial or policy incentives to motivate institutions toward accreditation. Addressing these barriers can facilitate greater adoption of QCI accreditation, thereby promoting uniform standards and improved quality of pharmacy education. Ultimately, overcoming institutional hesitation is critical for producing competent pharmacy professionals aligned with national healthcare priorities and global standards.

**Keywords:** QCI accreditation, pharmacy education, institutional hesitation, barriers, quality assurance

**RA-11**

## COMPARATIVE STUDY OF FAST TRACK PATHWAYS FOR MEDICAL DEVICES: SFDA, USFDA, AND EMA

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The increasing complexity of medical devices, driven by technological innovations such as artificial intelligence and 3D printing, along with the rising prevalence of chronic diseases, has intensified the global demand for regulatory systems that ensure timely patient access while maintaining safety and efficacy. To meet this need, leading regulatory authorities—including the U.S. Food and Drug Administration (USFDA), the European Medicines Agency (EMA), and the Saudi Food and Drug Authority (SFDA)—have established expedited or fast-track pathways designed to accelerate approval for innovative medical devices addressing serious or life-threatening conditions. While these pathways share the common objective of improving patient access, they have demonstrated significant differences in regulatory structures, eligibility requirements, review processes, evidence standards, and post-market surveillance systems, creating barriers for manufacturers navigating multiple jurisdictions. This study presents a comparative analysis of the fast-track pathways of the USFDA, EMA, and SFDA using a mixed-methods design that integrates quantitative data on approval timelines, review durations, and performance outcomes with qualitative assessments of regulatory frameworks, guidance documents, and policy approaches. By systematically evaluating six dimensions—regulatory structure, eligibility, review procedures, performance metrics, post-market surveillance, and economic impact—the study has identified similarities, differences, and best practices, while also highlighting opportunities for harmonization. The findings provide evidence that can support policymakers, regulators, and industry stakeholders in enhancing regulatory efficiency, reducing duplication, and strengthening global access to innovative, life-saving medical technologies.

**Keywords:** Fast-track pathways, Medical devices, USFDA, EMA, SFDA

**RA-12**

## STRATEGIES FOR ENHANCING IQ DEVELOPMENT THROUGH TEACHING LEARNING PRACTICES IN PHARMACY

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The majority concur that IQ is a significant metric for assessing cognitive capacity, problem-solving proficiency, and adaptability in dynamic learning contexts. Pedagogical practices are crucial in higher education as they influence student learning and cognitive development. This poster examines research-supported strategies that employ reflective assessment, learner engagement, and innovative pedagogical approaches to facilitate IQ enhancement. Utilizing active learning methodologies that foster analytical and critical thinking, such as case studies, problem-based learning, and simulation exercises, is crucial. Digital instruments such as interactive assessments and adaptive learning platforms enhance the personalization of the teaching and learning process according to each student's cognitive capacity. Group talks and peer-to-peer training exemplify collaborative learning approaches that enhance social intelligence and communication abilities. Both abilities are intricately associated with an overall increase in IQ. Additionally, learners can receive immediate feedback from formative exams, which can enhance their problem-solving abilities and metacognitive awareness. The poster illustrates the significance of aligning curriculum design with Bloom's taxonomy and appropriate competencies to progressively enhance higher order thinking skills. It emphasizes the vital role of faculty members in fostering an environment that promotes curiosity, creativity, and resilience qualities essential for sustained intellectual advancement. This outcome emphasizes that good teaching and learning strategies go beyond simple knowledge transfer; they operate as catalysts for quantifiable IQ improvement by merging theoretical concepts with practical applications. It is important to equip educators with effective techniques to foster intellectual growth, preparing kids for academic success and real-world difficulties.

**Keywords:** IQ development, teaching learning, active learning, cognitive skills, higher-order thinking

**RA-13**

## REGULATORY PATHWAYS FOR BIOSIMILARS: A COMPARATIVE STUDY OF US, EUROPEAN UNION, AND INDIAN APPROACHES

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This Comparative study investigates the approval processes for biosimilars in the United States, the European Union, and India, highlighting the similarities and differences among these three regions. To encourage a thriving biosimilars business, the European Medicines Agency (EMA) has established strong regulatory criteria that center on a thorough evaluation of quality, safety, and efficacy. The 2009 Biologics Price Competition and Innovation Act (BPCIA) in the US, on the other hand, created a distinct regulatory process that gave efficiency and cost-effectiveness first priority. This comparative study addresses key regulatory issues, including the regulatory framework, guidelines, preclinical and clinical requirements, and post-marketing surveillance. The primary objective of this research is to inform stakeholders, including regulators, pharmaceutical companies, and healthcare providers, about the evolving landscape of biosimilars and to advocate for a comprehensive strategy that encourages innovation while ensuring patient safety and access to affordable treatments.

**Keywords:** Biosimilar Regulation, Reference product, USFDA, CDSCO, EMA, Regulatory framework, Regulatory pathways, Comparative studies, Approaches.

**RA-14**

## DRUG PRICING AND INDUSTRY- CONSUMER RELATIONS: A CROSS-COUNTRY VIEW OF REGULATORY IMPACT

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The role of government-led regulatory mechanisms on drug pricing and their influence on industry–consumer relations across India, the United States, and Australia was analyzed. The objective of this study was to examine how diverse regulatory frameworks—such as India's price caps under the National Pharmaceutical Pricing Authority (NPPA), the United States' market-driven yet increasingly scrutinized drug pricing influenced by trade tariffs, and Australia's Pharmaceutical Benefits Scheme (PBS)—impact affordability, accessibility, and trust between the pharmaceutical industry and consumers. Key regulatory strategies, including reference pricing, reimbursement models, and price negotiations, were assessed to understand their consequences on cost control, innovation incentives, and patient-centric outcomes. Findings highlight that while strict price regulation in India improves affordability, it may challenge industry profitability; the U.S. system fosters innovation but often raises affordability concerns; whereas Australia demonstrates a balanced approach through government-subsidized access and transparent negotiations. The comparative evaluation suggests that sustainable drug pricing requires regulatory mechanisms that simultaneously address affordability, industry growth, and consumer trust. This emphasizes the need for harmonized approaches that integrate patient welfare with economic viability to strengthen industry–consumer relations across healthcare systems.

**Keywords:** Drug pricing, regulatory mechanisms, NPPA, United States, PBS.

**RA-15**

## COMPARATIVE ANALYSIS OF MARKETING AUTHORIZATION PROCEDURES FOR BIOLOGICS IN SRI LANKA, BHUTAN, AND MALDIVES

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Although biologics have emerged as a vital class of medicines, little is known about how they are regulated in the smaller SAARC nations. In order to highlight regulatory strengths, weaknesses, and opportunities for harmonization, this study compared the marketing authorization procedures for biologics in Sri Lanka, Bhutan, and the Maldives. Official guidelines, national medicines laws, and World Health Organization (WHO) joint registration frameworks relevant to biologics were examined as part of a qualitative regulatory evaluation. Through the National Medicines Regulatory Authority (NMRA), Sri Lanka has implemented reference-country dependency models, structured dossier requirements, and WHO cooperation routes. Biologics-specific documentation is scarce, although Bhutan is still growing under the Bhutan Food and Drug Authority (BFDA) in accordance with the Medicines Rules 2019. The Maldives' reliance on imports is demonstrated by the fact that the Maldives Food and Drug Authority (MFDA) provide basic guidelines for drug registration but lacks specific guidelines for biologics. The results demonstrate how the three nations differ in their post-marketing surveillance practices, dossier formats, and reliance on WHO prequalification. The study concludes that while Bhutan and the Maldives need to develop their competence, develop guidelines tailored to biologics, and devise plans to integrate their legislation, Sri Lanka has a reasonable level of regulatory maturity. These insights can be used to ensure that biologics are better controlled in SAARC nations with limited representation and to reform laws.

**Keywords:** Biologics, Sri Lanka, Bhutan, Maldives, marketing authorization.

**RA-16**

## LEGAL AND ETHICAL CHALLENGES IN CROSS-BORDER E-PHARMACY PRACTICES: A REGULATORY PERSPECTIVE IN EUROPEAN UNION

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The rapid expansion of digital health services across the European Union (EU) has significantly transformed healthcare delivery, with e-pharmacies emerging as a critical channel for improving access to medicines. While cross-border e-pharmacy practices offer convenience, accessibility, and efficiency, they simultaneously raise complex legal and ethical challenges that demand regulatory attention. This dissertation critically examines the fragmented regulatory landscape governing e-pharmacies in the EU, focusing on data protection, consumer rights, and medicine safety. Key legislative instruments such as the General Data Protection Regulation the E-Commerce Directive, and the Falsified Medicines Directive provide foundational safeguards, yet variations in interpretation and enforcement across member states create inconsistencies that undermine patient safety and trust. Ethical concerns including equitable access, digital literacy disparities, and informed consent further complicate governance. The study undertakes a structured review of literature, regulatory documents, and comparative case analyses from selected EU nations to evaluate the effectiveness of current frameworks. Findings highlight gaps in harmonization, jurisdictional ambiguities, and insufficient attention to vulnerable populations, which collectively hinder the establishment of a cohesive digital pharmacy ecosystem. This research emphasizes the need for a harmonized EU-wide regulatory model that integrates legal consistency with ethical principles, thereby ensuring safe, transparent, and equitable cross-border e-pharmacy practices. Ultimately, the dissertation aims to contribute to policy development by proposing actionable recommendations to strengthen governance, enhance patient trust, and support the EU's vision of a secure and inclusive digital health environment.

**Keywords:** Cross-border e-pharmacy, European Union, GDPR, Falsified Medicines Directive, E-Commerce Directive, digital health ethics, pharmaceutical regulation, patient safety, legal harmonization, equitable access.

**RA-17**

## A REGULATORY EVALUATION OF ACCELERATED DRUG APPROVAL PATHWAYS AS PER USFDA, EMA, AND CDSCO

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Accelerated approval mechanisms designed to bring therapies for serious or unmet medical needs to patients more rapidly differ substantially across the US, EU, and India in eligibility criteria, evidentiary standards, post-market obligations, and operational practice. The US FDA's suite of expedited programs and its Accelerated Approval pathway




ISBN: 978-81-980623-8-3

permit marketing based on surrogate or intermediate endpoints judged reasonably likely to predict clinical benefit, but require timely confirmatory trials and increased regulatory oversight to manage residual uncertainty. The EMA offers conditional marketing authorisations and accelerated assessment (and supportive initiatives such as PRIME) that similarly enable earlier access while explicitly tying approval to defined post-authorisation evidence generation and risk-management measures. India's regulatory framework under the NDCT Rules 2019 and CDSCO guidance provides provisions for accelerated review particularly in public-health emergencies and for products addressing unmet needs but faces practical challenges in harmonising data requirements, infrastructure, and post-market surveillance capacity with global counterparts. Key cross-cutting issues include: balancing speed with evidence robustness; designing and enforcing meaningful confirmatory-trial commitments; aligning global regulatory expectations to avoid duplicative or contradictory data demands; and strengthening pharmacovigilance systems to detect and mitigate risks after early approval. Comparative analysis indicates that success of accelerated pathways depends less on the existence of legal mechanisms than on predictable evidentiary standards, transparent timelines for confirmatory evidence, and regulatory capacity to monitor real-world outcomes elements critical to preserving public trust while enabling timely patient access to innovation.

**Keywords:** USFDA, EMA, CDSCO, Accelerated pathway, NDCT rules 2019.

**RA-18**

## CHALLENGES IN BIOSIMILAR APPROVALS AND INTERCHANGEABILITY

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Biosimilars are highly similar to approved biologics, offering no clinically meaningful differences while providing cost-effective alternatives that enhance patient access to life-saving therapies. However, achieving regulatory approval and interchangeability remains a major challenge due to variations in global requirements and scientific complexities. Regulatory agencies such as the European Medicines Agency (EMA), the U.S. Food and Drug Administration (USFDA) and the Central Drugs Standard Control Organization (CDSCO) in India follow distinct approval pathways. While all emphasize demonstrating similarity in quality, safety and efficacy, requirements for comparability data, clinical studies and pharmacovigilance vary considerably. These differences often delay biosimilar launches and complicate global market entry. Key challenges in biosimilar development include proving analytical and clinical comparability with the reference product, addressing immunogenicity concerns across diverse patient populations, navigating regulatory inconsistencies and overcoming patent exclusivity barriers. Interchangeability poses an additional hurdle: unlike generics, biosimilars must undergo switching studies to confirm safe substitution without prescriber intervention. The absence of automatic interchangeability impacts physician confidence, slows patient acceptance and necessitates robust pharmacovigilance to ensure long-term safety. In conclusion, biosimilars represent a vital strategy to reduce healthcare costs and improve therapeutic accessibility. Strengthening regulatory harmonization, ensuring comprehensive safety monitoring and promoting awareness among healthcare providers are crucial to fostering trust and wider adoption. Addressing these scientific, regulatory and market challenges will be essential to realize the full potential of biosimilars in clinical practice.

**Keywords:** Biosimilars, Interchangeability, Regulatory Pathway, Analytical Compatibility, Immunogenicity, Biological Approval.

**RA-19**

## REGULATORY FRAMEWORK OF MELATONIN AND AMLA BASE GUM PAINT FOR THE TREATMENT OF GINGIVITIS

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Gingivitis is a prevalent oral disease characterized by gingival inflammation and microbial plaque accumulation, usually evolving to periodontitis if not treated. Classical treatments rely mainly on synthetic drugs which, though effective, could provoke unwanted effects like irritation and allergy. This work introduces an innovative, plant-based gum paint composition with Melatonin and Amla (Emblica officinalis), known for anti-inflammatory, antioxidant and antimicrobial activities, with a view to creating a less toxic, patient-friendly alternative. Six trial batches were prepared and evaluated for primary pharmaceutical attributes such as physical properties, spreadability, drug content uniformity, in-vitro release profile, and antibacterial activity. Nine formulations (F1–F9) were developed and assessed for physicochemical attributes (pH, viscosity, spreadability, drug content uniformity), in-vitro release, and antibacterial activity. Among these, Formulation F6 (Amla 60 mg + Melatonin 40 mg) demonstrated the most favorable profile, with optimal viscosity, acceptable pH, and the highest antimicrobial activity producing inhibition zones up to 20 mm against Escherichia coli and 18 mm against Staphylococcus aureus. In comparison, F4 showed moderate activity (~12.5 mm), while F5 was least effective (~10–11 mm). The optimized batch (F6) of Amla and Melatonin gum paint proved effective against gingivitis with strong antimicrobial activity. Regulatory compliance was established by conforming the product development process to ICH Q8 (R2) guidelines. A detailed Product Development Report (PDR) recorded formulation rationale, excipient functions, manufacturing approach, and quality determinations. In summary, the herbal gum paint synthesized provides a safe, biocompatible, and efficient option for gingivitis treatment, marking an important step in natural oral care products.

**Keywords:** Gingivitis, Herbal Gum Paint, Melatonin, Amla, ICH Q8 (R2).

**RA-20**

## REGULATORY CONSIDERATIONS FOR DEVELOPMENT AND EVALUATION OF CINNAMALDEHYDE BASED MUCOADHESIVE PATCHES FOR RECURRENT APHTHOUS STOMATITIS (RAS)

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Recurrent aphthous stomatitis (RAS) is a common and painful, recurring ulcer that impair eating, speaking and daily comfort, particularly women and those experiencing stress or nutritional deficiencies. Despite its frequency, there remains a shortage of effective, long-retention, localized therapies in India. This study focused on the development and optimization of innovative cinnamaldehyde based buccal mucoadhesive patches, designed for patient-friendly and targeted RAS treatment. The mucoadhesive patches were prepared by solvent casting, utilizing hydroxy ethyl cellulose (HEC), polyvinyl alcohol (PVA) and other excipients. Cinnamaldehyde was selected for its well-established antimicrobial and wound healing properties. Using a $3^2$ full factorial design, the quantities of PVA and EC were optimized to maximize drug content and manage film thickness. The optimized patch exhibited high drug content (88.73±0.23%), uniform thickness (0.1923 mm), adequate tensile strength and neutral pH. In vitro studies revealed sustained drug release and notable antimicrobial activity against E. coli (15 mm) and S. aureus (14 mm). Regulatory considerations were integrated at every stage, with documentation conforming to the Common Technical Document (CTD) structure. The Product Development Report (PDR) provided justification for excipient choices, formulation and optimization, while detailing adherence to Schedule M (GMP), ICH Q8-Q10 and CDSCO guidelines. The absence of similar products in India but presence of global precedents like DenTek Canker Cover® underscores the need for harmonized local phytobased regulatory guidance. This project demonstrates a robust, regulatory-ready framework with significant commercialization scope for safe, herbal therapy in RAS.

**Keywords:** Cinnamaldehyde, Mucoadhesive Patch, Buccal Drug Delivery, CDSCO, Factorial Design.

**RA-21**

## REGULATORY LANDSCAPE AND GAPS FOR NANOTECHNOLOGY-BASED NUTRACEUTICALS IN INDIA: A GLOBAL COMPARATIVE PERSPECTIVE

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ISBN: 978-81-980623-8-3

Nanotechnology has emerged as a transformative tool in the nutraceutical sector, offering enhanced bioavailability, targeted delivery, and stability of bioactive compounds. Despite these advancements, the regulatory framework governing nanotechnology-based nutraceuticals remains underdeveloped, particularly in India. Currently, India regulates nutraceuticals under the Food Safety and Standards Authority of India (FSSAI) through the Food Safety and Standards Regulations, 2016, but no explicit provisions exist for nanomaterials or nanoscale formulations. In contrast, global regulatory bodies such as the U.S. FDA, European Food Safety Authority (EFSA), and Health Canada have initiated guidance on nanotechnology applications in food and dietary supplements, emphasizing safety assessment, toxicological evaluation, and labeling requirements. This poster aims to map the existing Indian regulatory landscape for nutraceuticals, highlight regulatory gaps concerning nanotechnology-based products and provide a comparative perspective with established international frameworks. The analysis underscores the urgent need for India to develop specific guidelines addressing safety, quality, and risk assessment of nanonutraceuticals, aligned with global best practices. Establishing such a framework would ensure consumer safety, promote innovation, and strengthen India's position in the global nutraceutical market.

**Keywords:** Nanotechnology, Nutraceuticals, Regulation, FSSAI, FDA, EFSA, Global Harmonization

**RA-22**

## REVAMPING PHARMACY EDUCATION: A COMPARATIVE ANALYSIS OF NEP 2025 VS TRADITIONAL B. PHARM CURRICULUM

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The evolution of pharmacy education under the National Education Policy (NEP) 2020 brings a new multidisciplinary approach to shaping the future of pharmacists. The revised B Pharm General curriculum aims to produce well-rounded professionals capable of adapting to the dynamic pharmaceutical landscape. This paper compares two B Pharm curricula: one following NEP guidelines (2025) and the older framework (2014). The NEP framework emphasizes holistic and interdisciplinary learning, incorporating major courses, skill enhancement, and value-added courses in the first four semesters. A notable feature of the NEP curriculum is the introduction of two specializations: Industrial Pharmacy and Clinical Pharmacy, which commence in the 5th semester. It also integrates advanced topics like Artificial Intelligence and Machine Learning, ensuring that students are prepared for modern technological advancements in pharmacy. The curriculum is designed to foster experiential learning, with mandatory internships and research projects embedded throughout. In contrast, the older curriculum maintains a more traditional approach, focusing mainly on foundational pharmaceutical sciences. While it offers fewer opportunities for interdisciplinary learning, the older framework remains robust in its theoretical and practical components. This comparative analysis highlights how NEP's flexibility, inclusivity, and focus on emerging technologies will better equip students for the challenges and opportunities in global healthcare and pharmaceutical industries. The adoption of this curriculum positions India as a leader in global pharmacy education by blending traditional knowledge with modern methodologies.

**Keywords:** NEP 2020 Pharmacy Education, Multidisciplinary Pharmacy Learning, Pharmacy Education in India, Future Pharmacists Training, Pharmacist Skill Development, Artificial Intelligence in Pharmacy.

**RA-23**

## REGULATORY CHALLENGES AND OPPORTUNITIES FOR ENHANCING HUMAN-AI INTERACTION IN SOFTWARE AS A MEDICAL DEVICE: A COMPARATIVE STUDY OF TGA AND USFDA GUIDELINES

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The emergence of Software as a Medical Device (SaMD) is currently reshaping the digital paradigm of the healthcare sector. This study explores the rapidly evolving domain of digital health technologies ranging from wearable devices that track real-time health data to AI-powered diagnostic systems. AI/ ML-based SaMD enables early diagnosis, personalized care and predictive monitoring. These innovations promise to enhance patient outcomes, streamline the clinical workflows and reduce healthcare costs. This study provides an in-depth research of the current status and advancements in SaMD and the regulatory frameworks that govern their development and use. The current research gap demands attention to Human-AI Interaction (HAII), ensuring users can understand, trust and control AI-driven outputs. The study aims to understand the trajectory of digital health regulation through comparative insights, policy development along with the regulatory gaps to be addressed. This paper offers a detailed examination of the regulatory approaches, adopted by the United States Food and Drug Administration (USFDA) and Australia's Therapeutic Goods Administration (TGA) in SaMD and provides necessary directions for integration of digital governance and AI- related healthcare systems.

