Conference Proceedings

KAMLA NEHRU INSTITUTE OF MANAGEMENT & TECHNOLOGY

# International e-Conference

on

# "Global Perspectives on Next-Generation Pharmaceutical Science, Technology and Healthcare"

16th & 17th October 2025

## About the Organizing Institute

Welcome to KNGI GROUP OF INSTITUTIONS

A leading institution in Uttar Pradesh in the Field of Pharmacy Education under the aegis of Kamla Nehru Group of Institutions attracts students from all over India because of its excellent academic programs and facilities.

The KNGI has been operating for more than 46 years under the auspices of Kamla Nehru Memorial Trust with outstanding experience and performance excellence.

The growth of the Institute with leaps and bounds in only three-year period provided the way to rise as a multi-faculty Institution with Commerce, Arts, Science, Law, and Education faculties at the undergraduate level and by the end of decade, the Institution had post graduate programs in 8 subjects representing the aforesaid faculties. In the advent of having a full-fledged faculty of Engineering and Technology in the year 1976, the needful initiatives were taken by the Trust and as a result of consistent efforts. It was established in 1980 as a fully financed institution by the government of Uttar Pradesh, which is presently being looked after by a separate management committee. As a result of this development, the original name as Kamla Nehru Institute of Science and Technology, has also been rechristened as Kamla Nehru Institute of Physical and Social Sciences. In the same continuity, two more institutions i.e., Kamla Nehru Krishi Vigyan Kendra in 1976 and Kamla Nehru Institute of Child Education in 1984, were established. With a dream to maintain academic excellence at par with any best institutions of the national and international repute in the country, he created a very congenial environment and the infrastructure which is essential for the purpose. In the year 2004 a full-fledged campus on 75-acre land, which falls in boundary of village of Faridipur at a distance of four kilometres from the main campus, has been established under the dynamic leadership of Shri Vinod Singh, the son and successor of the founder Late Sri. K.N. Singh to cope up the demand from a large number of students in professional and technical subjects. The new campus has got five faculties viz. a college of Pharmacy, Management Studies, Education, Agriculture, Engineering and Nursing. The new campus has got distinction bestowed with unique natural and pollution free peaceful environment on the state highway Faizabad-Allahabad bypass which also connects Lucknow, Varanasi, Allahabad & up to extreme east of. U.P.

## About the Conference

The **International Conference on "Global Perspective on Next Generation Pharmaceutical Science, Technology and Healthcare"**, organized by the **Kamla Nehru Institute of Management and Technology, Sultanpur**, is being held on **16th and 17th October 2025** through an online mode. This conference serves as a dynamic platform for academicians, researchers, healthcare professionals, and industry experts from across the globe to exchange ideas and share advancements in the field of pharmaceutical sciences and healthcare innovation.

In the rapidly evolving landscape of global health, the convergence of cutting-edge technology, modern pharmaceutical research, and innovative healthcare practices has become essential for sustainable progress. This conference aims to highlight recent developments and emerging trends that are shaping the next generation of pharmaceutical sciences—spanning areas such as drug discovery, artificial intelligence in healthcare, clinical pharmacy, patient care, regulatory science, and educational advancements in pharmacy.

The two-day event features **expert lectures, oral and poster presentations**, and interactive discussions with distinguished speakers and participants from leading institutions and organizations worldwide. By fostering collaboration and knowledge sharing, this conference aspires to inspire transformative research and innovative thinking that will redefine the future of pharmaceutical sciences and healthcare delivery on a global scale.

The organizing committee extends its warmest welcome to all delegates, presenters, and participants, and hopes that this conference will provide a meaningful and enriching academic experience for all.

## Message from the Manager

**Dear Colleagues,**

It gives me immense pleasure to that our Institute is organising 2 days online International **Conference on "GLOBAL PERSPECTIVE ON NEXT GENERATION PHARMACEUTICAL SCIENCE, TECHNOLOGY AND HEALTHCARE"**, scheduled to be held on **October 16–17, 2025**.