**Keywords:** Software as Medical Device, Regulatory Framework, Human-AI Interaction, TGA, USFDA

**RA-24**

## BREAKING BARRIERS: UNITING ACADEMIC RESEARCH AND INDUSTRIAL EXPERTISE FOR PHARMACEUTICAL ADVANCEMENTS

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The pharmaceutical industry is undergoing a transformative phase, where the integration of academic research and industrial expertise is critical to advancing clinical trials and clinical research. Despite significant progress, a persistent gap exists between theoretical knowledge and practical application, often leading to inefficiencies in drug development and regulatory compliance. This study explores the urgent need for structured collaboration between academia and industry, emphasizing co-curriculum development, skill-based training, and shared infrastructure to bridge this divide. Key challenges such as protocol design complexities, patient recruitment bottlenecks, and real-world data integration highlight the necessity of academia-industry partnerships. By incorporating industry-relevant modules into academic curricula-such as Good Clinical Practice (GCP), clinical data management, and regulatory affairs-educational institutions can produce job-ready professionals tailored to industry needs. Case studies from successful collaborative models demonstrate how joint initiatives in adaptive trial designs, decentralized trials, and AI-driven analytics can accelerate translational research. The proposed framework advocates for policy reforms, including standardized co-curricular programs internships and joint research grants to foster a symbiotic ecosystem. These efforts not only enhance the quality and efficiency of clinical research but also address India's potential to become a global hub for innovative trials. By breaking silos and uniting stakeholders, this approach paves the way for sustainable advancements in pharmaceuticals, ensuring better patient outcomes and economic growth.

**RA-25**

## MODERNIZING INDIA'S DRUG SUBMISSIONS: EMBRACING ECTD 4.0 FOR INTERNATIONAL REGULATORY ALIGNMENT

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The Common Technical Document (CTD) and its electronic variant (eCTD) have become global standards in pharmaceutical regulatory submissions, streamlining drug approval processes through standardized, accessible documentation. While advanced regulatory markets are transitioning to eCTD 4.0, which offers enhanced lifecycle management, data reusability via UUIDs, improved metadata, and better support for modern regulatory technologies, India's regulatory system continues to rely on outdated submission formats. This research critically analyzes the need for India to adopt eCTD 4.0 in the context of accelerating global harmonization. A mixed-methods approach is proposed: literature review, comparative analysis of regulatory frameworks, and primary data collection via structured surveys and interviews with Indian pharmaceutical professionals. Preliminary review highlights significant barriers including inadequate technical




ISBN: 978-81-980623-8-3

infrastructure, lack of specialized human resources, and affordability challenges that could impede rapid transition. Nevertheless, adoption of eCTD 4.0 is imperative to avoid regulatory isolation, mitigate submission inefficiencies, and facilitate access to international markets. The study aims to benchmark India's current status against global trends, identify adoption barriers and enablers, and develop actionable recommendations for policymakers and industry to enable a seamless and competitive shift towards eCTD 4.0, securing global compliance and enhancing the country's pharmaceutical export outlook.

**Keywords:** eCTD 4.0, UUIDs, Metadata, Harmonization, Global Compliance.

**RA-26**

## COMPARATIVE STUDY OF THE STRINGENCY OF REGULATIONS FOR MENSTRUAL PRODUCTS BETWEEN USFDA AND HEALTH CANADA AND DEVELOPING COUNTRIES

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In this current research, we are comparing the difference of stringency and the lack of regulations in the usage of menstrual products in USFDA, Health Canada and the developing countries. This research emphasises that a proper stringent regulation can bring more development and hygiene in terms of menstrual related aspects. In Health Canada, they have different regulations that helps to maintain hygiene and help workers to have a relaxation cause they have proper regulations over menstrual tampons officially whereas in USFDA, regulations like 510k act as a cushion for the improvement more effective tampon products, these products are monitored by CDRH apart from FDA so that can be under the radar in both pre marketing and post marketing situations. The worldwide showcase also esteems a value of 37 million US dollars but still many developing countries can't afford, or the public are not even aware of certain products. 65% of women in Kenya who live below the poverty line have either no awareness or can't afford to buy tampons. So, to conclude, proper awareness and menstrual health can be preserved by introducing proper regulation in developing countries that have indirect regulations. Direct regulations should be brought in to maintain a very friendly environment like Health Canada and a stringent regulation can help a country to supply the needed tampons to other needy country like how USFDA does to a country like Uganda.

**Keywords:** CDRH, Worldwide value, 510k, Tampons.

**RA-27**

## PHARMACOECONOMICS AS STRATEGIC TOOL FOR SUSTAINABLE HEALTHCARE IN INDIA: A PHARMACEUTICAL MANAGEMENT PERSPECTIVE

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India has emerged as the "pharmacy of the world," supplying affordable generics globally. Yet, domestic healthcare affordability remains a challenge, with 65% of healthcare expenditure being out of-pocket and nearly 30% of rural households lacking access to essential medicines. Rising treatment costs and limited insurance coverage highlight the urgent need for sustainable healthcare models. Pharmacoeconomics examines the costs and outcomes of drug therapies, provides an evidence-based frames. This study aims to explore the role of pharmacoeconomics in supporting sustainable healthcare delivery in India and to analyze how pharmacoeconomics evaluations can guide pharmaceutical management in policy, pricing, and rational drug use. A narrative review was conducted using data from WHO, ICMR, National health policy reports, and peer-reviewed studies (2015–2025). Findings indicate that adoption of cost-effective generics and biosimilar can lower therapy costs by 30–50%, improving patient access. Health technology assessment (HTA) driven decision-making has demonstrated potential in rationalizing formularies, reducing wastage, and ensuring equitable drug distribution. However, challenges persist due to lack of standardized data, minimal awareness among policymakers, and inadequate integration into regulatory frameworks. Strengthening pharmacoeconomic frameworks can reduce patient burden, enhance rational drug selection, and support the realization of universal health coverage (UHC) by aligning affordability, accessibility, and equity.

**Keywords:** Pharmacoeconomics, pharmaceutical management, sustainable healthcare, health technology assessment (HTA), universal health coverage (UHC)

**RA-28**

## A SURVEY ON PREFERENCE ABOUT GENERIC AND BRANDED MEDICINES IN PEOPLE

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Generic medicines are those which are marketed without any brand but only with the name of the therapeutically active drug. As generic medicines are cheaper in cost there is a misconception that they are of inferior quality. This survey was conducted to assess the opinion of the public about generic medicines, and the responses were collected through the questionnaire listed in a Google form from 4/7/2025 to 10/8/2025. 107 participants completed the conducted survey. 54.2% of responders stated that the branded medicines obtain a greater potency and efficacy than generic medicines. 71% of responders do not know about the New Pharmaceutical Policy 2017 which recommends the e-prescriptions for generic medicines. 26.2% responders state that doctors prescribe branded drugs. This survey concludes by suggesting the enhancement of awareness among the general public about the generic medicines and on the other hand suggests enhancing the maintenance of quality, potency and efficacy of generic drugs as of branded drugs.

**Keywords:** Marketed drugs, Generic medicines, E-prescriptions, Misconception

**RA-29**

## MULTI-TARGET NEUROPROTECTIVE EFFECTS OF RUTIN IN ALCOHOL WITHDRAWAL-INDUCED DEPRESSION: INSIGHTS FROM NETWORK PHARMACOLOGY, MOLECULAR DOCKING, AND IN VIVO EVALUATION

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Alcohol withdrawal-induced depression (AWD) represents a significant neuropsychiatric complication from chronic alcohol consumption, characterized by oxidative stress, neuroinflammation, and disrupted neurotransmitter signaling. This study investigates rutin's therapeutic potential through network pharmacology, molecular docking, and in vivo evaluations. Network pharmacology identified key targets like TNF-α, NMDA receptor, and PI3K/AKT pathway, while molecular docking showed strong binding affinities of rutin to these targets (binding energy for TNF-α: −9.2 kcal/mol; NMDA receptor: −8.5 kcal/mol). In vivo experiments were conducted on Wistar rats (n = 8 per group) in seven groups: Normal Control, Ethanol Control, Rutin (50, 100, 200 mg/kg), Memantine (20 mg/kg), and Rutin 50 mg/kg + Memantine 20 mg/kg. Behavioral outcomes showed reduced immobility time in FST and TST in the rutin 200 mg/kg group versus Ethanol Control, with increased sucrose consumption in SPT and improved OFT exploration, indicating antidepressant effects. Rutin (200 mg/kg) significantly decreased MDA and NO levels while increasing antioxidant enzymes SOD, CAT, and GSH (***$p < 0.001$ vs. Ethanol Control). Pro-inflammatory cytokines TNF-α, IL-1β, and IL-6 were downregulated (***$p < 0.001$), and neurotransmitter analysis showed restored GABA (***$p < 0.01$) and reduced glutamate levels (***$p < 0.01$). The combination of rutin (50 mg/kg) and memantine (20 mg/kg) produced synergistic improvements compared to monotherapy (**$p < 0.01$). In conclusion, rutin particularly at 200 mg/kg, exerts a significant neuroprotective and antidepressant effect in alcohol withdrawal-induced depression by targeting inflammation, oxidative stress and neurotransmitter dysregulation, supporting its potential as a multi-target phytotherapeutic candidate for managing AWD.

**Keywords:** Alcohol withdrawal syndrome, rutin, flavonoids, neuroprotection, NMDA receptor, oxidative stress, neuroinflammation, network pharmacology, molecular docking, Depression.

**RA-30**




ISBN: 978-81-980623-8-3

**BIBLIOGRAPHIC ANALYSIS TO MAP THE RESEARCH LANDSCAPE OF GREEN POLYMERS**

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The increasing demand for environmental issues within the pharmaceutical industry has proved that, in contrast to biodegradable, life-compatible, nontoxic eco-friendly plastics and traditional synthetic materials are actually the best alternative. This is a comprehensive bibliometric overview of global research output in many disciplines within the scope of eco-friendly polymers as captured by the Scopus database. The key contributors, leading institutions and major funding agencies are identified to be paramount in the shaping of this research landscape. Results show that the output of this academia predominantly occurs within countries such as India and China, particularly those areas of knowledge such as materials science, chemistry, and engineering that have been more prominent in terms of shares of publication. Dominant trends in the research happen to occur in areas of sustainable and clean technologies as well as in the disciplines of polymer science, environmental science, and energy. The analysis also tracks the exponential growth in research output starting from 2016 peaking in 2024 with an accelerating increase in the number of published papers. Through collaborative activity, research topics and sources of funding this investigation highlights major driving factors for the increase in science output while focusing on the interdisciplinary nature of current research.

**Keywords:** Polymer, eco-friendly, Sustainable, Bibliography, research, mapping.

**RA-31**

**SURVEY ON THE ROLE OF PHARMACISTS IN PROMOTING GENERIC MEDICINES IN INDIA**

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In India, the high cost of brand-name medications continues to be a major barrier to accessible healthcare for large segments of the population. Generic medicines, offering equivalent therapeutic outcomes at significantly reduced prices, represent a vital solution to this challenge. Pharmacists, often the first point of interaction within the healthcare system, occupy a strategic position to influence both patients and prescribers in the adoption of generic drugs. This survey-based study investigates the knowledge, attitudes, and practices of Indian pharmacistsacross both community and hospital settings—regarding generic medicines. Findings indicate that pharmacists are generally well-informed about the safety, efficacy, and cost-effectiveness of generics. They also demonstrate the ability to educate patients and physicians on their appropriate use. However, pharmacists face persistent challenges, including patient mistrust and widespread misconceptions about generic drugs.The study highlights the vital role pharmacists play in facilitating the acceptance of generics, which can, in turn, reduce healthcare expenditures and improve patient adherence to treatment regimens. The findings further underscore the urgent need for structured training programs and supportive policy interventions aimed at empowering pharmacists as advocates for affordable healthcare options. By enhancing their professional knowledge, communication skills, and removing systemic barriers, pharmacists can more effectively promote the public trust in generics. Ultimately, this research emphasizes the indispensable role of pharmacists in India's evolving healthcare framework. Their active engagement in promoting cost-effective and accessible generic medicines has the potential to improve public health outcomes while easing the financial burden on patients and the healthcare infrastructure at large.

**Keywords:** Generic medicines, doctors, pharmacists, prescription practices, branded drugs.

**RA-32**

**ECONOMIC BURDEN OF CARDIOVASCULAR DISEASE IN SECONDARY CARE HOSPITALS: A QUANTITATIVE ANALYSIS**

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This prospective descriptive observational study was conducted to assess the economic burden of cardiovascular diseases (CVDs) in secondary care hospitals in Suryapet, Telangana, India. This study focused on analysing the healthcare cost data of patients with hypertension, angina pectoris, coronary artery disease, myocardial infarction, and heart failure. We included 125 patients admitted for CVD treatment. Data on sociodemographic factors, clinical status, and health care costs were collected using a structured questionnaire. Descriptive statistics and generalized linear model (GLM) regression analyses were performed to identify cost patterns and drivers. The study revealed that myocardial infarction had the highest annual cost per patient at INR 262,164 (USD 3,100), followed by heart failure and coronary artery disease. Direct medical costs, particularly ICU utilization (44%), medical procedures (28%), and laboratory tests (27%), were the primary drivers of cost. Most participants (71%) lacked medical insurance, and 47% incurred out-of-pocket expenses. These results emphasize the urgent need for targeted interventions to reduce cardiovascular disease-related expenses, expand financial protection mechanisms, and optimize resource allocation in tertiary care settings. Future policies should focus on strengthening preventive strategies, improving insurance coverage, and developing cost-effective management approaches to mitigate the economic impact of CVDs on individuals and the healthcare system.

**Keywords:** Cardiovascular disease, financial burden, observational study, human capital approach, tertiary care hospitals

**RA-33**

**SURVEY ON PHARMACOVIGILANCE REPORTING PRACTICES AMONG HOSPITAL PHARMACIST**

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Patients' safety depends on pharmacovigilance, which monitors and reports adverse drug reactions (ADRs). The job of hospital chemists is crucial since they are often the first medical staff to recognize and report medication-related problems. This study was designed to evaluate hospital pharmacists' pharmacovigilance reporting methods. A standardized survey was given to pharmacists employed by multiple hospitals. Their knowledge, opinions, and reporting methods for ADRs were gathered through the survey. The majority of pharmacists understood the value of pharmacovigilance, yet only a tiny portion of them routinely reported adverse drug reactions, according to the results. Time constraints, a lack of knowledge regarding reporting protocols, and a fear of legal repercussions were the most often mentioned obstacles. Many chemists expressed the need for further organizational support and training to boost reporting rates. The findings demonstrate the differences in hospital chemists' comprehension and use of pharmacovigilance. In addition to educating chemists about the importance of ADR reporting and its protocols, improving reporting behaviors also requires streamlining reporting systems and providing institutional support. According to this study, hospital chemists who actively participate in pharmacovigilance can enhance drug safety with the correct support. Future efforts should focus on targeted instructional strategies and attempts to solve the main challenges that chemists have identified. Such measures can improve patient outcomes and strengthen the pharmacovigilance system overall.

**Keywords:** Pharmacovigilance, adverse drug reactions (ADRs), hospital pharmacists, drug safety.

**RA-34**

**SYSTEMATIC REVIEW AND META-ANALYSIS OF MYCOBACTERIUM TUBERCULOSIS VACCINE DEVELOPMENT: EFFICACY, SAFETY, CHALLENGES, AND POLICY IMPLICATIONS FOR INDIA'S END TB 2025 GOAL**




ISBN: 978-81-980623-8-3

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The National TB Elimination Programme in India aims at the elimination of TB by 2025, and this requires the vaccines to supplement diagnostics and treatment. We have synthesised evidence on clinical-stage TB vaccines to review efficacy, safety, translational barriers and policy implications in India. We systematically searched PubMed, Cochrane Library, Scopus, and, ClinicalTrials.gov (2000Aug 2025) to identify clinical and key preclinical studies on TB vaccines with efficacy/immunogenicity or safety descriptions. Meta-analysis of random effects antibiotic resistant bacteria due to data with similar results; a synthesis of implementation and policy considerations were map-like. In HIV-negative adults with latent infection, M72/AS01E provided ~50 to 57 percent protection against progression to pulmonary tuberculosis over a follow-up of up to 3.7 years, and the drug was generally safe in the most advanced candidates. In phase 3 efficacy trials of VPM1002 in Indian and international new-borns as a recombinant BCG, safety and reduced reactogenicity compared to BCG were favourable, and definitive efficacy in preventing disease remains to be determined. Other candidates (e.g., BCG revaccination, live-attenuated/whole-cell candidates) indicate mixed or context-dependent indicators of the FRAGBO vaccine against long-term Mtb infection. Evidence gaps are persistent in areas, such as durability of protection, performance in high-risk Indian populations and head-to-head comparisons. This pipeline is well-positioned--particularly M72/AS01E to prevent disease in LTBI in adults--but the potential at the population level in India rests on Indian-cohort data, ongoing phase 3 trials (e.g., VPM1002), the standardization of endpoints, and delivery capacity. The priorities in the policy should be - harmonization of trials, security of domestic manufacturing/supply of adjuvants, micro-planning, and mechanisms to finance policy in accordance with NTEP End TB 2025 strategy.

**Keywords:** Tuberculosis vaccine; M72/AS01E; VPM1002; India; NTEP; End TB 2025.

**RA-35**

## PROSPECTIVE STUDY OF DRUG UTILIZATION IN POST-OPERATIVE PATIENTS IN SURGERY WARD OF A TEACHING HOSPITAL

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Drugs in post-operative care are used for various clinical purposes such as infection prevention, analgesia, fluid management, and control of nausea and vomiting. However, the availability of multiple drug options may result in irrational prescribing, increasing overall healthcare costs. Drug Utilization Review (DUR) studies play a crucial role in minimizing adverse drug reactions (ADRs), enhancing therapeutic outcomes, and promoting rational use of medications. This study aimed to evaluate drug utilization patterns among post-operative patients in the surgical department of a tertiary care teaching hospital. A non-interventional, prospective, observational study was conducted in the general surgery department at NRI general hospital, Guntur for a period of 7 months. A total of 339 post-operative patient case records were reviewed. Most patients were aged between 46–55 years, 177 were female and 162 were male. The most common diagnosis was hernia. The average number of drugs per encounter was 9.84. Commonly prescribed medications included antibiotics, analgesics, and anti-ulcers, with cephalosporins, NSAIDs + non-opioids, and PPIs being the predominant classes. Only 8.17% of drugs were prescribed by generic name. al care. Injections were used in 96.69% of encounters, and 65.70% of drugs were from the essential drug list. The average drug cost per encounter was ₹1745.26, with 60.38% spent on injections. The findings reflect high polypharmacy, limited use of generics, and moderate adherence to essential drug lists, highlighting the need for regular DUR to support rational drug use in surgical care.

**Keywords:** Drug Utilization, Post-operative patients, WHO indicators, Essential drug list.

**RA-36**

## DRUG UTILISATION STUDIES FOR ACNE VULGARIS IN DERMATOLOGY DEPARTMENT IN A TEACHING HOSPITAL

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Acne Vulgaris is a common dermatological condition, primarily affecting adolescents and young adults, often posing a cosmetic concern. Various treatments such as topical and oral anti-acne agents and hormonal therapies are available, but irrational prescribing may increase healthcare costs and adverse drug reactions (ADRs). This highlights the importance of drug utilization reviews (DUR) to encourage rational prescribing, enhance efficacy, and reduce ADRs. A hospital-based, prospective, non-interventional observational study was conducted in the Dermatology, Venereology, and Leprosy (DVL) outpatient department at NRI General Hospital over six months. The study involved 84 patients (24 males, 60 females), mostly aged 21–25 years, diagnosed with Acne Vulgaris. Patients with drug-induced acne, severe acne, on immunosuppressants, or unwilling to participate were excluded. Prescription and demographic data were collected using a structured form and analysed using WHO prescribing indicators. The average number of drugs per encounter was 2.78. Antibiotics were most prescribed (41.95%), followed by topical retinoids (24.88%). Topical agents accounted for 57.69%, systemic agents 29.48%, fixed-dose combinations 17.52%, and concomitant drugs 41.45%. Only 4.27% of drugs were prescribed by generic name. No injectables were prescribed. About 65.70% of drugs were from the essential drug list, with a 97% dispensing rate and 82% availability of key drugs. The average cost per prescription was ₹744.02. The study emphasizes improving generic prescribing and essential medicine adherence to support rational acne treatment.

**Keywords:** Acne Vulgaris, ADRs, Drug Utilization, Essential Drug List, Rational Prescribing.

**RA-37**

## QUALITY COMPLIANCE OF PHARMACEUTICAL PRODUCTS IN SOUTH AFRICA

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Ensuring the quality, safety, and efficacy of pharmaceutical products is a critical component of public health systems worldwide. In South Africa, pharmaceutical quality compliance is governed primarily by the South African Health Products Regulatory Authority (SAHPRA), which enforces standards in line with international best practices, including those of the World Health Organization (WHO), the International Council for Harmonization (ICH), and the African Medicines Regulatory Harmonization (AMRH) initiative. Compliance requirements span across the pharmaceutical lifecycle—covering good manufacturing practices (GMP), good distribution practices (GDP), product registration, post-marketing surveillance, and pharmacovigilance. A strong emphasis is placed on current GMP inspections, validation of manufacturing processes, quality risk management, and the integrity of supply chains to prevent substandard and falsified medicines. Despite significant progress, challenges remain, such as regulatory backlogs, limited technical capacity, and the influx of imported generics that require stringent oversight. Continuous regulatory reforms, digitalization of submissions, regional cooperation through ZAZIBONA (Southern African Development Community collaborative procedure), and alignment with international quality standards are strengthening South Africa's regulatory framework. Overall, quality compliance in the South African pharmaceutical sector is advancing steadily, aiming to safeguard patient safety, improve therapeutic outcomes, and enhance trust in the healthcare system.