This international conference aims to provide a dynamic platform for academicians, researchers, industry professionals, and students to exchange their innovative ideas, share recent advancements, and discuss challenges and opportunities in the evolving fields of pharmaceutical science, technology, and healthcare.

I encourage all participants to actively engage in the scientific sessions, workshops, and interactive discussions. Take full advantage of this opportunity to connect with experts, explore new perspectives, and foster collaborations that will shape the future of healthcare and the pharmaceutical profession.

I wish the conference great success and hope it serves as an inspiring experience for all participants—enhancing knowledge, building networks, and sparking innovations.

Thank you for your support, dedication, and active participation. I look forward to witnessing fruitful deliberations and meaningful outcomes from this event.

**Sincerely,**

**Vinod Singh**
**Manager**
**Kamla Nehru Institute of Management and Technology**

**Sultanpur**

## Message from the Director

### Dear Colleagues

I am delighted to extend my warm greetings to all participants of the **International Conference on *"GLOBAL PERSPECTIVE ON NEXT GENERATION PHARMACEUTICAL SCIENCE, TECHNOLOGY AND HEALTHCARE"***, scheduled to be held on **October 16–17, 2025**, organized by the Kamla Nehru Institute of Management and Technology, Sultanpur.

This conference aims to serve as a dynamic platform for academicians, researchers, healthcare professionals, and students to exchange ideas, share cutting-edge research, and discuss the recent advancements shaping the future of pharmaceutical sciences and healthcare technologies. The pharmaceutical sector is rapidly evolving with the integration of modern technologies, artificial intelligence, and innovative therapeutic strategies. Conferences like this not only promote interdisciplinary collaboration but also inspire young minds to explore, innovate, and contribute meaningfully to the ever-expanding field of pharmacy and healthcare.

I encourage all participants to actively engage in the discussions, workshops, and technical sessions. Such academic interactions play a vital role in nurturing critical thinking, fostering global partnerships, and driving scientific innovation.

I wish this conference grand success and hope that the deliberations and outcomes will inspire new perspectives and research directions for the betterment of global healthcare.

**Sincerely,**

**Prof. (Dr.) Mahesh Prasad**
**Director**
**Kamla Nehru Institute of Management and Technology**
**Faculty of Pharmacy**
**Faridipur, Sultanpur**

## Organising Committee

**Hon'ble Shri Vinod Singh**
**(PATRON)**
**Manger KNGI**
**(MLA Sultanpur and Ex-Minister U.P. Govt.)**

**Prof. (Dr.) Mahesh Prasad**
**(Convenor)**
**Director**

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Mr. Kripa Shankar Yadav

# *Program Schedule*

## 16th October 2025

**INAUGURAL SESSION**

**10:00AM- 11:00AM**

**ADDRESS BY CONVENOR**

**Prof. Dr. Mahesh Prasad**

Director, Kamla Nehru Institute of Management and Technology, Sultanpur

**ADDRESS BY CHIEF GUEST**

***Dr. Piyush Khare***

Senior Scientist, Drug Regulations

**SCIENTIFIC SESSION**

**ORAL PRESENTATION**

**12:00PM – 02:00PM**

**POSTER PRESENTATION**

**02:00PM – 04:00PM**

## 17th October 2025

**EXPERT TALK BY RESOURCE PERSON**

**10:00AM- 11:00AM**

***Dr. Vijay Walia***

Sr. Program Director (CDx), Quest Diagnostics, Fedrick, MD, USA

**11:00AM- 12:00PM**

***Dr. Shashank Kumar Singh***

Senior Principal Scientist, Pharmacology Division, CSIR - Indian Institute of Integrative Medicine, Jammu