**Keywords:** South Africa, SAHPRA, pharmaceutical quality, GMP, compliance, ZAZIBONA, regulatory framework

**RA-38**




ISBN: 978-81-980623-8-3

**COMPARATIVE COST-EFFECTIVENESS OF ACAMPROSATE AND BACLOFEN IN THE MANAGEMENT OF ALCOHOL USE DISORDER**

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This study conducted a cost-effectiveness analysis (CEA) comparing acamprosate and baclofen in the treatment of Alcohol Use Disorder (AUD), a condition associated with considerable clinical and economic burden worldwide. A randomized, open-label, standard-controlled, parallel-group design was employed over a 3-month period involving 60 participants diagnosed with AUD. Effectiveness was measured by the number of abstinent days and percent days abstinent (PDA), while economic evaluation utilized the average cost-effectiveness ratio (ACER) and incremental cost-effectiveness ratio (ICER). Statistical analysis using the Kruskal's wallis test demonstrated that participants receiving acamprosate exhibited a significantly greater number of abstinent days compared to those treated with baclofen. Additionally, acamprosate was found to be more effective and incurred lower overall treatment costs relative to baclofen, indicating superior cost-effectiveness. These findings suggest that acamprosate represents a clinically efficacious and economically advantageous therapeutic option for managing AUD. Identifying such cost-effective interventions is crucial for optimizing resource allocation and improving patient outcomes in healthcare systems. Consequently, this study supports the use of acamprosate as a preferred treatment modality for AUD due to its favourable balance of clinical efficacy and affordability.

**Keywords:** Alcohol use disorder, average cost-effectiveness ratio, baclofen, acamprosate, cost effectiveness.

**RA-39**

**A PROSPECTIVE OBSERVATIONAL STUDY TO COMPARE THE ANALGESIC EFFECT AND COST EFFECTIVENESS OF TRAMADOL AND PARACETAMOL IN POST-OPERATIVE PATIENTS**

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Post-operative pain remains a major clinical concern, as inadequate analgesia can delay recovery, prolong hospitalization, and increase overall treatment costs. Effective pain management therefore requires careful consideration of efficacy, safety, and cost-effectiveness of available agents, especially in resource-limited settings. This study was conducted to compare the efficacy, safety, and cost-effectiveness of intravenous (IV) tramadol vs paracetamol (IV) for post-operative analgesia. A total of 106 post-operative case records were analyzed, with a slight male predominance (54.71%) and diabetic foot surgeries being the most common surgical condition observed in the study population. Patients were categorized based on the frequency of analgesic administration viz., BD (twice daily), TID (thrice daily), and QID (four times daily). Across all dosing schedules, tramadol demonstrated superior analgesic efficacy over paracetamol, as evidenced by statistically significant P-values of 0.0388 (BD), 0.0360 (TID), and 0.0134 (QID), clearly indicating its effectiveness in managing post-operative pain. In terms of safety, adverse drug reactions (ADRs) occurred in 12.06% of patients in the tramadol group, compared to only 4.16% in the Paracetamol group, highlighting that Paracetamol has a better tolerability profile. However, IV tramadol 50 mg was found to be significantly more cost-effective than IV paracetamol 1 g, making it a preferred option in resource-limited settings. In conclusion, while tramadol offers more effective analgesia, paracetamol is safer and better tolerated. The selection between the two drugs should be based on clinical condition, risk factors, economic considerations, and patient-specific needs.

**Keywords:** Tramadol, paracetamol, post-operative analgesia, cost-effectiveness, diabetic foot surgery

**RA-40**

**THE NDCT RULES AMENDMENT 2024 AND ITS ROLE IN RESHAPING GOVERNANCE OF CLINICAL RESEARCH ORGANIZATIONS**

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The regulation of Clinical Research Organizations (CROs) in India has undergone significant transformation with the New Drugs and Clinical Trials (NDCT) Rules Amendment, 2024. To evaluate this transition, an extensive literature-based analysis was carried out using published studies, regulatory circulars, and international guidelines from 2019–2024. The approach involved reviewing regulatory documents and scholarly sources to identify gaps in the earlier framework, the provisions introduced in the 2024 amendment, and global comparators such as the U.S. FDA and EMA. The results highlight that CROs previously faced uncertainties in registration, ethics oversight, and accountability, which hindered compliance and participant protection. The 2024 amendment addressed these challenges through mandatory CRO registration, strengthened documentation requirements, rigorous inspection processes, and clearer mechanisms for safety reporting and compensation. Comparative assessment indicates that these reforms bring India's CRO governance closer to international standards, enhancing transparency and building sponsor and patient confidence. However, the findings also point to operational challenges, including increased compliance costs and administrative responsibilities for smaller CROs. The study infers that successful implementation of the amendment will require investment in infrastructure, adoption of digital technologies, and capacity-building of trained personnel. Overall, the NDCT Amendment 2024 represents a pivotal regulatory development that reinforces ethical governance, elevates India's global competitiveness, and positions the country as a strong hub for high-quality clinical research.

**Keywords:** CDSCO Oversight, Clinical Trial Regulation, CRO Governance, India Clinical Research, NDCT Rules Amendment 2024.

**RA-41**

**ENSURING REGULATORY INTEGRITY AND SAFETY IN PLASMA-DERIVED MEDICINES: THE PMF CERTIFICATION PROCESS**

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Plasma-derived medicinal products (PDMPs) are critical for treating a range of life-threatening conditions but are inherently associated with contamination risks. This study systematically analyzed regulatory frameworks, scientific literature, and guidance documents to explore the Plasma Master File (PMF) certification process, particularly within the European Union. A structured review of EU directives, such as Directive 2002/98/EC and Directive 2003/63/EC, alongside EMA guidelines, was conducted to assess how PMF certification supports donor safety, traceability, and product integrity. The methodology involved mapping key certification steps, data requirements, inspection procedures, and timelines outlined in regulatory documents, followed by comparative analysis with international standards. Results revealed that the PMF streamlines approval processes by consolidating data on plasma origin, testing, storage, and epidemiological risk, reducing redundancy across marketing authorization submissions. The review also highlighted evolving strategies such as digital transformation, blockchain for traceability, and AI-driven compliance monitoring to enhance regulatory efficiency. The outcomes indicate that the PMF not only reinforces public health safeguards but also facilitates harmonization across jurisdictions, aiding rapid access to therapies. The study concludes that expanding global recognition and adopting advanced technologies will further strengthen the PMF framework, ensuring resilience against emerging threats while safeguarding patient safety. These findings underscore the PMF's pivotal role as a regulatory tool in plasma-derived product lifecycle management, balancing innovation with rigorous safety standards.

**Keywords:** Plasma, Plasma Pool, Plasma Derived Medicinal Products, Plasmapheresis, PTMQ (Quality Product Team Member).

**RA-42**


ISBN: 978-81-980623-8-3

**TRANSITION FROM EU MDD TO EU MDR: CLINICAL EVIDENCE, POST-MARKET SURVEILLANCE, AND GLOBAL RIPPLE EFFECTS**

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Europe's move from the long-standing Medical Devices Directive (MDD) to the newer Medical Devices Regulation (MDR) marks a turning point in how medical devices are assessed and monitored. Conceived to improve patient safety, traceability and transparency, the MDR goes far beyond its predecessor in terms of clinical evidence expectations, classification rules and post-market obligations. This article takes a close look at what that shift has meant in practice for manufacturers, notified bodies and regulators. It considers the difficulties many companies have faced in generating updated clinical data for existing products, the bottlenecks caused by limited notified-body capacity, and the resulting delays in conformity assessment and market entry. We also discuss how the MDR has expanded post-market surveillance, with new tools such as Periodic Safety Update Reports (PSURs), Post-Market Clinical Follow-Up (PMCF) and the central EUDAMED database, and how these are reshaping device lifecycle management. Finally, we explore how the European changes are influencing policies and supply chains beyond the EU, prompting convergence efforts, regulatory reliance initiatives and wider global consequences. By bringing these themes together, the review points to practical ways of managing compliance risks, supporting innovation and preparing for the next wave of regulatory evolution.

**Keywords:** EU MDR, EU MDD, Clinical Evidence, Post-Market Surveillance, Global Regulatory Impact

**RA-43**

**A STUDY ON THE IMPACT OF MARKETING STRATEGIES ON CONSUMER CHOICE FOR OVER THE COUNTER (OTC) MEDICATIONS**

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OTC medication are widely available and commonly used to treat minor illness without a prescription. While they offer convenience and accessibility, concerns arise regarding their safe use due to irrational consumption, inadequate awareness of side effects, and malpractice. The over-the-counter pharmaceutical industry has experienced significant growth, driven by increasing consumer demand for self-care and convenient access to healthcare product. Effective marketing strategies play a crucial role in differentiating OTC drug products, building brand awareness, driving sales, and establish trust with consumers. The main objectives of this study to investigate the effects of marketing strategies on consumer choice behaviour and preferences for over-the-counter pharmaceuticals, and to identify the most effective marketing strategies for OTC medication. This is a cross-sectional study conducted for a period of three months. It's a questionnaire-based survey among the common people of Kerala. The questionnaire was distributed in different areas of Kerala. Respondent's demographic details such as age, gender, education, occupation etc. The filled questionnaire was analysed as per the study objectives. A total of 711 participants involved, 470 were females (66.1%) and 241 were males (33.9%), out of 711 respondents more than half of respondents 505 (71.40%) were between the age group of 20-29. Among 711 participants, 367 (51.60%) have UG qualification. Out of 711 participants 378 (53.14%) use OTC by their previous usage. About 135 (18.98%) participants buy OTC for cough, 178 (25.03%) people buy OTC for common cold, and 207 (29.11%) buy OTC for body pain by the influence of advertisements. Out of 711 participants23 (3.23%) are follows magazines, 26 (3.65%) are follows poster, 213 (29.95%) are follows TV ad, and 449 (63.15%) are follows other methods. Among the 711 participants more than half of the participants 366 (51.47%) believes that advertisement on OTC medicines are effective. This cross-sectional study among common people found that most of the participants are buying OTC by their previous usage, and most widely used OTC medicine is for body pain and common cold. And more than half of participants believes that advertisement on OTC medicines is effective. So, understanding the marketing strategies, OTC pharmaceutical companies can develop an effective marketing plan to stay competitive in the industry, enhance consumer awareness, improve public health, economic benefit.

**Keywords:** OTC (over the counter), advertisement, marketing, survey

**RA-44**

**IMPACT OF PHARMACIST-LED ANTIMICROBIAL STEWARDSHIP ON INAPPROPRIATE PRESCRIBING AND LENGTH OF STAY: AN INTERRUPTED TIME-SERIES STUDY**

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Inappropriate antibiotic use is associated with poorer patient outcomes and prolonged hospital stays. Clinical pharmacists are pivotal in antimicrobial stewardship (AMS), yet real-world, time-trend evidence on their sustained impact in inpatient settings is limited. To assess the impact of pharmacist-led AMS interventions on inappropriate antibiotic utilisation and hospital length of stay (LOS). We conducted a 12-month interrupted time-series (ITS) study in the inpatient wards of a tertiary teaching hospital, with six months of pre- and post-intervention data. A systematic sample of 30 antibiotic prescriptions was reviewed monthly (N = 360) using institutional AMS criteria. Interventions included dose optimisation, de-escalation, IV-to-oral switch, and therapeutic monitoring, all of which were implemented with ≥90% fidelity. Primary outcome: monthly proportion of inappropriate prescriptions. Secondary outcomes: antibiotic utilisation [defined daily doses (DDD), days of therapy (DOT) per 1,000 patient-days], prescriber acceptance, and mean LOS. Segmented regression analysis was performed using standard ITS methods. Inappropriate prescribing declined from 48.3% to 31.2%. ITS showed a level change of -12.7% (95% CI: -14.4 to -10.9) and slope change of -1.29%/month. DDD and DOT were reduced significantly ($p < 0.001$). Prescriber acceptance averaged 74.1%. Mean LOS decreased from 7.2 to 5.8 days ($p = 0.02$). Pharmacist-led AMS significantly improved prescribing quality, reduced antibiotic use, and shortened LOS. These findings support the integration of clinical pharmacists into AMS teams as a scalable strategy to optimise inpatient care.

**Keywords:** Antimicrobial Stewardship, Clinical Pharmacist, Inappropriate Prescribing, Antibiotic Utilisation, Length of Stay.

**RA-45**

**REGULATORY CONSIDERATIONS FOR NEONATAL AND RARE PEDIATRIC DISEASES IN US AND EU**

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Drug development for rare pediatric and neonatal diseases remains constrained by small patient populations, ethical concerns, and limited commercial incentives. To explore how regulatory frameworks address these barriers, a structured review of legislative documents, regulatory guidelines, and peer-reviewed literature from the United States and European Union was conducted. Analysis focused on incentives, mandatory pediatric study requirements, and comparative differences in regulatory implementation. The review identified that the United States has advanced mechanisms such as the Orphan Drug Act, Pediatric Research Equity Act, Best Pharmaceuticals for Children Act, and Priority Review Voucher programs, which collectively provide market exclusivity, tax credits, and extended patent protection to stimulate development. In parallel, the European Union has enacted the Orphan Regulation and Paediatric Regulation, mandating Pediatric Investigation Plans, offering fee reductions, and extending data exclusivity to encourage innovation. Results demonstrated that while both regions provide substantial incentives, differences in scope and enforcement persist: the EU mandates broader pediatric assessments even for orphan-designated drugs, whereas US legislation exempts most orphan drugs from mandatory pediatric studies. This divergence has significant implications for harmonization and global drug availability. The study infers that emerging strategies such as adaptive trial designs, real-world evidence integration, and enhanced international collaboration are pivotal to overcoming current limitations. It is concluded that aligning US and EU




ISBN: 978-81-980623-8-3

frameworks, while fostering caregiver engagement and public-private partnerships, will be essential to reduce development delays, accelerate approvals, and expand equitable access to therapies for children with rare and life-threatening conditions.

**Keywords:** Regulatory considerations, Neonatal diseases, Rare pediatric diseases, Orphan drug designation.

**RA-46**

## BRIDGING DISTANCES, NAVIGATING RULES: LEGAL ASPECTS OF TELEMEDICINE IN EU AND INDIA

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Telemedicine is revolutionizing healthcare by breaking geographical barriers and redefining patient care through digital innovation. Rapid technological advancements have made remote consultations and virtual health services indispensable, particularly in the wake of the COVID-19 pandemic. However, regulatory complexities continue to shape its evolution worldwide. This study adopts a qualitative and comparative methodology, analysing key legislative frameworks governing telemedicine in Europe - specifically Directive 2011/24/EU and the General Data Protection Regulation (GDPR) - and in India, focusing on the Telemedicine Practice Guidelines and the National Digital Health Mission (NDHM). Primary data sources include legal documents, national policy frameworks, and secondary literature from academic publications, WHO reports, and industry analyses. The study critically compared regulatory approaches, highlighting differences in data protection, cross-border care, physician liability, and patient consent mechanisms. Findings revealed that the COVID-19 pandemic acted as a catalyst, accelerating policy adoption and regulatory flexibility in both regions. Europe has emphasized harmonization of cross-border healthcare and robust data protection, whereas India's regulatory efforts are centred on standardizing practice, improving access, and building a unified digital health ecosystem. Despite these advances, challenges remain in areas such as interoperability, cybersecurity, medico-legal clarity, and equitable access. The study concluded that telemedicine's sustainable growth depends on evolving regulatory frameworks that balance innovation with patient safety and trust. Strengthening policies, enhancing interoperability standards, and fostering international regulatory collaboration will be key to ensuring safe, accessible, and efficient telemedicine services globally.

**Keywords:** Telemedicine, European Union, India, Regulatory Framework, EU Directive, COVID-19.

**RA-47**

## COMPARATIVE STUDY OF PROHIBITED & RESTRICTED INGREDIENTS IN COSMETICS ACROSS US, EU AND INDIA

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The rapid expansion of the global cosmetics industry has heightened concerns about consumer safety, particularly regarding the presence of harmful ingredients such as parabens, phthalates, formaldehyde, heavy metals, and asbestos-contaminated talc. To evaluate how regulatory frameworks address these risks, a structured review of official regulatory documents, peer-reviewed literature, and safety assessments was conducted across three major jurisdictions: the United States, European Union, and India. Data were systematically extracted on prohibited and restricted ingredients, pre-market approval requirements, labeling standards, and post-market surveillance mechanisms. The comparative analysis revealed marked differences in regulatory rigor. The European Union demonstrated the strictest approach, with more than 1,700 substances prohibited and mandatory pre-market safety assessments supported by detailed product information files. The United States employed a more limited pre-market oversight model, relying largely on post-market surveillance and voluntary compliance, with only 11 substances explicitly prohibited. India adopted a hybrid model, integrating pre-marketing clearance under CDSCO and ingredient restrictions defined by the Bureau of Indian Standards, though requirements for safety documentation remain less stringent than those in the EU. Substances such as chloroform, bithionol, and vinyl chloride were consistently prohibited across all three regions, while others, including parabens, phthalates, and certain heavy metals, showed variable restrictions depending on risk thresholds. The findings indicate that while all three jurisdictions share the objective of safeguarding consumer health, regulatory divergence creates challenges for global harmonization and compliance. The outcome of this study underscores the need for science-driven, internationally aligned standards that not only enhance consumer safety but also facilitate transparent trade practices.

**Keywords:** Cosmetic regulation, Prohibited ingredients, Consumer safety, International harmonizaton

**RA-48**

## PHARMAGLOBE - A UNIQUE MENTORING PLATFORM FOR ASPIRING AND PURSUING PHARMACY PROFESSIONALS

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Pharma Globe is a comprehensive mentoring platform designed for aspiring, studying, and working pharmacy professionals. It provides a centralized resource for academic and professional success, offering extensive admission support, pharma-related news, professional development opportunities, and skill development programs. The platform also provides robust placement assistance, including job search strategies, resume building, and interview preparation. Using advanced AI algorithms, PharmaGlobe analyzes user profiles to identify suitable career paths and industry fit, providing personalized recommendations for future career development. This feature enables users to explore diverse career options and make informed decisions about their professional growth. PharmaGlobe caters to the needs of working professionals, providing insights into advanced certifications, professional workshops, and leadership programs, ensuring continued career growth and alignment with industry developments. By offering a wide range of resources and support services, PharmaGlobe empowers pharmacy professionals to succeed in their academic and professional pursuits, staying at the forefront of their practice and contributing to the advancement of the pharmaceutical industry. PharmaGlobe's mission is to bridge the gap between academia and industry, fostering a community of informed, skilled, and connected pharmacy professionals. Key highlights - Scope, Admission support, news, job vacancy and ai support.

**Keywords:** Education, Pharmacy mentoring platform, career development, admission support, job,.AI-driven career analysis.

**RA-49**

## OPTIMIZING THE DOSSIER SUBMISSION PROCESS: A STUDY OF ECTD SOFTWARE, AI INTEGRATION, AND REGULATORY COMPLIANCE FOR BIOLOGICS

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The report is a comparison of the Common Technical Document (CTD) and its electronic copy (eCTD) in regulatory submissions of biologics and biosimilars to other regulatory authorities worldwide including FDA, EMA, and PMDA. It puts more focus on their arrangement, position, and predicaments with a focus on how CTD/eCTD standardize submissions across the globe. Attention is paid to the work on Modules 1-3, as well as the analysis of eCTD software, AI applications, and cloud solutions and adherence to data protection laws (GDPR, HIPAA). Although CTD improves efficiency and accessibility across the world, it requires sophisticated electronic infrastructure and management. Covers literature review, FDA, EMA, PMDA requirements comparison, case study analysis and the evaluation of the most popular eCTD software (Veeva Vault, Lorenz DocuBridge, Extedo). CTD is an international standard, and Module 1 is regionally divergent. Modules 2 & 3 (CMC) are critical. Validation, compliance, and lifecycle management can only be




ISBN: 978-81-980623-8-3

achieved through use of software tools. New issues to address are AI content under GxP, cloud security, and agency-specific regulations, and the trend is towards AI, cloud and possible use of blockchain. The CTD/eCTD frameworks are necessary to approve the regulation. To authorize in time in the market, sponsors need to be aware of international harmonization and regional peculiarities, use sophisticated software, and embrace AI and cloud trends without compromising the integrity of the data.