**02:00PM- 03:00PM**

***Dr. Ravikant M***

D2L Pharma Research Solutions Private Limited, Netherlands, Europe

**03:00PM- 04:00PM**

***Dr. Sourabh Kosey***

Professor & Head, Dept. of Pharmacy Practice, ISF College of Pharmacy, Moga, Punjab

**VALEDICTORY SESSION**

04:00PM- 04:30PM

**VOTE OF THANKS**

# SPEAKER'S BIOGRAPHY

## Dr. Vijay Walia

**Senior Program Director – Companion Diagnostics (CDx), Quest Diagnostics, USA**

**Former Lead Scientific Reviewer, U.S. Food and Drug Administration (FDA)**

It is an honor to introduce **Dr. Vijay Walia**, a globally recognized leader in **regulatory science, precision medicine, and companion diagnostics (CDx)**. With over **19 years of distinguished experience** across government, industry, and research institutions, Dr. Walia has made transformative contributions to the advancement of modern diagnostic and therapeutic integration.

Dr. Walia currently serves as **Senior Program Director for Companion Diagnostics at Quest Diagnostics (USA)**, where he leads strategic initiatives bridging regulatory, scientific, and commercial efforts in the development of **biomarker-based diagnostic assays**. His leadership ensures alignment between diagnostic innovation and global regulatory standards, accelerating patient access to precision medicine technologies.

Previously, Dr. Walia served at the **U.S. Food and Drug Administration (FDA)** as a **Lead Scientific Reviewer and Biologist**, where he played a pivotal role in evaluating and approving **innovative in-vitro diagnostic devices**, including several **COVID-19 Emergency Use Authorizations (EUAs)**. His tenure at the FDA strengthened the scientific and regulatory framework that underpins safe and effective diagnostic innovation.

Before joining the FDA, Dr. Walia held senior scientific leadership roles at **Thermo Fisher Scientific**, where he oversaw molecular assay development, regulatory submissions, and commercialization pathways for advanced life-science technologies. Earlier in his career, he conducted **pioneering cancer genomics and molecular biology research** at the **National Institutes of Health (NIH)**, USA, focusing on **oncogenic signaling pathways, p53 regulation, and next-generation sequencing technologies**.

**Dr. Shashank Kumar Singh**

**Senior Principal Scientist, Pharmacology Division**

**CSIR – Indian Institute of Integrative Medicine (IIIM), Jammu, India**

**Dr. Shashank Kumar Singh** is a distinguished scientist and research leader at the **Council of Scientific and Industrial Research (CSIR) – Indian Institute of Integrative Medicine (IIIM), Jammu**, where he serves as **Senior Principal Scientist in the Pharmacology Division**. He is widely recognized for his groundbreaking contributions to **oncology and immuno-oncology**, particularly in the discovery and preclinical development of novel anticancer agents from both **natural and synthetic sources**.

Dr. Singh's pioneering work focuses on identifying molecular inhibitors targeting critical cancer pathways—such as **PI3K/Akt/mTOR, EGFR, CDKs, and epigenetic regulators**—and validating their efficacy through **advanced in vitro and in vivo tumor models**. His research integrates **mechanistic biology**, **drug discovery**, and **translational pharmacology**, aiming to bridge laboratory innovations with clinical relevance.

He has played a key role in several national flagship programs, including the **PAN-CSIR Cancer Research Program** and the **CSIR Phytopharmaceutical Mission**, both of which emphasize developing **affordable and accessible cancer therapies** suited to the Indian healthcare landscape. Through these initiatives, Dr. Singh has contributed to multidisciplinary collaborations that unite chemists, pharmacologists, and clinicians in the shared mission of combating cancer through indigenous research and innovation.