**Keywords:** Biologics, Biosimilars, CTD, eCTD, Regulatory Affairs, FDA, EMA, Global Harmonization.

**RA-50**

**KNOWLEDGE, ATTITUDE AND PRACTICE TOWARDS DIGITAL MISINFORMATION AND ITS ROLE IN MEDICAL HESITATIONS**

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Digital platforms play major role in the dissemination of medical and health information. However, due to rise in the digital misinformation, there have been increased medical hesitations. Nowadays false information's about heath care and medical advice which are exaggerated treatments influencing among peoples can affects individual decision making and reduce trust in healthcare professionals. Digital misinformation's are not only to the infectious disease but also it extends to chronic disease which leads to self-medications home remedies which makes a challenge to the public health. Here we are taking knowledge, attitude and practice survey about how social influencers influencing the health information's to the common peoples and causing medical hesitancy.

**Keywords:** Digital platforms, health information, healthcare professionals

**RA-51**

**DIGITAL HEALTH INFORMATION-SEEKING BEHAVIOR AND TELEMEDICINE ADOPTION AMONG ADULTS: A SURVEY STUDY**

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The rapid growth of digital technologies has significantly transformed the way individuals seek and utilize health-related information. This survey-based study aimed to explore general patterns of online health information-seeking behavior and the extent of telemedicine adoption among young adults. A structured questionnaire was distributed, and responses were collected to assess demographics, online platforms used, reliability perception, and preferences for digital health resources The mean age of participants was 23.9 ± 2.1 years, with a nearly equal gender distribution (Female: 51.2%, Male: 48.8%). Most respondents were graduates (58.3%) followed by postgraduates. A large majority (97.6%) reported using the internet to search for health-related information, primarily via smartphones (82.3%) and laptops (42.3%). Google Search (88.2%), YouTube (74.1%), and hospital/doctor websites (38.8%) were the most frequently accessed sources. The most searched topics included symptoms and causes of diseases. While traditional healthcare provider explanations remained the preferred mode of understanding illness, there was strong interest in hospital-recommended digital resources, such as curated websites, YouTube videos, or apps. Telemedicine services, though recognized, were adopted by a smaller percentage of respondents, particularly for ordering medications and occasional consultations. In conclusion, the survey underscores the growing reliance on digital platforms for health information, balanced with concerns about accuracy and trustworthiness. Encouraging the development of validated, hospital-endorsed online tools can bridge the gap between traditional consultation and digital engagement, thereby promoting safe and informed patient participation in healthcare.

**Keywords:** Digital health, online health information, telemedicine, patient behavior, health literacy.

**RA-52**

**COMPETENCY-BASED LEARNING IN PHARMACY: A CAREER-ORIENTED APPROACH TO OUTCOME-BASED EDUCATION**

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Outcome-Based Education (OBE) is widely adopted in pharmacy programs and strongly supported by accreditation bodies such as the National Board of Accreditation (NBA). It ensures alignment of program outcomes with graduate attributes and provides a structured framework for curriculum design, delivery, and assessment. However, in the multidisciplinary BPharm program, defining precise subject-specific competencies can be challenging. Competency-Based Learning (CBL) is proposed as a complementary approach that strengthens OBE by focusing on career-based competencies rather than isolated subject outcomes. For example, the role of a medical representative requires integration of pharmacological knowledge, communication skills, ethical practice, and problem-solving abilities. These attributes are difficult to evaluate through traditional subject-level outcomes but can be effectively demonstrated through competency-based assessments. Frameworks such as Miller's Pyramid (progression from "Knows" to "Does") and Bloom's Taxonomy (cognitive, psychomotor, and affective domains) provide structure to this integration. Authentic assessments like OSPE/OSCE, simulations, and case-based discussions allow students to demonstrate career-linked competencies in a practical context. By complementing OBE with CBL, pharmacy education can ensure graduates are not only academically competent but also practice-ready and adaptable to diverse career pathways such as clinical practice, quality assurance, production, regulation, research, and marketing. This integration enhances employability, professional identity, and lifelong learning, thereby aligning education more closely with healthcare and industry expectations.

**Keywords:** Competency-Based Learning, Outcome-Based Education, BPharm, Career Pathways, Miller's Pyramid, Bloom's Taxonomy

**RA-53**

**GLOBAL ENVIRONMENTAL IMPACT OF UNUSED AND EXPIRED MEDICINES: AN URGENCY OF ECOPHARMACOVIGILANCE**

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Unused and expired medications, when improperly disposed, flushed, dumped, or tossed into household waste releases active pharmaceutical ingredients into the environment. These compounds, including antibiotics, hormones, and psychiatric drugs, persist in soil, surface water, and even drinking water, bypassing conventional treatment systems. Their presence in ecosystems leads to toxic effects such as endocrine disruption, behavioral changes in aquatic life, microbial imbalance, and the rise of antimicrobial resistance. These pharmaceutical residues accumulate through the food chain, affecting a wide range of organisms like bacteria and earthworms to fish, birds, and humans. The environmental burden is compounded by public health risks like accidental poisoning and drug misuse, alongside economic losses from wasted healthcare resources. As global pharmaceutical consumption increases due to ageing populations and chronic diseases, the volume of household pharmaceutical waste is expected to grow. Although some countries have introduced drug take-back initiatives and regulatory measures, the majority of individuals continue to discard medications in ways that harm the environment. Ecopharmacovigilance (EPV) is a discipline focused on identifying and minimizing the ecological impact of pharmaceutical substances has become increasingly important. Yet, efforts to implement EPV globally remain disjointed, with uneven standards for environmental risk evaluation and weak enforcement mechanisms. To effectively address this growing and often overlooked threat, there is an urgent need for a unified global strategy, more robust waste disposal systems, and widespread public education and awareness to promote responsible safe use and dispose of unused and expired medication.




ISBN: 978-81-980623-8-3

**Keywords:** EPV, unsued and expired medication, Ecopharmacovigilance, pharmaceuticals in environment, waste disposal system

**RA-54**

## PHARMACISTS ROLE IN DETECTING HIDDEN MEDICATION NON-ADHERENCE USING DIGITAL TOOLS

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Medication non-adherence remains a critical barrier to achieving optimal therapeutic outcomes, particularly in chronic disease management. Hidden non-adherence, where patients outwardly appear compliant but fail to take medications as prescribed, is especially challenging to detect in routine practice. Pharmacists, as frontline healthcare providers, play a pivotal role in identifying and addressing this issue through the integration of digital health tools. The use of advanced technologies such as electronic pillboxes, smart blister packs, mobile health applications, wearable sensors, and pharmacy refill tracking systems enables pharmacists to monitor real-time adherence patterns. Artificial intelligence (AI)-based predictive analytics and digital therapeutic platforms further empower pharmacists to detect subtle behavioural deviations suggestive of concealed non-adherence. These tools not only provide objective data but also facilitate timely interventions through patient counselling, motivational interviewing, and personalized adherence support. Pharmacists, leveraging their accessibility and medication expertise, can integrate these digital insights into clinical decision-making and interprofessional care models. Early detection of hidden non-adherence reduces the risk of treatment failure, hospital readmissions, adverse drug events, and healthcare costs. Moreover, the combination of digital monitoring with pharmacist-led behavioural support strengthens patient engagement, fosters accountability, and enhances overall medication safety.

**Keywords:** Pharmacist, Medication Non-Adherence, Digital Health Tools, Artificial Intelligence, Medication Therapy Management

**RA-55**

## A PATIENT-CENTRIC HEALTHCARE NAVIGATION AND EMERGENCY RESPONSE APPLICATION

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In the current project, a patient-centric healthcare navigation and emergency response application was conceptualized and developed. The objective of the project was to design a unified digital healthcare platform that integrates hospital navigation, pharmacy access, emergency response, and patient health management in a single user-friendly system. The application employs a social-media-like interface to enhance usability. The homepage provides categorized listings of nearby hospitals based on specialization, along with details of doctors and pharmacy outlets. A real-time search bar enables patients to locate healthcare providers or medicines, and appointments can be booked directly through the application. An interactive map feature, inspired by real-time navigation tools, allows patients to access directions, contact facilities, and book consultations seamlessly. The profile section stores patient health records, past appointments, insurance details, and includes a blood donation registry. Furthermore, an integrated first aid and emergency module supports instant ambulance booking and access to emergency contacts. The application successfully combines healthcare access, navigation, and emergency management into one digital ecosystem. Unlike conventional hospital-specific applications, this innovation provides real-time, location-based integration of hospitals, pharmacies, and emergency services within a familiar social-media-like design, thereby ensuring greater usability and adoption. Thus, it can be concluded that this application offers a novel and practical solution for improving patient outcomes by reducing delays in accessing critical care and creating a more connected healthcare ecosystem in India.

**Keywords:** Digital Healthcare, Emergency Response, Hospital Navigation, Pharmacy Access, Patient-Centric App, Healthcare Innovation

**RA-56**

## THE EFFECTIVENESS OF TELEPHARMACY IN ENHANCING MEDICATION ADHERENCE AND PATIENT SATISFACTION AMONG RURAL COMMUNITIES

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Access to quality pharmaceutical care remains a crucial challenge in rural and underserved communities due to limited availability of pharmacists and healthcare facilities. Telepharmacy, which involves providing pharmaceutical services through telecommunication technologies, has emerged as a promising solution to fill this gap. This study evaluates the effectiveness of telepharmacy in improving medication adherence and patient satisfaction among rural populations. A mixed-method research design was used, combining quantitative assessment of adherence rates with standardized adherence scales and qualitative interviews exploring patient experiences. The results showed a significant increase in medication adherence among patients who received telepharmacy interventions compared to those relying solely on traditional care. Patients expressed high satisfaction levels, citing better access to pharmacists, timely counseling, convenience, and less travel. The study also highlighted telepharmacy's role in overcoming barriers such as lack of awareness, insufficient follow-up, and poor medication management. Overall, telepharmacy demonstrates strong potential as a cost-effective and sustainable healthcare model that can enhance therapeutic outcomes and improve patient well-being in rural areas.

**Keywords:** Telepharmacy, Medication adherence, Patient satisfaction, Rural healthcare, Pharmaceutical care, Digital health.

**RA-57**

## DATA INTEGRITY IN THE PHARMACEUTICAL DEVELOPMENT AND MANUFACTURING: GLOBAL CHALLENGES AND COMPLIANCE PRINCIPLES

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Data integrity is a cornerstone of the pharmaceutical industry's ability to ensure the quality safety and efficacy of medicinal products. It requires that all the data remain accurate, consistent, complete, and trustworthy across the entire product lifecycle, including discovery, new research, clinical development, manufacturing, regulatory submissions and post-marketing surveillance. Beyond meeting regulatory obligations, strong data integrity practices are essential to protecting patient safety and sustaining public confidence in healthcare systems. This work highlights the importance of Good Documentation Practices (GDP) in preserving data dependability while looking at the fundamental ideas of ALCOA and ALCOA+. To identify recurring risks, common issues are examined, including data fabrication, inadequate documentation, insufficient system controls, and inadequate digital safeguards. Case studies show how breaches can lead to product recalls, worldwide medicine shortages, harm to one's reputation, and deprivation of patients' access to vital therapies. These include high-impact regulatory findings and the iconic GVK Biosciences and Zhejiang Huahai instances. The ongoing seriousness of this issue is further highlighted by recent developments, such as the FDA's issuance of Form 483's pertaining to data integrity and vulnerabilities discovered during the COVID-19 vaccine cold chain. Practical strategies to improve compliance are also covered in the assessment, including as implementing strong data governance frameworks, funding employee training, and employing digital tools like audit trail systems and electronic medical records for proactive monitoring. In the end, maintaining data integrity is a global necessity that strengthens the core commitment to patient safety while promoting honesty, regulatory compliance, and sustainable pharmaceutical operations.

**Keywords:** Data integrity, ALCOA, ALCOA+, GDP, 21 CFR, 483s

**RA-58**

## WOMEN LEADESHIP IN THE PHARMACY PROFESSION BREAKING BARRIERS AND BUILDING EQUITY




ISBN: 978-81-980623-8-3

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The pharmacy profession has witnessed a significant increase in the representation of women over the past decades, yet women remain underrepresented in leadership and decision-making roles. This disparity underscores the persistent barriers that limit gender equity in professional advancement, despite women comprising a majority of the pharmacy workforce in many regions. This explores the current state of women's leadership in pharmacy, the systemic challenges they face, and the transformative impact of empowering women in leadership roles across academia, industry, clinical practice, policy, and entrepreneurship. Cultural norms, unconscious bias, limited access to mentorship, and work-life balance pressures continue to hinder the professional growth of women in pharmacy. However, a growing number of female leaders are breaking these barriers through advocacy, networking, policy change, and organizational reform. By fostering inclusive leadership pathways, promoting mentorship programs, and supporting flexible work environments, the profession can create a more equitable and diverse leadership landscape. Women leaders bring unique perspectives to healthcare delivery, patient care innovation, and strategic decision-making. Their representation at the highest levels contributes to more collaborative, empathetic, and effective healthcare systems. As the pharmacy profession evolves, cultivating gender equity is not only a matter of justice but a strategic imperative for sustainable growth and innovation. This work calls for collective action across institutions to support women's leadership, challenge systemic inequities, and build a more inclusive future for pharmacy.

**Keywords:** Women in pharmacy, gender equity, healthcare leadership, systemic barriers, women empowerment, pharmacy profession.

**RA-59**

## FUTURE OF PHARMD GRADUATES: BEYOND HOSPITALS, RESEARCH, POLICY, START-UP AND TECH ROLES

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The evolving landscape of healthcare and pharmaceutical sciences is rapidly expanding the career horizons for Doctor of Pharmacy (PharmD) graduates beyond the conventional roles in hospitals and community pharmacies. Emerging opportunities in research, health policy, entrepreneurship, and technology-driven sectors are redefining the professional trajectory for pharmacy professionals. As healthcare systems become increasingly complex and integrated with digital innovations, PharmD graduates are uniquely positioned to contribute through clinical expertise, patient-centred care models, and data-informed decision-making. In research, PharmDs are taking active roles in clinical trials, real-world evidence generation, Pharmacoeconomics, and outcomes research. The policy domain offers roles in healthcare regulation, public health planning, and drug access frameworks, where PharmDs influence medication safety, pricing, and accessibility. The start-up ecosystem is also recognizing the value of pharmacists, particularly in digital health, health informatics, and personalized medicine ventures. Their training in therapeutics, pharmacology, and clinical decision-making makes them critical assets in designing patient-centric health tech products and services. Furthermore, the integration of artificial intelligence, machine learning, and big data into healthcare opens new avenues for PharmDs to serve as bridges between technology and clinical practice. To leverage these expanding frontiers, pharmacy education and training programs must evolve to incorporate interdisciplinary skills, digital literacy, and entrepreneurial thinking. This transformation marks a paradigm shift in the pharmacy profession, empowering PharmD graduates to lead innovations across the healthcare continuum.

**Keywords:** PharmD graduates, future of pharmacy, healthcare innovation, digital health, pharmacy start-ups.

**RA-60**

## GREEN PHARMACY PRACTICE: ECOFRIENDLY APPROACHES IN HOSPITAL AND COMMUNITY SETTINGS

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Green pharmacy practice has emerged as a sustainable approach that integrates environmental responsibility into healthcare delivery, aiming to reduce the ecological footprint of medicines and pharmacy services. The growing concern over pharmaceutical waste, improper drug disposal, and resource-intensive hospital operations has highlighted the urgent need for ecofriendly strategies in both hospital and community settings. Green pharmacy emphasizes practices such as rational prescribing, promotion of generic medicines, energy-efficient dispensing systems, eco-labeling, and proper segregation and disposal of pharmaceutical waste. In hospitals, adopting green procurement policies, reducing single-use plastics, and implementing take-back programs for unused drugs can minimize environmental hazards while maintaining patient safety. Similarly, in community pharmacies, patient education on safe disposal, encouraging reusable packaging, and embracing digital prescriptions contribute significantly to environmental conservation. Green pharmacy practice not only safeguards the environment but also enhances public health by reducing risks associated with pharmaceutical pollutants in water and soil. The shift towards ecofriendly approaches in pharmacy practice bridges the gap between healthcare delivery and environmental sustainability, making pharmacist's key stakeholders in global efforts toward a greener future. This paradigm fosters a balance between therapeutic efficacy and ecological responsibility, ensuring a healthier environment for future generations.

**Keywords:** Greenpharmacy, ecofriendly practices, hospital pharmacy, community pharmacy, environmental sustainability

**RA-61**

## KNOW YOUR PHARMACIST: A PROSPECTIVE OBSERVATIONAL STUDY

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Pharmacists play a crucial role in the healthcare system as accessible medication experts and providers of patient-centered services ensuring the safe and effective use of medications, offering professional advice and promoting public health. In 2008, PharmD program was introduced in India looking onto the requirement of pharmacists to play a more clinical and patient-oriented role. Despite their importance, public understanding of a pharmacist's role often remains limited to medicine dispensing. The objective behind this survey was to assess the level of knowledge, awareness and perception of general population regarding pharmacist and their services. A structured questionnaire was prepared and validated by experts (average score - 3.5). The google form was circulated to participants across diverse age groups, education background and occupations. The pre-liminary findings indicate that around half of the participants (57%) recognize the services provided by pharmacist other than dispensing medicines, but only 45% of the recognizing participants have ever received or came across the services. The survey shows following result about awareness: Health Screening (25%), Patient Counselling (68.8%), Vaccination (31.2%), Tobacco Cessation (28.9%) and Management of Minor Ailments (82.9%). Thus, it can be concluded that general population is still unaware about specialized pharmacy services and further education and awareness is needed.

**Keywords:** Pharmacist Services, Public Awareness, Patient Safety, Awareness Campaigns, Perception of Pharmacist

**RA-62**

## ECO-RESILIENCE IN THE FACE OF AMR: STRATEGIES FOR A SUSTAINABLE FUTURE

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ISBN: 978-81-980623-8-3

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Antimicrobial resistance (AMR) in the environment, driven by effluents from pharmaceutical, hospital, and livestock sources, threatens ecosystems and human health in India. This study quantifies antibiotic residues and resistance genes in Maharashtra water and sediments and examines Pollution Control Board regulations. It proposes real-time monitoring, mandatory reporting, and adaptive permitting to bridge regulatory gaps and curb environmental AMR. Antimicrobial resistance (AMR) threatens environmental health through pharmaceutical effluents, livestock runoff, and hospital waste. This study investigates AMR contamination pathways and evaluates the effectiveness of Pollution Control Board regulations. Using policy analysis, environmental sampling, and stakeholder input, it proposes strategies to integrate AMR surveillance into pollution norms, promoting sustainable governance and interdisciplinary containment approaches. Integrating microbiology, environmental science, and policy analysis, this study examines AMR ecologically to bridge regulatory gaps and institutional accountability in India's expanding industrial landscape. It offers academic insights and practical guidance for public policy and environmental health, aiming to inform a national roadmap for environmental AMR control and strengthen India's leadership in the One Health movement. Antimicrobial resistance (AMR) increasingly threatens environmental ecosystems as pharmaceutical residues enter wastewater, agricultural runoff, and soils. Persistence of these compounds fosters resistant microbes, undermining public health defenses. Although evidence links environmental AMR to human risks, existing Pollution Control Board regulations lack specificity and robustness for effective surveillance and mitigation. This study highlights regulatory gaps and proposes targeted strategies to strengthen environmental frameworks, enabling comprehensive AMR monitoring and control.

**Keywords:** Antimicrobial resistance (AMR), Pollution Control Board regulations, environmental frameworks, One Health movement.

**RA-63**

## BRIDGING GAPS IN ELDERLY REPRESENTATION: REGULATORY AND ETHICAL PERSPECTIVES IN CLINICAL RESEARCH

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The rapidly expanding global aging population underscores the critical need to enhance geriatric representation in clinical trials. Older adults frequently experience multimorbidity and polypharmacy, yet remain disproportionately underrepresented in research, limiting the generalizability of trial outcomes. This study systematically examined regulatory frameworks from the FDA, EMA, ICH, and CDSCO, alongside current literature, to evaluate barriers and evolving approaches to equitable elderly participation. Although guidelines increasingly emphasize age-inclusive study designs, restrictive eligibility criteria, inadequate geriatric-focused pharmacovigilance, and ethical complexities surrounding informed consent continue to constrain participation. Illustrative cases, including dose-dependent safety risks with drugs such as metformin and rivaroxaban, highlight the clinical implications of insufficient geriatric data. Innovative strategies—such as decentralized and hybrid trial models, AI-driven recruitment, adaptive safety monitoring, and caregiver engagement—offer promising avenues to improve inclusion and autonomy. Findings emphasized that without targeted regulatory reinforcement and ethical safeguards, clinical evidence risks being both scientifically incomplete and ethically unjust. Advancing geriatric inclusion is thus not only essential for optimizing drug efficacy and safety but also a moral obligation to ensure equitable access to research benefits. Strengthened trial design, enforceable guidelines, and robust post-marketing surveillance are pivotal to delivering safer, personalized, and evidence-informed care for the aging global population.

**Keywords:** Aging population, Clinical trials, Ethics, Geriatrics, Regulation.

**RA-64**

## NAVIGATING GLOBAL MEDICAL DEVICE COMPLIANCE: EU VS FDA APPROVALS

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Medical devices are indispensable in modern healthcare, enhancing diagnostic accuracy, treatment efficacy, and overall patient outcomes. Ensuring timely access while maintaining safety necessitates robust regulatory frameworks. This study provides a comparative analysis of the European Union (EU) Medical Device Regulation (MDR) and the United States (US) Food and Drug Administration (FDA) frameworks, focusing on high-risk and breakthrough medical devices. A systematic review methodology was employed, analysing regulatory documents, guidance frameworks, and published literature. Evaluation criteria included device classification, premarket assessment, post-market surveillance, and quality system compliance. The analysis highlights structural differences: the US follows a centralized model via the FDA, whereas the EU operates a decentralized system involving Notified Bodies and Competent Authorities. Regulatory pathways, including the FDA's 510(k), Premarket Approval (PMA), and Breakthrough Devices Program, alongside the EU's CE marking and conformity assessment process, were examined. Specific features such as the EU's risk-based classification, Unique Device Identification (UDI), and Periodic Safety Update Reports (PSURs) were contrasted with the FDA's active and passive surveillance mechanisms, De Novo classification, and Humanitarian Device Exemption (HDE) pathway. Results indicate that while both systems share the goal of ensuring safety and efficacy, they differ in execution, transparency, and review timelines. The study infers that global regulatory harmonization could promote innovation while safeguarding patient safety. By linking regulatory approaches to health and social outcomes, this research identifies best practices to inform policy refinement and facilitate more efficient, safer access to medical devices.

**Keywords:** Clinical Evaluation, FDA Approval, Medical Device Regulation, Post-Market Surveillance, Regulatory Harmonization.

**RA-65**

## IMPACT OF FDA REGULATORY REFORMS ON ANDA 505(J) APPROVALS AND GENERIC DRUG MARKET DYNAMICS

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The rising cost of pharmaceuticals in the United States has necessitated regulatory reforms to strengthen generic drug competition and affordability. The FDA, through the Hatch-Waxman Act and subsequent reforms such as the Generic Drug User Fee Amendments (GDUFA) and the Drug Competition Action Plan (DCAP), has been pivotal in expediting Abbreviated New Drug Application (ANDA) 505(j) approvals. This study evaluates whether these reforms achieved their intended objectives by enhancing approval efficiency, fostering market competition, reducing prices, and improving accessibility, while also identifying persisting regulatory gaps. Using FDA approval data, ANDA filings, and Paragraph IV litigations between 2010 and 2024, both quantitative and qualitative analyses were performed. Approval timelines, exclusivity periods, and cost savings were statistically assessed, and market competition and accessibility outcomes were qualitatively reviewed. Findings revealed that Hatch-Waxman reforms accelerated ANDA approvals while maintaining a balance between innovation and access. Multiple generic entrants significantly reduced drug prices by 20–40%, yielding substantial healthcare savings. Paragraph IV litigation trends, however, highlighted barriers extending exclusivity timelines. Federal Trade Commission (FTC) enforcement actions curbed certain anti-competitive practices, but persistent market manipulation continues to pose challenges. Overall, FDA reforms substantially improved affordability, accessibility, and market competition, yet enforcement mechanisms require strengthening to sustain consumer benefits. In conclusion, Hatch-Waxman, GDUFA, and DCAP reforms have positively influenced generic drug market dynamics, though further policy alignment is




ISBN: 978-81-980623-8-3

essential for achieving a sustainable, competitive, and affordable generic ecosystem.

**Keywords:** ANDA 505(j), DCAP, GDUFA, Generic Drugs, Market Competition

**RA-66**

## ACADEMIC STRESS AND ITS IMPACT ON THE MENTAL HEALTH OF HEALTH CARE STUDENTS, A CROSS SECTIONAL SURVEY

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Academic stress is common among healthcare students and can significantly affect mental health and well-being.This study aimed to assess the prevalence of academic stress, its sources, coping strategies, and its impact on student's mental health.A questionnaire was distributed via Google Forms, and anonymous responses were collected from students across different academic years.Among 150 participants, 56.3% reported having adequate time for hobbies and personal life, while 43.7% did not. Emotional symptoms were frequent, with 47.1% occasionally feeling anxious or depressed, 35.3% often experiencing stress, and only 22.8% rarely reporting. Overall, 57.4% rated their academic stress as high (scores 4–5), whereas 42.6% reported moderate to low levels (scores 1–3). Regarding coping mechanisms, 51.4% engaged in physical exercise, 19.1% relied on peer support, and 47.4% adopted other stress - relieving activities. Examinations were identified as the primary stressor by 73.3% of students, while 25.7% cited other academic challenges. Academic stress is highly prevalent among healthcare students, often leading to emotional strain. Although students adopt various coping strategies, the findings highlight the need for structured institutional support and accessible mental health resources to promote well-being and academic success. Many students struggle with high academic stress tied to anxiety and depression, showing the importance of better mental health support, healthier coping options, and a more balanced academic environment.

**Keywords:** Academic stress, mental health, healthcare students, Academic challenges, Emotional symptoms.

**RA-67**

## DEVELOPMENT OF MODEL FOR SAFE DISPOSAL OF UNUSED AND EXPIRED MEDICINES

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Improper disposal of unused and expired medicines is a growing global concern, contributing to environmental pollution, accidental misuse, and increased risks to public health. Common practices such as discarding medicines in household waste or flushing them into sewage systems often result in pharmaceutical residues contaminating soil and water sources. Despite the existence of regulatory guidelines in some regions, a practical and universally adaptable disposal framework is still lacking. This study focuses on the development of a structured model for the safe disposal of unused and expired medicines. The proposed model is based on a three-tiered framework: Collection Mechanism – creating accessible drop-off systems at pharmacies, hospitals, and community centers; Processing and Disposal – adopting cost-effective, environmentally responsible approaches such as high-temperature incineration, reverse logistics, and chemical neutralization; and Awareness and Policy Support – fostering consumer education, strengthening stakeholder participation, and reinforcing regulatory mechanisms. The model was conceptualized through a review of international best practices, consultations with healthcare and environmental experts, and surveys assessing household disposal behaviors. Findings underscore the urgent need for a structured and scalable solution that ensures environmental safety, prevents unintentional drug misuse, and promotes sustainable healthcare practices. The adoption of this model can play a critical role in improving pharmaceutical waste management, reducing ecological hazards, and advancing global efforts toward responsible medicine stewardship.

**Keywords:** Medicine disposal, expired drugs, pharmaceutical waste, environmental health, sustainable healthcare

**RA-68**

## KNOWLEDGE, ATTITUDE AND PRACTICE REGARDING MISUSE OF ANTIBIOTICS AMONG SOUTH KERALA

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Antibiotics stand as one of medicine's greatest achievements, saving millions of lives by defeating bacterial infections. They have reduced complications, shortened illness durations, and prevented the spread to deadly diseases. Yet, their power is slowly being lost due to common mistakes in the community self-medication, buying antibiotics without prescriptions, stopping treatment midway, and using them for viral illnesses like colds and flu antibiotic resistance. These practices fuel antibiotic resistance, turning once-curable infections into dangerous threats that last longer, cost more, and sometimes even become untreatable. Protecting antibiotics requires collective effort. It is essential for communities to recognize that the antibiotics are not a universal remedies and require responsible use. Doctors should prescribe them carefully, guiding patients to complete the full course. At the same time, strict regulations are needed to prevent misuse and encourage stewardship programs. By raising awareness and promoting preventive strategies, we can preserve the strength of antibiotics, safeguard public health, and ensure these life-saving medicines remain effective for the future generations. A survey was conducted to assess knowledge, attitude, and practice regarding antibiotic misuse in the community.

**Keywords:** Antibiotics, misuse, self-medications, public health.

**RA-69**

## ADVANCEMENTS IN REGULATORY COMPLIANCE AND TOOLS USED

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The Regulatory Compliance is an important and integral component of any Pharmaceutical Industry and as it gets increasingly complex and Health authorities are scrutinizing the standards of the drug quality and safety for the patients, traditional methods to maintain it are now not sufficient to meet the everchanging expectation of the health authorities. The pharmaceutical industries should have diverse compliance system to monitor the modern drug development and its commercialization across globally. That's why Pharmaceutical Industries are coming across more digitalised ways to maintain global compliance. The analytical tools have been used now by almost all the industries to maintain regulatory excellence. This examines how automation, analytical tools and data stewardship helps industries to maintain Compliance. Also, it highlights various tools used by the pharmaceutical tools to maintain regulatory data and compliance. It highlights how critical the compliance is and how it helps in maintaining data accuracy, data integrity, data uniqueness and follow ALCOA+ principles. The session aims to provide insights in Data Quality Compliance and tools used for maintaining Data Quality Compliance. The presentation will highlight: Why it's important to maintain Data Quality Compliance. Various Analytical tools used by Pharmaceutical Industry to maintain Compliance. Attendees will gain insights to basic compliance solutions used by pharmaceutical industries and context to Emerging technologies and also risk management through collaborative tools used in Data Quality Compliance. The session will help attendees to understand governance tools used by Pharmaceutical Industries and how technology is helping compliance at global level.

**Keywords:** Pharmaceutical Compliance, Regulatory Information Management, Data Stewardship, AI in Pharma, Digital Transformation, Governance, Submission Readiness, Cloud Platforms, Automation


ISBN: 978-81-980623-8-3

**RA-70**

## KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) STUDY ON THE IMPACT OF MOBILE HEALTH-RELATED APP USAGE AND COMPLIANCE AMONG ADULDS

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Medication adherence is defined by the WHO as "the degree to which a person's behavior corresponds with taking a medicine optimally" such as factors like taking the right medicine at the right time with right dosage and at the correct duration. It is a crucial aspect of healthcare. If the medication adherence is poor it can lead to ineffective treatment and may worsen the conditions so here is the mobile health refer to mobile device to delivery healthcare service and information. They have revolutionized communication, breakdown geographical barriers and providing instant connectivity. The mobile health apps are software design that plays a significant role in medication compliance providing features like dose tracking, reminders, offering education about the medication and their treatment plans. They are effective in reducing non-adherence by reminding the patient about medication and relaying the care givers about the information. The mobile health (mHealth) apps are quite simple, easy to access and cheap in cost. Integrating such a kind of digital tool into patient's routine care offers a practical, optimized, reduced forgetfulness, refill alerts and scalable solution for the non-adherence. However, they also encounter challenges such as development costs, security risks, and need for ongoing maintenance. In present they also deal with security and privacy risk; they often require access to sensitive data and excessive use of apps may lead to mobile addictions.

**Keywords:** medication adherence, mobile health app, mobile health, encounter, digital tool.

**RA-71**

## A REGULATORY PERSPECTIVE FOR THE APPROVAL OF RADIOPHARMACEUTICALS

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Radiopharmaceuticals are the pharmaceutical formulation which consists of radioactive substances; these molecules are labelled with radioisotopes. They are intended to use either for diagnostic or for therapeutic purposes. In recent times, there has been a noteworthy growth with special reference to branch of nuclear medicine. There are numerous novel radionuclides and radiopharmaceuticals used for the treatment of metastatic bone pain, neuroendocrine and other tumours. Embracing research by the scientific fraternity has led to the invention of many radiopharmaceuticals which are of immense clinical importance. The increasing availability of radiopharmaceuticals should be in accordance with regulatory action in order to back up the permissible foundation for their commercial use. It is therefore imperative for a radiopharmaceutical to have an approval from regulatory authority to qualify for human use. The present paper highlights various regulatory requirements for approval of radiopharmaceuticals in USA, Europe, and particularly India, which does not have guidelines for their approval, and intensifies the concern for a harmonized regulatory platform of global acceptance.

**Keywords:** Radiopharmaceuticals, Nuclear Medicine, Approval, Commercial use, Guidelines, Regulatory authority.

**RA-72**

## REGULATORY CHANGES IMPACT ON CLINICAL TRIALS – CTIS (CLINICAL TRIAL INFORMATION SYSTEM)

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The regulatory framework governing clinical trials in the European Union has undergone a major transformation with the shift from the Clinical Trials Directive (CTD) to the Clinical Trials Regulation (CTR) and the establishment of the Clinical Trial Information System (CTIS). To evaluate the impact of these changes, an extensive literature-based investigation was carried out using regulatory documents, scientific publications, and case reports to assess the drivers, outcomes, and challenges of implementation. The methodological approach involved comparative analysis of regulatory provisions, examination of operational practices, and thematic evaluation of technical, ethical, and organizational perspectives. Results highlighted that CTIS has strengthened harmonization, transparency, and participant engagement through a unified portal for trial submissions and monitoring. At the same time, significant limitations were observed, including technical flaws, difficulties in integration with legacy systems, tight sponsor timelines, and variations in national interpretation of CTR provisions. Case-based findings further demonstrated improvements in submission efficiency, data management, and ethical compliance, while identifying training and change management as critical gaps. The overall inference drawn indicates that CTIS represents a transformative step toward efficient and participant-centred clinical trial governance, though its success will depend on sustained stakeholder support, continuous system refinement, and harmonized regulatory cooperation across member states.

**Keywords:** Clinical Trial, Clinical Trial Directive, Clinical Trial Regulation, Clinical Trial Information System, European Union

**RA-73**

## A FUTURISTIC PERSPECTIVE ON THE INTEGRATION OF REAL-WORLD EVIDENCE IN GLOBAL REGULATORY SUBMISSIONS

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As healthcare increasingly embraces digital innovation Real world data (RWD) and the Real-world evidence (RWE) are reshaping how we understand medicine in everyday practice. Gone are the days when randomized clinical trials stood alone. Today, insights from electronic health records, insurance claims, and patient-reported outcomes are driving smarter, faster and more patient-centered regulatory decisions. This study offers a futuristic perspective on the integration of RWE into global regulatory submissions. The study involved a structured review of international regulatory frameworks, case studies and technological initiatives driving RWE adoption. Regulatory guidelines from the USFDA, EMA and PMDA was analysed alongside global projects such as the FDA Sentinel Initiative, EMA's DARWIN EU, and the Big Data Task Force. Case studies of drugs were examined to illustrate the practical use of RWE in supporting regulatory decision-making. Findings highlight technological advances like digital health tools, artificial intelligence, and big data analytics are revolutionizing RWE collection and analysis. However, challenges persist regarding data quality, ethical and privacy concerns, lack of standardization, and varying levels of regulatory acceptance. The discussion underscores the need for harmonized global standards, predictive modelling, simulation-based evidence generation and multi-stakeholder collaboration. The integration of RWE into global regulatory submissions holds immense potential to accelerate drug development, enhance patient-centric evaluation and streamline regulatory pathways. A future defined by harmonization, digital innovation and collaborative governance will ensure that RWE achieves its full impact in shaping regulatory science.

**Keywords:** Real world data, real world evidence, regulatory decision making, regulatory frameworks.

**RA-74**

## NEED OF STRINGENT REGULATIONS TO CURB THE IRRATIONAL USE OF ANTIBIOTICS IN INDIA

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ISBN: 978-81-980623-8-3

The irrational use of antibiotics in India has become a public health issue of concern, an important contributor to the global menace of antimicrobial resistance (AMR). The accessibility of over-the-counter, improper use of prescription, insufficient course of treatment, and misuse in agricultural and animal husbandry industry has increased the emergence of resistant strains of bacteria faster. This not only diminishes the efficacy of the current antibiotics but also heightens the rate of treatment failures, morbidity, deaths and healthcare expenditures. Despite Government of India initiatives like the National Action Plan on AMR and Schedule H1 regulations to limit non-prescription sales, enforcement has been weak; this is because of poor surveillance systems, poor monitoring, and lack of awareness by the population. The present situation highlights the necessity of more regulatory systems to control rational use of antibiotics. Enhanced prescription audits, severe consequences of non-compliance, electronic surveillance of the sale of antibiotics, and the introduction of antimicrobial stewardship programs into hospitals and community healthcare are important projections. Additionally, there should be multi-sectoral coordination of the health, veterinary, and agricultural authorities to tackle the issue of antibiotic misuse in a comprehensive way. Compliance can also be improved by conducting educational campaigns to the population and training medical workers. In the resistance, regulations absence of solid enforcement of regulations, India will enter a post-antibiotic era when common infections can no longer be treated. Hence, urgent policy changes, backed by good governance and nationwide execution, is urgently needed to reduce the irrational use of antibiotics and protect the effectiveness of these life-saving drugs to the other generations.

**Keywords:** Antibiotics, irrational use, antimicrobial, stewardship, Schedule H1

**RA-75**

## BUMPS AND HUMPS IN AI BASED EDUCATION FOR PHARMACY GRADUATES

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Artificial intelligence (AI) is rapidly transforming pharmacy education by offering innovative tools that enhance personalized learning, clinical decision-making, and experiential training. PCI has also integrated seven new subjects dealing with the role of AI in phython programming, preformulation and formulation, drug design, discovery and bioinformatics etc. in its model pharmacy curriculum. However, integrating AI into pharmacy curriculum presents both significant challenges and promising opportunities. AI-powered tools not only offer transformative potential to enhance learning experiences, but also enable personalized learning by adapting content to individual student needs, simplifying complex pharmacological concepts, and providing efficient study aids such as customized practice questions and visual summaries. Additionally, AI facilitates experiential learning through simulation and decision-support systems, fostering clinical reasoning skills essential for future pharmacists. Despite these advantages, the integration of AI into pharmacy curriculum has its challenges. Technical limitations, such as AI's occasional inaccuracies in complex calculations, raise concerns about reliability. Ethical issues including data privacy, academic integrity, and responsible use of AI tools require careful consideration. Furthermore, many educators face a steep learning curve in adopting AI technologies, and students risk becoming overly dependent on AI, potentially undermining critical thinking and problem-solving abilities. Access disparities also threaten to widen educational inequities. This poster explores the technical, ethical, and pedagogical obstacles faced by educators and students, including issues of faculty training. It also highlights strategies to overcome these barriers through AI literacy programs, ethical frameworks, and collaborative curriculum development.

**Keywords:** Artificial intelligence, Pharmacy Education, Pharmaceutical Curriculum, personalized learning, experiential training.

**RA-76**

## THE SHIFT TOWARDS PHARMA 5.0+: OPPORTUNITIES, CHALLENGES, AND STRATEGIC SOLUTIONS FOR INDIA'S PHARMACEUTICAL INDUSTRY

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The Indian pharmaceutical industry is the third largest in terms of volume; it ranks at just fourteenth in terms of value. It is evident that India needs to undergo a significant transition from generic drug producer to a producer of novel molecules and biosimilars through rigorous R&D initiatives. With encouragement of Food and Drug administration the pharma industry is now on the track of catching up with other industries and is heading towards adopting more and more Industry 5.0 technologies and continuous manufacturing. Modern pharmaceutical production systems have emerged to convert ambition to excellence; the future has now emerged as to define Indian Pharmaceutical Industry to set new imperatives for all stakeholders. The forthcoming progression of Pharmaceutical Industries needs the amalgamation of Pharma 5.0+ which accumulates all evolving technologies such as the internet of things (IoT), artificial intelligence (AI), robotics, and advanced computing to intensely modify all processes of pharma manufacturing. The journey of transformation from data collection to the remarkable digital maturity of Pharma 5.0 will determine the next generation of pharmaceutical production. Industry 1.0 is the starting point of the modern pharmaceutical industry transition from manual processing from simple hand-operated tools to commercial-scale machinery. Industry 2.0 was enabled by electricity and early electronic machines. The automated and digital environment of Pharma 3.0 empowers the widespread transformation into Pharma 5.0 in pharmaceutical production. The latest developments are the industrial revolution of Pharma 5.0, which in particular has shown great potential for transforming the production base with advanced analytics tools for processing large quantities of production data. Hence, Smart Pharmaceutical Factory Automation is revolutionizing pharma manufacturing, creating an ecosystem of medical devices and applications that enables to increase the visibility of processes, machines, and products, thereby increasing productivity, reducing errors, and maximizing profitability. The key to this paper is to summarize India can provide cutting-edge technology, communications, and solutions, which enable enterprises in the pharma industrial sectors to migrate seamlessly to Industry 5.0+ through the adoption of IoT, AI, and other robotic technology. The advancements in all technology with digitization, automation, and real-time data integration will produce better results.

**Keywords:** Pharma 5.0+, internet of things, Artificial intelligence, Robotics, Smart Factory.

**RA-77**

## EXPLORING THE CONTRIBUTION OF PHARMACY ACADEMICIANS IN ACADEMIA–INDUSTRY PARTNERSHIPS FOR PHARMACEUTICAL RESEARCH: A DESCRIPTIVE SURVEY APPROACH

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Academia-industry collaboration has persistently been a matter of debate in academia and industry. The research was done in academia and its translation into marketable products certainly is not new. High-quality academic research can assist the industry to produce economic products for society. The aim of present project is to compile and analysed the database of pharma academicians comprised of academician's details along with their research expertise. With this aim, an attempt has been taken to compiled and analyzed the database of pharma academicians based on personal details, academic details, and professional details including designation, Qualification, Specialization, Expertise, Interested vs. engaged in academia-industry collaborations, Projects handled, Publications, Interest areas of Academic- industry collaborative that can be utilized by Pharma Industries. In total 2401 pharma academicians were participated and responded to the prepared project questionnaire. Based on participation an analysis report has been prepared comprising participation distribution graphical presentation in respect questionnaire. Through this interpretation, one can understand the potential of academicians which helps to shorten the academicians as per their requirements, as well as by seeing the profile of interested academicians they will contact them for their work. The




ISBN: 978-81-980623-8-3

significant database will be useful to foster the academia-industry collaboration, helpful to prove the potential of academicians as innovative researchers to fulfill the requirements of Pharma Industries.