In addition to oncology, Dr. Singh's research extends to **drug repurposing, combination therapy, and hepatoprotective pharmacology**, exploring adjunct treatments to minimize side effects of conventional therapies. He has also worked on exploring **marine and plant-based natural resources** for the identification of new bioactive compounds with therapeutic potential

**Dr. Ravikant Marella**

**Director & European Representative**

D2L Pharma Research Solutions Private Limited, Netherlands, Europe

It is a privilege to introduce **Dr. Ravikant Marella**, a distinguished professional and thought leader in the domain of pharmaceutical research intelligence, clinical market analytics, and strategic healthcare consulting. He currently serves as **Director and European Representative (UK & EU)** for **D2L Pharma Research Solutions Pvt. Ltd.**, a globally recognized life-science business intelligence and consulting organization headquartered in Bengaluru, India, with collaborative presence across Europe and the United States.

With nearly two decades of multidisciplinary experience bridging **pharmaceutical research, regulatory insight, and business strategy**, Dr. Marella has been instrumental in expanding D2L Pharma's footprint in global markets. Under his leadership, the organization has supported major multinational pharmaceutical and biotechnology firms in areas such as **Key Opinion Leader (KOL) mapping and engagement**, **competitive intelligence**, **market access strategy**, and **real-world evidence analysis**. His efforts have been pivotal in aligning data-driven research solutions with strategic decision-making for innovative drug development and commercialization.

Dr. Marella's professional interests lie in fostering the integration of **scientific innovation with translational healthcare outcomes**. Beyond his corporate responsibilities, Dr. Marella is an active contributor to global forums and professional networks in pharmaceutical management and research analytics. His insights on **data-driven decision making, regulatory harmonization, and clinical development intelligence** have been well received at international symposia and conferences. He also mentors young professionals and researchers aspiring to bridge the gap between laboratory science and market implementation.

We are delighted to welcome **Dr. Ravikant Marella** to our conference and look forward to his valuable perspectives on the integration of scientific analytics and strategic innovation in pharmaceutical research.

**Dr. Sourabh Koshey**

**Associate / Senior Faculty, Department of Pharmacy Practice**
**College of Pharmacy, Moga, Punjab, India**

It is my privilege to introduce **Dr. Sourabh Koshey**, an accomplished academic and researcher in the field of **Pharmacy Practice**, currently serving on the faculty of the **College of Pharmacy, Moga, Punjab**. Dr. Koshey is known for his committed engagement with patient-centered pharmacy care, clinical services, pharmacoepidemiology, and interprofessional collaboration.

In his capacity in the Department of Pharmacy Practice, Dr. Koshey oversees and teaches core and advanced courses in **clinical pharmacy, pharmacotherapy, medication safety, and patient counseling**. He is deeply invested in bridging the gap between classroom knowledge and real-world therapeutic practice, mentoring students to become healthcare professionals who contribute meaningfully to patient outcomes.

Dr. Koshey has led and participated in multiple institutional and community-based projects focused on **medication adherence, pharmacovigilance, clinical audit**, and **rational drug use**. His research interests include assessing drug utilization patterns, optimizing therapeutic regimens in chronic disease settings (such as hypertension, diabetes, cardiovascular disease), and evaluating the impact of pharmacy interventions in outpatient and inpatient settings.

Beyond teaching and research, Dr. Koshey is committed to professional development and remains engaged with pharmacy societies, continuing education, and community outreach programs. He strives to elevate the role of the pharmacist in direct patient care and to promote evidence-based practice within his region.

We are honored to welcome **Dr. Sourabh Koshey** to our conference. We look forward to his insights on **advancing pharmacy practice, patient-centered care, and therapeutic optimization in the Indian healthcare context**.

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Proceedings of the e-International Conference Global Perspective on Next Generation Pharmaceutical Science, Technology and Healthcare

KNIMT/2025/IC-001

# 3D Printing of Personalized Medicines: The Future of Dosage Forms

Sandhya Baranwal

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## Abstract

Three-dimensional (3D) printing has emerged as an innovative technology transforming the pharmaceutical industry by enabling the production of personalized medicines. This technique allows precise control over the size, shape, and drug release characteristics of dosage forms, ensuring therapy tailored to individual patient needs. Unlike traditional manufacturing, 3D printing provides flexibility in combining multiple drugs into a single dosage form, thereby improving patient compliance and treatment efficiency. Various printing methods, such as fused deposition modelling (FDM), inkjet printing, and stereolithography, have been successfully utilized to develop oral, transdermal, and implantable drug delivery systems. The incorporation of computer-aided design (CAD) and artificial intelligence (AI) further enhances the precision and reproducibility of formulations, facilitating on-demand drug production in clinical and hospital settings. This approach is particularly beneficial for paediatric, geriatric, and chronically ill patients requiring customized doses or multidrug combinations. Despite its enormous potential, challenges such as regulatory approval, material standardization, and quality assurance must be addressed to ensure large-scale implementation. Overall, 3D printing represents a significant step toward the future of personalized medicine, merging technology and healthcare to create patient-specific, efficient, and sustainable therapeutic solutions.

**Keywords:** *3D printing, personalized medicine, drug delivery, dosage form design, fused deposition modelling, artificial intelligence, pharmaceutical technology*

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# Smart Technologies Driving the Future of Global Healthcare

Shashwat Tiwari
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## Abstract

The pharmaceutical industry is undergoing a paradigm shift toward Pharma 5.0, an era characterized by the intelligent integration of digital transformation, automation, and human-centric innovation. Building upon the digital foundations of Industry 4.0, Pharma 5.0 aims to harmonize advanced technologies such as Artificial Intelligence (AI), Internet of Things (IoT), nanotechnology, robotics, and blockchain with ethical and sustainable healthcare practices. This study seeks to explore the global perspective of Pharma 5.0 as a transformative model in next-generation pharmaceutical sciences and healthcare. It emphasizes how innovative technologies can revolutionize drug discovery, manufacturing, distribution, and patient care while maintaining the ethical and humanistic focus of modern medicine. A systematic review and analytical synthesis of recent technological trends, scientific literature, and international healthcare models was conducted. The study evaluates the convergence of AI-driven analytics, smart nanocarriers, digital twins, and data governance systems, highlighting their roles in shaping an interconnected, efficient, and transparent global healthcare ecosystem aligning with the United Nations Sustainable Development Goals (SDGs). Findings suggest that Pharma 5.0 enhances precision medicine, real-time decision-making, and patient-specific therapeutics through intelligent automation. Smart manufacturing and blockchain-enabled supply chains ensure quality assurance, traceability, and sustainability. Furthermore, the human-centered approach of Pharma 5.0 bridges global disparities by supporting accessibility, equity, and resilience in healthcare systems. Pharma 5.0 represents a holistic integration of technology and human values, fostering a patient-centric, data-secure, and sustainably innovative healthcare paradigm. Its global adoption could redefine the future of pharmaceutical sciences by transforming challenges into opportunities for ethical and intelligent healthcare advancement.

**Keywords:** *Pharma 5.0, Artificial Intelligence, Smart Technologies, Precision Medicine, Smart Global Healthcare, Digital Transformation, Sustainable Innovation.*

Proceedings of the e-International Conference Global Perspective on Next Generation Pharmaceutical Science, Technology and Healthcare

# Development and Validation of Stability Indicating RP-HPLC and UV spectrophotometry methods for the determination of Lenalidomide in Bulk and Tablets

Ashuka Singh [1], Rohit Tripathi [1*]

[1]*Department of Pharmaceutical Chemistry, Shambhunath Institute of Pharmacy, Prayagraj*

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## Abstract

Lenalidomide is an immunomodulator with anti-angiogenic and anti-inflammatory effects. In this study, we developed green HPLC and spectrophotometric methods for determining the quantity of lenalidomide in pure and pharmaceutical forms. A very sensitive RP-HPLC method was developed to quantify lenalidomide in Lenalidomide capsule dose formulations. Samples were analyzed using reverse-phase (RP-HPLC) with a Kromasil C18 stationary phase (150 x 4.6 mm, 5.0 µm) and a mobile phase of pH 2.5 phosphate buffer and acetonitrile in a 90:10 volume/volume ratio. The flow rate is 1.0 mL/minute. The column and sample cooler temperatures were kept at 30°C and 5°C, respectively. The injection volume was 10 µL, and the wavelength was 210 nm. The new HPLC technique was validated for specificity, precision, linearity, accuracy, solution stability, and filter analysis. A validation study compared to the ICH guidelines.