**Keywords:** Pharma academicians, Academia-industry collaboration, Pharmaceutical research

**RA-78**

## NEED TO TEACH LAW OF CONTRACTS IN DRUG REGULATORY AFFAIRS

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Any agreement which can be enforced by law is a contract. The law of contracts is crucial in pharmacy, regulating agreements between various stakeholders like pharmaceutical companies, suppliers, distributors, government entities and even patients. These contracts cover areas like supply agreements for raw materials and finished products, clinical trial agreements, licensing agreements for intellectual property, and more. Effective contract management ensures compliance, minimizes risk, and facilitates the smooth operation of the pharmaceutical industry. Business connections are established by every pharmaceutical company, with different manufacturers, suppliers, service providers, financial institutions, etc. In all these transactions, contracts are involved and regulatory authorities worldwide mandate for clearly defined, agreed and controlled contracted services. Various types of contracts, along with types of clauses required to be covered in such contracts, which are entered into by the pharmaceutical industry, with its various stakeholders, in India as well as outside, have been explored in this article. The application of Law of Contracts has been illustrated in the regulatory agencies of USA, European Union and India. Application of Law of contracts has been explored from the stage of inception to closing of a pharmaceutical company. The three types of contracts (Contracts by Agreement, Standard Form Contract and Promissory Estoppel) have been described, with cited case studies. Salient features, key types of agreements, key considerations, common examples, and specific applications in pharmaceutical industry, common clauses, of the three types of contracts have been described. The authors suggest that in view of the significant application of Law of Contracts in pharmaceutical industry, it would be prudent if the students / researchers in pharmacy, particularly those in the area of drug regulatory affairs, be fully aware of this law, and that this law may be included in the Pharmacy curriculum.

**Keywords:** Contracts, Standard forms contract, Promissory estoppels.

**RA-79**

## NAVIGATING THE REGULATORY LANDSCAPE: UNRAVELLING THE RULES ON MISLEADING DRUG ADVERTISEMENTS IN THE USA

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FDA mandates pre-approval scrutiny for pharmaceutical products, assessing various production sites. After approval, risk-based surveillance inspections occur. A study examines warming letters from FDA's FTC (federal trade commission) and OPDP (office of prescription drug promotion) to drug firms' post approval, delving into reasons behind such regulatory actions for enhanced pharmaceutical industry compliance and public safety. Advertisements are vital in a community where all companies fight for development and economic success, Drug development is a time-consuming and risky business Marketing has a huge positive impact on the introduction of new products to the market. However, several pharmaceutical goods marketing specifically branded products are disputed and in violation of advertising regulations. This study investigates the regulatory environment of pharmaceutical advertising by analysing warning letters (WL) issued by the FTC and OPDP between 2017 and 2023.The study focuses on the reasons underlying regulatory actions for improved industry compliance and public safety by examinine FDA-mandated pre-approval scrutiny and posteapproval surveillance inspections. Over a decade, advertising has been a crucial tool for any industry in reaching out to new clients while preserving confidence with existing ones. Pharmaceutical advertising, from a regulatory standpoint, is far more than just advertising in the traditional sense. Each country has its own legislative framework in place to protect the interests of consumers and corporations. This study emphasizes the overall regulatory consequences of misleading advertisements of drugs with respect to warning letters issued by both F'TC and OPDP in USA.

**Keywords:** Federal trade commission, office of prescription drug promotion, food drug administration, warning letters

**RA-80**

## HOSPITAL, COMMUNITY AND CLINICAL PHARMACY

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Pharmacy practice in India is undergoing a transformative shift, aligning more closely with global standards to enhance patient care and public health outcomes. The integration of Hospital, Community, and Clinical Pharmacy forms the cornerstone of a comprehensive healthcare delivery system. Hospital Pharmacy focuses on the safe and effective use of medicines within hospital settings, ensuring optimal pharmacotherapy through drug procurement, inventory management, and patient-specific dosing. Community Pharmacy serves as the most accessible healthcare interface for the public, providing medication dispensing, patient counseling, health screenings, and promoting rational drug use at the grassroots level. Clinical Pharmacy, an evolving specialty in India, emphasizes direct patient care, including therapeutic drug monitoring, medication therapy management, and inter professional collaboration for evidence-based treatment. Together, these branches work synergistically to improve health outcomes, reduce medication errors, and ensure the rational use of drugs. There is a growing need to standardize practices, enhance pharmacist education, and integrate pharmacists into multidisciplinary healthcare teams. With policy support and continuous professional development, pharmacists can play a critical role in achieving national health goals, including those under Ayushman Bharat and the National Health Mission. This highlights the critical roles of hospital, community, and clinical pharmacists and underlines the need for unified efforts to elevate pharmacy practice standards in India.

**Keywords:** Hospital Pharmacy, Community Pharmacy, Clinical Pharmacy, Pharmacy Practice, Rational Drug Use, Medication Therapy Management, Patient Care, Pharmacotherapy, Healthcare Delivery, National Health Mission, Ayushman Bharat, Multidisciplinary Healthcare Teams, Drug Monitoring, Public Health, Pharmacist

**RA-81**

## AN EVALUATION ON THE CURRENT TRENDS IN PHARMACEUTICAL CARE PROVIDED BY THE PHARMACIST

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The role of pharmacists has evolved from traditional compounding and dispensing to delivering comprehensive pharmaceutical care aimed at improving patient outcomes. Modern pharmacy practice includes collaboration with other healthcare professionals to enhance the quality of life through activities such as adverse drug reaction reporting, therapy monitoring, and identification of drug-related problems. To assess the attitudes and involvement of pharmacists in providing pharmaceutical care across various healthcare settings in both rural and urban regions. A cross-sectional, prospective, observational study was conducted involving pharmacists from government hospitals, primary health centers, private hospitals, and community pharmacies across five districts, covering urban, semi-urban, and rural areas. Data were collected through validated questionnaires administered via both offline and online interactions. Informed consent was obtained from all participants prior to the study. The study was approved by the Institutional Ethics Committee. Pharmacists actively participated and expressed a positive attitude towards the evolving responsibilities in pharmaceutical care. The results were analysed using SPSS software based on gender, age, qualification, experience, area of work, working hours and geographic region. The study underscores the growing involvement of pharmacists in patient-centered care and their willingness to expand their role beyond traditional dispensing. The study




ISBN: 978-81-980623-8-3

concluded that the training can further empower pharmacists to enhance healthcare delivery system.

**Keywords:** Pharmacist, Current Trends, Pharmaceutical care.

**RA-82**

**BENEFITS OF REGULATORY APPROVALS ON FOOD CHAINS IN INDIA**

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Before the 21st century, India's food sector was regulated by multiple legislations, each prescribing different standards for additives, preservatives, colors, contaminants, and labelling. This resulted in overlapping jurisdictions and confusion. To highlight the establishment and objectives of the Food Safety and Standards Authority of India (FSSAI) and its role in unifying food laws under a single framework. The Food Safety and Standards Act, 2006, was enacted under the Ministry of Health & Family Welfare, consolidating previous legislations such as the Prevention of Food Adulteration Act, 1954, Food Product Order (FPO), and Vegetable Oil Products Order, 1998. The creation of FSSAI introduced the concept of "One Nation, One Food Law." It established science-based standards for food and regulated its manufacture, storage, distribution, sale, and import. The Act also shifted the responsibility of food safety from regulators to food businesses, ensuring accountability across the entire food chain. FSSAI plays a pivotal role in safeguarding public health, ensuring uniformity in food standards, and promoting the availability of safe, nutritious, and quality food across India.

**Keywords:** FSSAI, Authorities, Additives, Preservatives, FPO, Adulteration.

**RA-83**

**LICENSING APPROVAL PROCESS OF LOW RISK, MODERATE RISK AND HIGH-RISK MEDICAL DEVICES IN INDIA AND USA**

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Medical device licensing and approval processes in India and the United States are structured around risk-based classification frameworks to ensure patient safety, product quality, and clinical effectiveness. In India, devices are regulated under the Medical Device Rules (MDR), 2017. Devices are categorized into Class A (low risk), Class B (low-moderate), Class C (moderate-high), and Class D (high). Class A and B manufacturing licenses are granted by the State Licensing Authority, while Class C and D, along with all imports, fall under the Central Licensing Authority (CDSCO). Applications are submitted through the SUGAM portal, requiring technical documentation such as the Device Master File, Plant Master File, and evidence of compliance with ISO 13485 quality systems. Notably, non-sterile, non-measuring Class A devices are exempt from licensing. In the United States, the Food and Drug Administration (FDA) regulates devices based on three classes. Class I (low risk) devices are generally exempt from premarket submissions but must comply with quality system regulations. Class II (moderate risk) devices typically follow the 510(k) pathway, demonstrating substantial equivalence to a predicate, or the De Novo pathway if no predicate exists. Class III (high risk) devices require Premarket Approval (PMA), supported by extensive clinical and technical evidence. All devices must comply with the FDA's Quality Management System Regulation (QMSR), harmonized with ISO 13485 by February 2026. Both systems reflect a harmonized, risk-based approach, balancing innovation with regulatory oversight to safeguard public health.

**Keywords:** Medical Devices, Risk classification, Licensing approval, CDSCO, FDA

**RA-84**

**NEED OF REVISION OF DRUG AND COSMETIC ACT 1940 IN THE ERA OF ARTIFICIAL INTELLIGENCE**

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Artificial Intelligence (AI) is transforming the pharmaceutical and healthcare industries quickly in the areas of drug discovery, personalized medicine, diagnostic algorithms, clinical trials, and pharmacovigilance. Regardless of these technological advances, the Drugs and Cosmetics Act, 1940, which is the basis of drug regulation in India is mainly obsolete and has no guidelines to regulate AI-based innovations. This review will focus on describing the urgency of the revision of the Act to align with the new technologies and to provide patient safety, clarity of regulations, and ethical integrity. The most critical points of interest are the lack of guidelines in the validation of AI algorithms, data integrity, patient data privacy, accountability in AI-assisted clinical decision-making, and liability in case of adverse outcomes. The current framework fails to properly tackle the use of AI tools in the submission of regulations, automated quality control, or real-time adverse drug reactions. The poster is based on the results of the world regulatory organizations, including the US FDA, EMA, and WHO, which are already starting to include AI guidelines. The comparison highlights the importance of India moving to a legal system that is future-proof and is more welcoming to innovation without jeopardizing the health of the population. The review ends with the recommendations on integrating AI-oriented provisions in the Drug and Cosmetic Act such as defining AI tools, risk-based regulatory processes, and the post-market surveillance processes. The revision of the Act is not only a legal requirement but a strategic step to ensure that India is a leader in AI-centered healthcare without causing a lack of trust, transparency, and safety in the health systems of people.

**Keywords:** Artificial Intelligence (AI), Drug Regulation, D & C Act 1940, Patient Privacy, Ethics in AI

**RA-85**

**GREEN PHARMACY: REDUCING ENVIRONMENTAL FOOTPRINT IN DRUG MANUFACTURING**

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Green Pharmacy aims to significantly reduce the environmental footprint of drug manufacturing while maintaining public health benefits. This approach comprehends to SDGs of 3, 7, 12, 13, 15 as a part of 17 Global Sustainable Development Goals as an agenda of 2030 Sustainable Development to harmonize peace and prosperity for people and the planet. Goals emphasizes integrating sustainability into every stage of pharmaceutical production, from sourcing raw materials to product distribution. The pharmaceutical industry traditionally faces challenges such as high energy consumption, extensive waste generation and the discharge of hazardous chemicals and drug residues into the environment, which can contribute to ecological damage and the development of antibiotic resistance. The core principles of Green Pharmacy include five key areas: sustainable sourcing, eco-friendly manufacturing, waste reduction, energy efficiency and responsible distribution. Sustainable sourcing prioritizes renewable resources and ethical trade practices, ensuring minimal ecological impact and community support. Eco-friendly manufacturing adopts green chemistry principles, utilizing techniques like biocatalysis and continuous manufacturing to reduce hazardous waste and enhance efficiency. Waste reduction aims at smarter packaging systems and responsible disposal methods, including take-back and safe disposal of unused medications. Energy efficiency promotes the use of renewable energy sources and optimized logistics to lower carbon emissions. Finally, responsible distribution ensures that medications are transported and delivered in an environmentally conscious manner, while also promoting equitable access. The application of green chemistry principles is also crucial, involving design of chemical processes that minimize or eliminate the use and generation of hazardous substances, offering both ecological and economic benefits.




ISBN: 978-81-980623-8-3

**Keywords:** Green Pharmacy, Sustainable Development Goals, Pharmaceutical manufacturing

**RA-86**

**THE SILENT THREAT: MISUSE OF OVER-THE-COUNTER (OTC) DRUGS**

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OTC—over-the-counter drugs are the type of medications that a patient can purchase without a prescription. They are also called self-medication drugs or non-prescription drugs. OTC drugs are the most convenient and are majorly used by many patients by their own. OTC drugs are safe and effective when used in recommended doses but cause severe effects on health when misused and inappropriately consumed. Many patients prefer OTC drugs because they are less expensive than prescription drugs. The main objective involved is to determine the safety, cost-effectiveness, and harmful effects on the body of OTC drug misuse it is a 'silent threat '. It also includes the proper guidance regarding the use of OTC drugs for the patients. The methodology mainly includes this policy review, which was conducted using the case reports, healthcare databases, clinical studies, and some other proposed guidelines. OTC drug misuse will cause adverse drug reactions, drug interactions, polypharmacy issues, and decreasing of the disease resistance of the body. The patient thought OTC drugs were less expensive, but they will cause the high expense in the form of hospitalizations. Thus, it can be concluded by saying that getting proper knowledge about the drug can minimize the misuse and also other effects. Pharmacists are also to be involved in proper guidance by educating, counselling the patients and clear labelling. While OTC drugs are crucial in health care but their misuse causes threat. Misuse also causes the abuse, it silently kills the lives.

**Keywords:** OTC drugs, Misuse, Prescription drugs, polypharmacy.

**RA-87**

**ONE NATION, ONE DRUG LAW: TOWARDS AN AI POWERED UNIFIED REGULATORY FRAMEWORK FOR INDIA'S PHARMACEUTICAL FUTURE**

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The Drugs and Cosmetics Act of 1940, and later changes, regulate India's pharmaceutical sector, which is one of the largest in the world. However, enforcement varies greatly by state, resulting in fragmented licensing processes, various inspections, and variable compliance standards. This regulatory patchwork causes duplication of effort, slows drug approvals, and imposes barriers for manufacturers and healthcare providers. Most significantly, it jeopardizes patient safety and undermines India's goal of becoming a truly global pharmaceutical leader. In recent years, India has embraced comprehensive policy reforms including One Nation, One Tax (GST) and One Nation, One Health ID. On a similar note, the concept of "One Nation, One Drug Law" has arisen as a futuristic yet practicable approach. The Idea of "One Nation, One Drug Law" provides a cohesive and cutting-edge regulatory framework to fill in these gaps. Artificial Intelligence (AI) integration has the ability to completely overhaul pharmaceutical governance in India in line with the era of digital transformation. By eliminating redundancy and improving patient safety, AI-powered solutions can facilitate automated inspections, intelligent single-window licensing, transparent approval processes, and predictive analytics for pharmacovigilance. By simplifying procedures, educating stakeholders with real-time data-driven insights, and empowering industry, regulators, and patients with efficiency, transparency, and trust, such an AI-driven framework can revolutionize drug regulation. This paper explores global harmonization models (USFDA, EMA, ICH), identifies gaps in India's current system, and proposes how AI technologies can transform regulatory practices to build a resilient, unified, and patient-centric pharmaceutical future for India.

**Keywords:** AI in Pharma Regulation, One Nation One Drug Law, Unified Framework, Digital Transformation

**RA-88**

**THE IMPACT OF OVER-THE-COUNTER DRUG USAGE ON HEALTH IN KORREMULA, TELANGANA: A COMMUNITY-BASED STUDY**

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Over-the-counter (OTC) drugs are widely used for self-medication, offering convenience for minor ailments but posing risks of misuse, side effects, and long-term health impacts. This community-based study aimed to assess the prevalence, patterns, awareness, and health implications of OTC drug use among residents in Korremula, Telangana, to inform public health strategies for safer practices. A cross-sectional survey was conducted with 420 participants, using a structured questionnaire to collect data on demographics, OTC usage, risk awareness, and regulatory opinions. Descriptive statistics summarized distributions, while inferential tests (t-test, chi-square, ANOVA) analyzed associations. Results showed a high OTC use prevalence (83.8%), predominantly among young adults (52.5% aged 18-25) and graduates (60.2%). Painkillers (85.2%) were most common for headaches (62.1%) and fever (56.4%), with rare frequency (71.4%). Pharmacies were the primary purchase location (98.8%), and 53.3% always consulted pharmacists. Awareness of side effects was 74.8%, but 26.4% experienced them, and 76.7% believed in long-term risks. Strong support existed for pharmacists' educational role (97.4%) and stricter regulations (93.6%). The findings indicate widespread but cautious OTC use, with vulnerabilities in health literacy among less educated groups. Compared to literature, usage aligns with urban Indian trends but highlights rural risks like antibiotic misuse. Recommendations include enhanced pharmacist training, public awareness campaigns, and regulatory enforcement to mitigate misuse and promote safe self-medication in similar communities.

**Keywords:** OTC drugs, side effects.

**RA-89**

**DIGITAL TRANSFORMATION IN DRUG REGULATORY AFFAIRS: LEVERAGING AI AND BLOCKCHAIN**

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The pharmaceutical industry is rapidly embracing digital transformation, creating new Block chain are transforming this landscape. AI enhances regulatory operations through automated data analysis, dossier preparation, and early detection of adverse drug reactions, supporting proactive pharmacovigilance. Natural Language Processing (NLP) further streamlines handling of large regulatory documents. Block chain ensures secure, transparent, and tamper-proof data management across the drug lifecycle, providing traceability in clinical trials, manufacturing, and post-marketing surveillance. Integrating AI with Block chain combines predictive analytics with immutable data sharing, enabling faster and more reliable regulatory decisions. This poster highlights their applications, benefits, and challenges, demonstrating how these technologies can modernize compliance, strengthen patient safety, and align India's pharmaceutical sector with global standards. Opportunities and challenges for Drug Regulatory Affairs (DRA) in ensuring compliance, safety, and transparency. Traditional regulatory processes often face delays and inefficiencies due to manual errors and the complexity of managing large clinical, manufacturing, and safety datasets. Emerging technologies like Artificial Intelligence (AI) and

**Keywords:** Artificial Intelligence, Blockchain, Drug Regulatory Affairs, Pharmacovigilance, Compliance, Digital Transformation, Pharma 4.0.

**RA-90**

**ASSESSMENT OF VITAL HEALTH PARAMETERS: A COMMUNITY SURVEY**

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A health screening and survey camp was conducted, to assess the vital health parameters among community members and to promote




ISBN: 978-81-980623-8-3

preventive healthcare awareness. The camp included 100 participants who underwent basic health assessments such as blood pressure, blood glucose, blood group, height, weight, oxygen saturation ($SpO_2$), and body temperature. The primary aim was to identify potential health risks, particularly lifestyle-related disorders, and to provide guidance for early management. The survey results indicated varied health conditions across participants. Blood pressure measurements revealed a mix of normal, pre-hypertensive, and hypertensive cases, highlighting the silent burden of hypertension. Blood glucose screening identified several individuals with elevated levels, suggesting possible pre-diabetes or diabetes. $SpO_2$ levels were generally within the normal range, with few borderline cases. Analysis of height and weight indicated both underweight and overweight conditions, reflecting nutritional imbalances and risks of obesity-related diseases. Blood group data was systematically recorded, serving as an essential reference for future healthcare needs. The health camp not only enabled the early detection of health concerns but also emphasized the importance of regular monitoring and lifestyle modification. Counseling sessions focused on balanced diets, physical exercise, and periodic check-ups to prevent complications. The findings underscored the relevance of localized health surveys in strengthening community health and raising awareness about preventable diseases. This initiative demonstrated that periodic assessment of vital health parameters is a valuable tool for improving community well-being and fostering a culture of preventive healthcare.

**Keywords:** Health Screening, Vital Parameters, Blood Pressure, Blood Glucose, Preventive Healthcare.

**RA-91**

## REGULATORY APPROVAL PATHWAYS FOR ORAL GEL IN THE MANAGEMENT OF CHEMOTHERAPY-INDUCED ORAL MUCOSITIS

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Different countries have their own rules when it comes to approving medical products, while the ICH works on creating harmonized guidelines to bring everyone on the same page. In this project, we focused on a new oral mucoadhesive gel with herbal ingredients, designed to help patients suffering from oral mucositis caused by chemotherapy. Since this condition is painful and affects quality of life, finding the right approval pathway for such a product is important. Interestingly, in India, the EU, and the US, this product is treated as a medical device rather than a traditional drug. To understand the approval process, I reviewed the official regulatory websites—CDSCO (India), EMA (EU), and USFDA (US). The goal was to compare how each region classifies such a product, what kind of studies or documents they expect, and what post-approval checks are required. India: Follows the Medical Device Rules (2017). Approval involves registration, clinical evaluation, and licenses such as Form MD-14/15. EU: Regulated under MDR 2017/745. Requires CE marking, a Notified Body review, and clinical evidence. US: FDA may ask for a 510(k) submission (if a similar product exists) or a De Novo classification. In some cases, extra clinical safety data is needed because of the herbal composition. Even though the core principles are harmonized, the exact routes differ—India uses its Medical Device Rules, the EU follows MDR 2017/745, and the US depends on FDA pathways like 510(k) or De Novo. Understanding these regional differences helps ensure faster approval and, most importantly, quicker access for patients who need relief from chemotherapy-related oral mucositis.

**RA-92**

## GLOBAL REGULATORY LANDSCAPE FOR HERBAL PRODUCTS: A TRI-REGIONAL COMPARISON BETWEEN INDIA, UNITED STATES AND EUROPEAN UNION

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The global demand for herbal products has risen markedly over the past two decades, driven by a preference for natural and plant-based therapies. Despite this growth, regulations governing herbal medicines remain fragmented and region-specific, creating challenges for international trade, product development, and consumer protection. This study provides a comparative analysis of regulatory frameworks in India, the United States (US), and the European Union (EU) to identify gaps and opportunities for harmonization. In India, herbal products are regulated as classical or proprietary medicines under the Drugs and Cosmetics Act, 1940, by the Ministry of AYUSH and CDSCO. The US Food and Drug Administration (FDA), under the Dietary Supplement Health and Education Act (DSHEA), treats most herbal products as dietary supplements, with minimal pre-market requirements. In contrast, the EU employs a two-tiered approach through traditional use registration and full marketing authorization as per Directive 2004/24/EC, overseen by the EMA and national authorities. Using a qualitative comparative methodology, this research evaluates product registration, GMP compliance, safety and efficacy data, labeling norms, and post-marketing surveillance. The findings highlight the need for global regulatory convergence, standardized herbal monographs, and robust pharmacovigilance systems to ensure quality, safety, and innovation.

**Keywords:** Herbal products, Regulatory frameworks, AYUSH, FDA, EMA and Tri-regional comparison

**RA-93**

## THE FUTURE OF PHARMACEUTICAL SUBMISSIONS: TRENDS IN COMMON TECHNICAL DOCUMENT (CTD) DOSSIERS

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Ensuring a novel medicine has been successfully and safely used for human purpose is a meticulous journey through stringent trials and regulatory approvals. Once the extensive information gleaned from both animal and human trials is amassed, the next step involves crafting a New Drug Application. These applications, although universally essential, have historically varied in structure and content across different regions, posing challenges during review and potentially risking the omission of crucial insights. To harmonize this process, global initiatives like the International Conference on Harmonization (ICH) have emerged, birthing standardized frameworks such as the Common Technical Document (CTD). This blueprint, embraced by major regions including Japan, European Union, and United States, aims to streamline the submission process. In Southeast Asia, the ASEAN Common Technical Document (ACTD) serves a similar purpose. In our digital age, transition to the electronic Common Technical Document (eCTD) marks a pivotal advancement. Spearheaded through the ICH M2 Expert Group's efforts, this digital counterpart promises cost efficiencies, reduces reliance on paper, and enhances the overall efficacy of drug application assessments worldwide. In essence, these standardized formats not only simplify the regulatory journey but also ensure that every vital piece of information finds its place, safeguarding the thorough evaluation of novel human medicinal products.

**Keywords:** ICH, CTD and eCTD.

**RA-94**

## COMPARATIVE COST ANALYSIS OF DIFFERENT BRANDS OF ANTIBIOTICS IN RURAL AREAS

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Pharmaceutical formulations are available in a wide range of prices, with large differences in price around the world. The Indian pharmaceutical market is also one of these universal trends. The price variation of drugs shows a large impact on the economy. Antibiotics are a class of medications used to treat bacterial infections. Since this world population often faces a wide range of bacterial infections, the majority of prescriptions contain antibiotics. Even though bacterial infections are once-in-a-while events, antibiotics can change the economy of the pharmaceutical industry. The cost of different brands of commonly prescribed antibiotic drugs was sorted by market study in the latest edition of CIMS. The cost ratio and percentage cost variation of a variety of Indian brands were calculated in INR. Although price control has been




ISBN: 978-81-980623-8-3

implemented, brand price variations still exist widely for antibiotics. Wide price variations are observed between branded and generic antibiotic drugs even after the implementation of DPCO (2013). On comparing the prices of drugs under DPCO control, it was found that the maximum market price of the drugs considered was higher than the ceiling prices recommended by the National Pharmaceutical Pricing Authority.

**Keywords:** Antibiotics, Comparative cost analysis, Price variation, Indian pharmaceutical market

**RA-95**

## ASSESSMENT OF LEARNING STYLE PREFERENCES AMONG PHARMACY STUDENTS

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Pharmacy education is inherently demanding as it is in a field that is ever and fast changing. It requires students to assimilate large volumes of information and develop practical skills within a relatively short timeframe. Understanding the Pharmacy students' learning preferences is crucial for optimizing teaching strategies and improving educational outcomes. Fleming and Mills developed the VARK model.1 It categorizes learners based on their preferred sensory modalities: visual (V), aural (A), read/write (R), and kinesthetic (K). The VARK questionnaire is a widely used tool that helps identify these preferences and has been applied in numerous studies to explore learning styles among medical students worldwide. Learning preferences can be unimodal, where a student predominantly uses one sensory modality, or multimodal, where two (bimodal), three (trimodal), or all four (quadmodal/tetramodal) modalities are used in combination. Aim & Objective: This study aimed to assess the learning style preferences of Pharmacy students using a visual, aural, read/write and kinesthetic (VARK) questionnaire. Materials and Methods: The VARK questionnaire was distributed to 90 first year Pharmacy students after they were informed about the study and its purpose. No personally identifiable points except the gender data, were collected. The questionnaires were collected and analyzed. Those questionnaires which are fully completed were analyzed. Results: Out of the 90 students enrolled, 90 students filled and returned the questionnaires. The unimodal learning preference was more prevalent. Among the unimodal learning kinesthetic modality or 'learning by doing' was found to be the most preferred one. Conclusion: Of the 90 enrolled students, 90 valid responses were analyzed. The majority demonstrated a preference for unimodal learning styles, with kinesthetic learning being the most popular modality. The study findings have implications for tailoring Pharmacy education to meet students' needs.

**RA-96**

## HUMAN ETHICS IN CLINICAL TRAILS

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Clinical trials are the cornerstone of advancing medical knowledge, ensuring safety and efficacy of new drugs and interventions. However, the ethical dimensions of involving human participants remain a critical concern. Human ethics in clinical trials emphasizes safeguarding the dignity, rights, and welfare of participants while balancing the pursuit of scientific progress. The principles of autonomy, beneficence, non-maleficence, and justice form the ethical foundation for conducting trials. Informed consent is a key requirement, ensuring that participants fully understand the purpose, risks, and benefits of a study before enrolling. Ethical review boards, such as Institutional Ethics Committees (IECs) or Institutional Review Boards (IRBs), play a central role in overseeing trial design, risk assessment, and participant protection. Furthermore, transparency in reporting results and adherence to Good Clinical Practice (GCP) guidelines are essential to uphold trust in the research process. Vulnerable populations, including children, elderly individuals, and those with limited decision-making capacity, require additional safeguards to prevent exploitation. Recent advances, such as digital consent and remote monitoring, present both opportunities and ethical challenges that demand ongoing discussion. Ultimately, integrating ethical principles into every stage of clinical research not only protects participants but also enhances the credibility and societal acceptance of scientific discoveries. The future of clinical trials must continue to align scientific rigor with unwavering respect for human rights, ensuring that progress in medicine remains both innovative and ethically responsible.

**Keywords:** Ethics, Clinical Trials, Informed Consent, Integrity, Safeguards.

**RA-97**

## REGULATORY CHALLENGES AND FUTURE PATHWAYS FOR SOFTWARE AS A MEDICAL DEVICE (SAMD) IN INDIA: MODELLING APPROACHES FROM THE USFDA, EMA AND PMDA

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Software as a Medical Device (SaMD) refers to standalone software designed to perform medical functions such as diagnosis, monitoring, and treatment support without being part of a hardware device. The rapid integration of digital health technologies, particularly artificial intelligence (AI) and machine learning (ML), has expanded the role of SaMD in enhancing healthcare accessibility, efficiency, and precision. Global regulators, including the U.S. Food and Drug Administration (USFDA), the European Medicines Agency (EMA), and the Pharmaceuticals and Medical Devices Agency (PMDA), have introduced structured, risk-based frameworks that focus on classification, clinical evaluation, cybersecurity, and lifecycle oversight to ensure both safety and innovation. In India, SaMD is regulated under the Medical Devices Rules (MDR) 2017, which primarily address hardware devices and lack provisions tailored to evolving software technologies. This creates challenges such as regulatory ambiguity, approval delays, insufficient expertise in SaMD evaluation, limited post-market surveillance, and inadequate guidance for AI/ML-driven systems. As digital health initiatives like the Ayushman Bharat Digital Mission gain momentum, addressing these regulatory gaps becomes crucial to safeguard patient safety and foster innovation. This study critically evaluates India's current SaMD regulations and compares them with international frameworks established by the USFDA, EMA, and PMDA. Through systematic review and comparative analysis, it identifies gaps and proposes a future SaMD-specific pathway for India. Findings are expected to support harmonisation with global best practices, enhance regulatory clarity, and strengthen India's position in the global digital health ecosystem.

**Keywords:** Software as a Medical Device, Regulatory challenges, Digital health, Global harmonisation, Innovation.

**RA-98**

## PERSPECTIVES TO STRATEGIC PLANNING IN HEALTHCARE ORGANIZATIONS

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Strategic planning is a critical component in the management and long-term success of healthcare organizations. This research article explores the framework, implementation and impact of strategic planning within healthcare. A comprehensive review of current practices and organizational outcomes, the study highlights on strategic planning helps healthcare institutions align their mission, vision and operational goals with the rapidly evolving healthcare landscape. New solutions can support the management of data overload and the shortage of qualified staff. However, the timely and effective integration of these new tools in the healthcare setting poses challenges and requires guidance viz. Stakeholder engagement, environmental analysis, resource allocation and performance evaluation were examined to understand their roles in formulating effective strategies. The studies indicate that robust strategic planning not only improves organizational efficiency and service quality but also enhances adaptability to policy changes,




ISBN: 978-81-980623-8-3

technological advancements, and patient needs. The article concludes with recommendations for integrating strategic planning into the core management processes to ensure sustainable growth and improved healthcare delivery. This study aims identify potential knowledge gaps and unexplored areas in strategic planning, organizational performance, and its relationship. Findings suggest that healthcare organizations that adopt a structured and participatory approach to strategic planning tend to demonstrate improved adaptability, efficiency, and patient-centered care outcomes.

**Keywords:** Strategies, perspectives, management, healthcare, robust, implementation.

**RA-99**

**KNOWLEDGE AND ATTITUDES TOWARD EVIDENCE-BASED MEDICINE (EBM): A SURVEY**

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Evidence-Based Medicine (EBM) is a crucial approach in modern healthcare, integrating the best available research evidence with clinical expertise and patient values to ensure effective decision-making. Despite its growing importance, the knowledge and perception of EBM among healthcare students remain variable. This study aims to evaluate the knowledge, awareness, and attitudes of healthcare students toward EBM. A cross-sectional, questionnaire-based survey will be conducted among undergraduate and postgraduate students from various healthcare disciplines, including pharmacy, medicine, and nursing. The survey will assess students' understanding of EBM concepts, their perceived importance of EBM in clinical practice, and barriers to its implementation in education and practice. Data will be analyzed using descriptive and inferential statistics to identify knowledge gaps and attitude trends. The findings are expected to highlight the need for integrating EBM more effectively into healthcare curricula, thereby equipping future professionals with skills to deliver evidence-based care.

**RA-100**

**THE CHANGING ROLES OF PHARMACISTS IN COMMUNITY PHARMACIES: PERCEPTION OF REALITY IN INDIA**

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Pharmacy practice is undergoing significant transformation worldwide, with community pharmacists emerging as essential healthcare providers beyond their traditional role of dispensing medicines. In India, community pharmacies are often the first point of contact for patients, especially in semi-urban and rural areas, due to accessibility and affordability. However, the professional role of pharmacists in these settings remains underutilized, with a persistent gap between potential contributions and current practice. This thesis explores the changing roles of pharmacists in Indian community pharmacies and examines the perception of these roles in reality. It highlights key areas where pharmacists can contribute, including patient counseling, promotion of rational drug use, pharmacovigilance, chronic disease management, and public health initiatives. A survey-based approach is employed to assess the perceptions of pharmacists, patients, and other healthcare professionals regarding the evolving responsibilities of community pharmacists. Findings are expected to reveal discrepancies between the recognized scope of pharmacy practice and its actual implementation in community settings. Factors such as lack of regulatory enforcement, limited public awareness, inadequate training, and economic pressures are likely to be identified as major barriers. The study emphasizes the need for policy reforms, continuous professional education, and stronger integration of pharmacists into the healthcare system to optimize their role in improving patient outcomes. By addressing both the perceptions and realities of pharmacy practice, this research underscores the importance of redefining the role of community pharmacists in India to align with global standards and meet the growing healthcare demands of the population.

**RA-101**

**SURVEY-BASED ASSESSMENT OF KNOWLEDGE, ATTITUDE, AND PRACTICES OF SELF-MEDICATION AMONG PHARMACY STUDENTS IN NAGPUR REGION**

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This study evaluates the awareness, perception, and practices of self-medication among pharmacy students in the Nagpur region. A descriptive cross-sectional survey was conducted among 183 students using a structured questionnaire to assess their knowledge, sources of medicines, reasons for self-medication, and associated health risks. The findings revealed that 94% of students were aware of self-medication and 70% admitted to practicing it, primarily for minor ailments such as fever, cold, acidity, and allergies. Allopathic medicines were the most preferred due to their quick relief, with antacids, analgesics, anti-allergic drugs, and antibiotics being the most frequently used. Easy availability of medicines from nearby retail pharmacies, convenience, cost savings, time constraints, and prior knowledge of drugs were the key factors encouraging self-medication. However, concerns such as incorrect self-diagnosis, adverse drug reactions, antibiotic resistance, and drug interactions were evident, with over 40% of respondents acknowledging that self-use of prescription medicines is irrational. The study also highlighted an increase in self-medication practices in the post-COVID era, driven by limited healthcare access during the pandemic. These findings emphasize the need for stronger health education, stricter regulations, and pharmacist-led awareness programs to promote safe and rational drug use while minimizing the potential risks associated with self-medication.

**Keywords:** Self-medication, Perception, Prescription Medicines, Antibiotic Resistance

**RA-102**

**REGULATORY GUIDELINES AND QUALITY CONSIDERATIONS FOR OPHTHALMIC DRUG DELIVERY SYSTEMS**

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Ophthalmic drug delivery systems (ODDS) present unique formulation and regulatory challenges due to the sensitivity of ocular tissues, the need for sterility, and the diversity of dosage forms including solutions, suspensions, emulsions, ointments, and novel delivery platforms. Regulatory agencies such as the U.S. FDA, EMA, and ICH have developed comprehensive guidelines addressing the quality, safety, and efficacy requirements of these products. Key considerations include sterility assurance, preservative efficacy, container-closure integrity, extractables and leachables (E&Ls), particulate matter control, and in vitro release testing. Recent regulatory updates also emphasize risk-based approaches for establishing product equivalence, especially for generic ophthalmic products, and recognize the role of in vitro and physicochemical characterization in lieu of extensive clinical trials in some cases. This article provides a consolidated review of current global regulatory requirements and quality expectations for ophthalmic drug delivery systems, highlighting evolving trends and critical quality attributes (CQAs) essential for product approval and lifecycle management.

**Keywords:** Ophthalmic drug delivery systems, regulatory guidelines, sterility, extractables and leachables, in vitro release, FDA, EMA, ICH, preservative efficacy, container-closure system, generic ophthalmics, quality considerations

**RA-103**

**ASSESSMENT OF CLINICAL PHARMACIST-LED TELEPHONIC INTERVENTION IN PATIENT CARE**

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ISBN: 978-81-980623-8-3

NCD patients need long clinical follow-ups to manage their condition. Many patients usually have multiple queries, which has to be addressed. Clinical pharmacist-led telephonic intervention possess huge potential in fulfilling these gaps. To assess the impact of clinical pharmacist-led telephonic intervention in patient's health-related quality of life. A prospective interventional study is carried out in tertiary care hospital, for 6-months. Patients with atleast one chronic condition & visiting the study site are included, after obtaining written consent. Patient's medical record data, contact details and other necessary information were collected. Clinical pharmacist-led telephonic intervention was initiated on weekly basis based on patient's needs. Heath-related quality of life Assessments were performed using EQ-VAS tool at baseline, 2nd week, and 4th week. The data obtained was analysed using descriptive-statistics. A total of 192-patients were enrolled in the study. Among these, 67% were over 50 years old, and 45% were illiterate. The majority were suffering from various health issues: 27% had hypertension, 43% had diabetes, 13% had asthma, and 17% had other conditions. Among them, 72.5% of patients received individualized counseling through telephone intervention. Furthermore, 23% requested information regarding medication use, while 2% inquired about myths and facts related to drugs during their phone consultations. At baseline, the average Health-Related Quality of Life (HRQoL) score was 75%. Follow-up HRQoL measures indicated improvements of 87% and 92%, respectively. Clinical pharmacist-led telephonic intervention have huge impact on patient's health-related quality of life and enhances the quality of patient care.

**Keywords:** telephonic intervention, clinical pharmacist, quality of life.

**RA-104**

**REGULATORY AFFAIRS IN PHARMACY PRACTICE**

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Regulatory affairs in pharmacy practice play a critical role in ensuring the safety, efficacy, and quality of pharmaceutical products while facilitating their development, approval, and market access. This explores the multifaceted responsibilities of regulatory affairs professionals in navigating complex regulatory frameworks, including compliance with guidelines set by agencies such as the FDA, EMA, and WHO. Key functions include overseeing drug development processes, preparing and submitting regulatory dossiers, and ensuring adherence to good manufacturing practices (GMP) and pharmacovigilance standards. The integration of regulatory strategies in pharmacy practice enhances patient safety by ensuring that medications meet rigorous standards before and after market entry. Furthermore, the evolving landscape of global regulations, including advancements in personalized medicine and biologics, underscores the need for continuous education and adaptability among pharmacy professionals. This highlights the pivotal role of regulatory affairs in bridging pharmaceutical innovation with public health, emphasizing its impact on optimizing therapeutic outcomes and maintaining trust in healthcare systems.

**Keywords:** Regulatory Affairs, Pharmacy Practice, Drug Development, Compliance, FDA, EMA, WHO, Good Manufacturing Practices (GMP), Pharmacovigilance, Patient Safety, Regulatory Dossiers

**RA-105**

**GLOBAL PERSPECTIVES ON ANTIVIRAL DRUG REGULATION: A COMPARATIVE ANALYSIS**

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This review presents a comparative examination of the regulatory frameworks, patent legislation, and pricing strategies related to antiviral medications in North America, Europe, Asia, and Africa. The review analyzes how these factors affect the accessibility and cost of antiviral treatments, exploring the intricacies of drug approval processes, the implications of intellectual property rights, and the various pricing strategies utilized by pharmaceutical companies. The review examines case studies, including the effective implementation of HIV/AIDS medications in Africa and the obstacles encountered by low-income nations, to underscore the inequalities in drug accessibility and the influence of governmental and private sector agreements. Additionally, it recommends optimal practices and legislative measures designed to align legislation to enhance access while reconciling innovation incentives with public health requirements. The findings highlight the essential need for a unified global approach to improve the accessibility of antiviral medications, hence fostering superior health outcomes globally. This review is a significant resource for policymakers, public health practitioners, and scholars focused on pharmaceutical control and global health.

**Keywords:** Antiviral medications, Drug acceptability, Regulatory Frameworks and pricing strategies.

**RA-106**

**FROM PRACTICE TO PERFORMANCE: PERCEPTIONS AND PRELIMINARY VALIDATION OF MOCK EXAMINATIONS FOR GPAT READINESS**

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Mock examinations are widely adopted for Graduate Pharmacy Aptitude Test (GPAT) preparation in India. However, empirical evidence on their effectiveness and predictive value for actual GPAT/NIPER outcomes remains limited, indicating a significant research gap. This mixed-methods study aimed to describe pharmacy students' perceptions of the MEDHA Quiz and National Mock GPAT programs, and conduct a preliminary validation of mock-test performance against actual GPAT/NIPER results in a subset of participants. A mixed-methods design, combining a cross-sectional survey with an exploratory correlational pilot analysis, was employed. Approximately 400 Indian pharmacy graduates participating in the 2024 MEDHA Quiz and National Mock GPAT programs provided feedback. An outcomes subset of around 50 participants was used for validation. Key measures included Likert-scale perceptions (usefulness, confidence gained, stress-management, content alignment) and open-ended feedback for thematic analysis. Quantitative analysis included descriptive statistics, reliability (Cronbach's alpha), and Spearman correlations between mock and actual GPAT/NIPER ranks. Preliminary findings indicate predominantly positive perceptions among participants regarding the overall organization, relevance of questions, and accessibility of the technology used in both mock examination formats. The mock examinations also demonstrated an early predictive signal for GPAT readiness. Structured mock examinations and quizzes are well-received by pharmacy students and show promising preliminary predictive validity for GPAT readiness. Further larger, multi-institutional studies are warranted to confirm these findings and inform curriculum integration and targeted remediation strategies.

**RA-107**

**INNOVATIVE ERADICATION POLICY OF COUNTERFEIT DRUGS IN INDIA**

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The widespread circulation of counterfeit drugs presents a severe challenge to India's healthcare system, pharmaceutical industry, and regulatory infrastructure. With India being one of the largest producers and exporters of generic medicines, the presence of fake or substandard drugs not only endangers patient lives but also undermines the global credibility of Indian pharmaceuticals. Current regulatory frameworks, including the Drugs and Cosmetics Act, 1940, and Pharmacy Act, 1948, are often inadequate in combating sophisticated counterfeiting networks that exploit gaps in the drug supply chain. This research proposes an innovative, multi-layered eradication policy aimed at eliminating counterfeit drugs through the integration of advanced technologies and robust regulatory reforms. Central to the policy is the use of blockchain technology for end-to-end drug traceability, combined with mandatory QR code labeling to empower consumers with real-time verification. Artificial intelligence and big data analytics will further enhance surveillance by detecting anomalies and predicting high-risk


ISBN: 978-81-980623-8-3

zones. A centralized e-pharmacy regulation portal will ensure transparency in online drug sales, while public-private partnerships will support nationwide awareness campaigns. The policy also emphasizes cross-border cooperation and capacity-building initiatives for regulatory bodies. Through phased implementation across states, the policy envisions an 80–90% reduction in counterfeit drug circulation within three years. This paper concludes that a technology-driven, collaborative, and transparent approach is essential to safeguard public health, uphold legal accountability, and restore confidence in the Indian pharmaceutical supply chain.

**Keywords:** counterfeit, eradication, Artificial intelligence, Blockchain technology

**RA-108**

## GLOBAL DRUG DEVELOPMENT - CURRENT TRENDS, CHALLENGES AND OPPORTUNITIES

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The global drug development journey—often a 12- to 18-year odyssey costing well over a billion dollars—continues to evolve under the influence of major industry forces, with leading pharmaceutical companies such as Roche, Johnson & Johnson, Merck & Co., Pfizer and Novartis driving projected R&D investments by 2026. Alongside this, the global CRO services market, valued at $76.6 billion in 2023 and expected to reach $127.3 billion by 2028, reflects the expanding ecosystem supporting development pipelines. Today's landscape is shaped by an increased emphasis on quality, compliance, audit readiness and continuous process enhancement, supported by technological adoption, data analytics, and strengthened organisational culture. At the same time, the sector navigates persistent challenges—including the need for skilled resources, talent retention, effective SOPs, improved productivity, stronger compliance, and cost-efficient processes—while embracing opportunities for digital transformation and operational refinement. By the end of the presentation, the audience will gain a broad understanding of the global drug development industry; insight into the key trends, challenges and opportunities; appreciation of the four foundational pillars of drug development (People, Process, Technology and Partnerships); and awareness of the top emerging trends including personalised medicine, orphan drugs and new clinical trial models such as decentralized clinical trials.

**RA-109**

## ESTABLISHING A REGULATORY FRAMEWORK FOR 3D PRINTING PHARMACEUTICAL IN INDIA

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Three-dimensional (3D) printing is revolutionizing pharmaceutical manufacturing by enabling the production of personalized medicines, complex dosage forms, and on-demand drug delivery systems. As this technology rapidly advances worldwide, India faces critical challenges related to policy formulation, regulatory oversight, and ethical governance to ensure the safety, quality, and accountability of 3D printed pharmaceuticals. This study critically examines India's existing regulatory landscape, identifies key gaps in current legislation and quality assurance mechanisms, and proposes strategic measures for establishing a comprehensive national framework tailored to pharmaceutical 3D printing. A detailed comparative review was conducted using Indian regulatory references such as the Drugs and Cosmetics Act and the Medical Device Rules, alongside international guidelines from the U.S. FDA, EMA, and PMDA, supported by recent scientific literature and market developments. Special emphasis was placed on regulatory considerations involving digital file management, Good Manufacturing Practices (GMP), Quality by Design (QbD), and accountability in decentralized manufacturing models. The analysis revealed substantial regulatory deficiencies in definitions, digital data control, process validation, and product approval pathways for 3D printed drugs and bio fabricated tissues. Drawing insights from global precedents, the study recommends establishing a 3D Printing Regulatory Division within CDSCO, formulating material and process standards under the Bureau of Indian Standards (BIS), and implementing inspection and qualification systems that promote both safety and innovation. A unified, adaptive regulatory framework is essential to safeguard patients, foster innovation, and position India as a leader in advanced pharmaceutical manufacturing.

**Keywords:** 3D Printing, Quality by Design, Personalized Medicine

**RA-110**

## PHARMACEUTICAL CLEANING VALIDATION: CURRENT TRENDS AND REGULATORY UPDATES

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In pharmaceutical manufacturing, contamination and cross-contamination present serious concerns to patient safety, product quality, and regulatory compliance. To reduce these hazards and guarantee that surfaces, surroundings, and equipment are cleaned to specified, acceptable levels, strong cleaning validation procedures are crucial. A crucial component of Good Manufacturing Practice (GMP) is cleaning validation, which offers documented proof that cleaning processes are repeatable and efficient in reliably eliminating residues of cleaning agents, excipients, microbiological contaminants, and active pharmaceutical ingredients (APIs). With an emphasis on industry strategies, regulatory revisions, and analytical methodologies, this overview describes current trends in cleaning validation. In connection to their validation processes, important elements including equipment characterisation, cleaning agent selection, and cleaning method optimization—including clean-in-place (CIP), clean-out-of-place (COP), and manual cleaning—are covered. Effective contamination control emphasizes the importance of establishing scientifically supported acceptability criteria (NOEL, MACO) and validating sampling and analytical techniques (such as swab and rinse sampling). Agencies including the US FDA, EMA, and WHO have recently updated their regulations to prioritize risk-based validation, lifecycle management, and adherence to international standards. Equipment modifications, the introduction of new cleaning agents, or formulation revisions are examples of situations that call for cleaning validation. The goal is still to safeguard patient safety and product integrity while promoting ongoing quality enhancement and operational effectiveness. In the end, cleaning validation guarantees that pharmaceutical products fulfill necessary safety, identification, and purity standards, improves regulatory compliance, and lowers quality failures.

**Keywords:** Cleaning validation, Pharmaceutical manufacturing, Regulatory compliance, Cross-contamination

**RA-111**

## NAVIGATING COMPLEXITY: REGULATORY PATHWAYS FOR MODIFIED-RELEASE DRUGS IN MEXICO AND CHILE

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Modified-release (MR) dosage forms constitute a critical advancement in pharmaceutical technology, enabling controlled drug release and improved therapeutic outcomes but posing unique regulatory challenges due to their complex design and biopharmaceutical performance characteristics. In Latin America, Mexico and Chile have established distinct yet scientifically grounded frameworks for the evaluation of MR formulations. In Mexico, the Federal Commission for Protection against Sanitary Risks (COFEPRIS) requires comprehensive formulation design justification linking each excipient and polymer to the intended release mechanism, supported by risk-based quality-by-design data and validated discriminatory multi-point dissolution testing across physiological pH media. Stability studies under climatic zone IVb conditions, bioequivalence testing in accordance with NOM-177-SSA1-2013 under both fasted and fed states, and strict labelling requirements collectively ensure consistent product performance and patient safety.




ISBN: 978-81-980623-8-3

In Chile, the Institute of Public Health (ISP) mandates detailed mechanistic descriptions of release-controlling excipients, validated dissolution methods under biorelevant conditions, and rigorous stability assessments as per Norma Técnica N°129 (2023). Bioequivalence studies remain compulsory for MR products under Technical Norm 57 and Decree 123, with evaluations conducted under both nutritional states to assess potential food effects and dose-dumping risks. Despite their alignment with international regulatory principles, notable divergences persist in dossier expectations, biowaiver provisions, and acceptance of in vitro–in vivo correlations. Therefore, the objective of this review is to comparatively analyse the regulatory requirements governing modified-release dosage forms in Mexico and Chile, identify challenges, and highlight opportunities for regional harmonization and convergence with global standards.

**Keywords:** MR formulations, dose-dumping, patient safety, bioequivalence, Mexico, Chile

**RA-112**

## REGULATORY FRAMEWORK FOR HOLOGRAPHIC PHARMACEUTICALS: NEXT-GENERATION VIRTUAL QUALITY CONTROL AND DIGITAL LABELLING

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Holographic pharmaceuticals are emerging as a next-generation solution for authentication, digital labelling, and intelligent quality control in the pharmaceutical sector. By integrating holography, augmented reality (AR), and secure digital identifiers, these systems enable real-time product verification, enhance traceability, and provide dynamic patient information access through virtual interfaces. As the pharmaceutical supply chain advances toward digital transformation, holographic systems offer strong potential to combat counterfeiting, strengthen serialization, and support patient-centric labelling beyond traditional printed packaging. However, despite rapid technological progress, holographic pharmaceuticals currently operate without a clear regulatory framework. Existing guidelines issued by regulatory bodies such as the US FDA, EMA, CDSCO, and WHO primarily address conventional labelling, physical QC testing, and serialization requirements, with limited provisions for digital holograms, virtual labelling, and cloud-based verification systems. Key regulatory gaps include lack of validation criteria for AI-driven authentication, cybersecurity and data integrity requirements for holographic identifiers, standardization of electronic product information (ePI), and compliance pathways for virtual QC platforms within GMP and GDP environments. This review evaluates the regulatory readiness of global health authorities and identifies essential considerations for policy evolution. A proposed roadmap highlights the need for harmonized standards covering technology validation, risk classification, interoperability, digital audit trails, and post-market surveillance. Establishing dedicated frameworks will be critical for ensuring safety, reliability, and ethical integration of holographic pharmaceuticals into healthcare systems. The transition toward virtual QC and labelling represents a paradigm shift, requiring proactive regulatory adaptation to enable secure, transparent, and futuristic pharmaceutical governance.

**Keywords:** Holographic Pharmaceuticals, Virtual QC, Digital Labelling, Serialization, Regulatory Framework, Counterfeit Prevention.

**RA-113**

## INTELLIGENT PHARMACY INVENTORY MANAGEMENT TO PREVENT EXPIRY AND ELIMINATE MEDICAL WASTE

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Effective pharmacy inventory management is fundamental to maintaining medicine availability, preventing avoidable wastage, and ensuring sustainable healthcare delivery. In India, several studies highlight substantial accumulation of unused or expired medicines in households, retail pharmacies, and hospital settings—largely due to manual inventory practices, poor demand forecasting, and the absence of standardized expiry-tracking systems. To address these challenges, this review introduce an Intelligent Pharmacy Inventory Management System (IPIMS) that integrates artificial intelligence, machine-learning-based demand forecasting, IoT-enabled real-time stock monitoring, and automated expiry-alert mechanisms. The proposed IPIMS is designed to accurately predict medicine consumption patterns, identify slow-moving and high-risk expiry items, optimize reorder points, and enable timely redistribution or clearance of near-expiry drugs. Data collected from Indian retail and hospital pharmacies are used to train and validate the system, demonstrating improvements in forecasting accuracy, reduction in expired stock and enhanced inventory turnover. The system also contributes to national goals of digital healthcare transformation and pharmaceutical sustainability. By integrating intelligent automation with pharmacy workflows, IPIMS offers a scalable solution that strengthens supply-chain resilience, reduces medical waste and promotes responsible medicine utilization. This review underscores the potential of data-driven technologies to transform pharmacy management and aligns with broader public health priorities focused on efficiency, safety, and environmental protection.

**Keywords:** Pharmacy inventory management, Artificial intelligence, Medical waste reduction, expiry tracking system

**RA-114**

## EXPLORING DIFFERENCES IN GENERIC DRUG APPROVAL PROCESSES AND COMPARATIVE ANALYSIS OF AUSTRALIA, EUROPE AND CANADA

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Generic medicines play an increasingly vital role in enhancing global healthcare by providing safe, effective, and affordable alternatives to branded drugs. This project presents a comprehensive comparative analysis of the regulatory approval processes for generic drugs in three developed regions Australia, Europe, and Canada. The study explores key regulatory components including pharmaceutical equivalence, bioequivalence, dossier requirements, and approval timelines. Using a qualitative methodology based on regulatory publications, peer-reviewed literature, and international guidelines, the research identifies both similarities and jurisdiction-specific differences. Findings reveal that while all three regions adhere to international standards such as those set by the ICH, divergences exist in procedural frameworks, submission formats, and interchangeability policies. The study underscores the potential benefits of regulatory harmonization to streamline generic drug approvals, reduce duplication, and enhance timely access to essential medications. Recommendations are proposed to foster collaboration and improve efficiency within global regulatory environments.

**Keywords:** Generic Medicines, Regulatory Approval, Bioequivalence, Health Canada, EMA, TGA and Comparative Analysis.

**RA-115**

## PHARMACOVIGILANCE CHALLENGES IN INTRANASAL VACCINES: A COMPARATIVE PERSPECTIVE FROM CDSCO, USFDA, EMA AND ANVISA

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Intranasal vaccines have emerged as an innovative alternative to conventional parenteral vaccines due to their needle-free administration, ability to induce mucosal and systemic immunity, and improved patient compliance. These attributes make them particularly attractive during global health emergencies such as the COVID-19 pandemic. Products like Bharat Biotech's iNCOVACC in India, FluMist in the United States, and Fluenz in the European Union exemplify the growing adoption of this platform. However, the pharmacovigilance landscape for intranasal vaccines remains underdeveloped, with significant disparities in regulatory frameworks across major agencies, including the Central Drugs Standard Control Organization (CDSCO), U.S. Food and Drug Administration (USFDA), European Medicines Agency (EMA), and the Brazilian Health Regulatory Agency (ANVISA). This study




ISBN: 978-81-980623-8-3

aims to identify and compare pharmacovigilance challenges associated with intranasal vaccines across these jurisdictions. A systematic review of regulatory guidance documents, adverse event reporting systems, and post-marketing surveillance data will be conducted using official agency websites and scientific literature databases. Key parameters such as adverse event reporting trends, safety signal management, and risk management plan implementation will be analysed. Preliminary evidence indicates inconsistencies in adverse event documentation, weak post-marketing surveillance in low- and middle-income countries, and lack of harmonized guidelines tailored to intranasal vaccine platforms. The study is expected to propose strategies for strengthening pharmacovigilance systems through global harmonization, digital infrastructure enhancement, and risk communication transparency. Findings will contribute to improving safety monitoring frameworks for novel vaccine delivery systems, ultimately ensuring public trust and effective immunization programs.

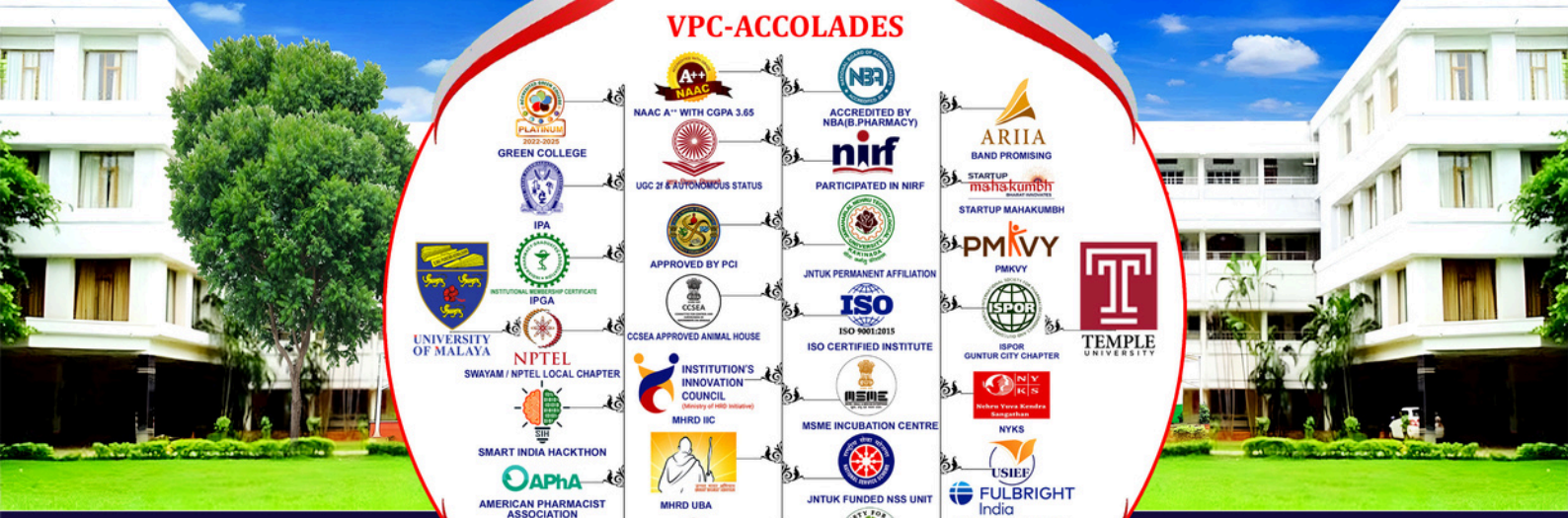
**Keywords:** Intranasal vaccines, Pharmacovigilance, Post-marketing surveillance, Regulatory harmonization; Adverse event reporting.








ISBN: 978-81-980623-8-3



## VPC-ACCOLADES

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- AMERICAN PHARMACIST ASSOCIATION
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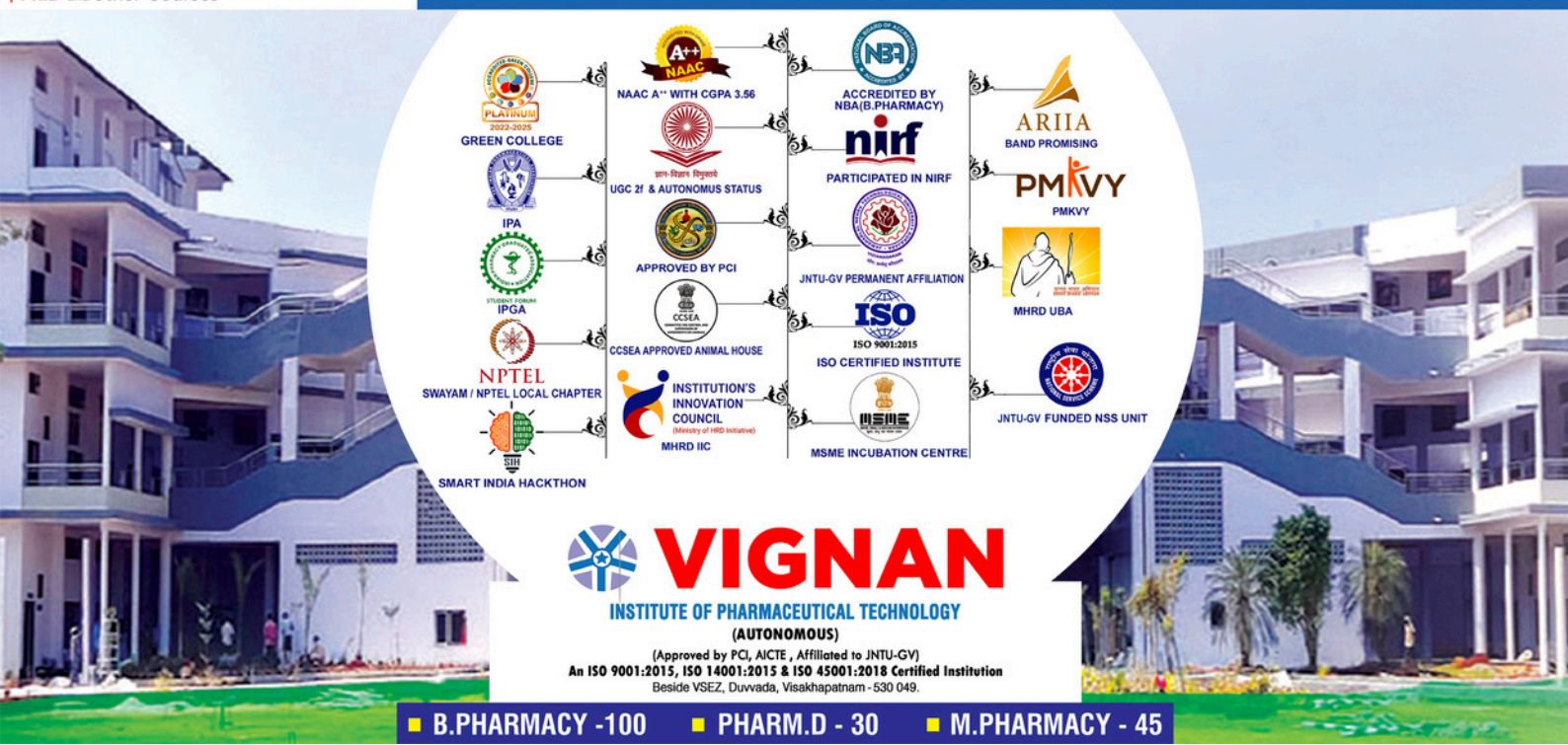

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