**Keywords:** *Immunomodulator, Anti-angiogenic, Anti-inflammatory*

Proceedings of the e-International Conference Global Perspective on Next Generation Pharmaceutical Science, Technology and Healthcare

# Evolutions in Dry Powder Inhalers (DPIs) for Asthma Management: Emerging Technologies for Improved Formulations

Deepa Neopane[1], Poonam Kushwaha[1]*

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## Abstract

Asthma is a chronic respiratory disease characterized by airway inflammation and hyperresponsiveness, and it remains a leading global health burden. Among various therapeutic modalities, dry powder inhalation systems (DPIS) have recently emerged as an exciting advancement in asthma management. The development of DPIs has been driven by the need for better drug delivery efficiency, improved patient adherence, and reduced environmental impact. Recent advancements in DPI technology have focused on optimizing powder formulation, particle engineering, and device design to enhance aerosolization and pulmonary deposition. Novel spray-drying methods, particle-coating techniques, and nanotechnologies have enabled scientists to develop highly dispersible, stable, dry-powder formulations with desirable aerodynamic behaviour. Moreover, newer carrier-free formulations, excipient engineering, and more innovative inhalation systems integrated with the sensor are currently transforming asthma therapeutics by enabling reliable dose delivery and real-time monitoring of inhalation patterns. The latest progress in DPI technology, novel formulation strategies, and the future of asthma management are discussed in the review based on the latest developments in this field.

**Keywords**: *Dry Powder Inhalers; Asthma Management; Pulmonary Drug Delivery; DPI technology; aerodynamics; patient adherence*.

Proceedings of the e-International Conference Global Perspective on Next Generation Pharmaceutical Science, Technology and Healthcare

# Integration of Antiadhesive and Gastro-retentive Mechanisms for Targeted Gastric Drug Delivery

Janvi*, Dr. Snigdha Bhardwaj

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## Abstract

To advance next-generation pharmacy, there is a need for innovative drug-delivery approaches that improve therapeutic precision and reduce systemic side effects. This study presents a new gastro-retentive platform (GRDDS) that uniquely combines antiadhesive and floating tablet functions for targeted gastric treatment. It addresses key shortcomings of standard oral therapies for persistent gastric infections, which often fail due to quick gastric clearance and bacterial adhesion. We developed a multifunctional polymer matrix to provide extended gastric retention, controlled drug release, and selective interaction with the gastric mucosa. The formulation's antiadhesive properties are intended to prevent bacterial colonization and biofilm development, offering a localized strategy for managing pathogens. In vitro tests demonstrated excellent floating duration, adhesion capability, and sustained release. This integrated GRDDS model is a translational advance that connects pharmaceutical engineering, microbiology, and patient-focused care. By merging physical retention with active antiadhesion, it establishes a basis for a new class of intelligent oral therapeutics designed to enhance gastric health and reduce the recurrence of infections.

**Keywords:** *Gastro-retentive drug delivery, Antiadhesion, Floating system, H. pylori*.

Proceedings of the e-International Conference Global Perspective on Next Generation Pharmaceutical Science, Technology and Healthcare

# Development And Evaluation of Mouth Dissolving Tablet Alosetron Hydrochloride

**Pushpendra Kumar Tiwari*, Kiran Shukla, Jaideo Pandey**

Rajarshi Rananjay Sinh College of Pharmacy, Amethi, Sultanpur, U.P.

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## Abstract

The oral route remains the most widely accepted form of drug administration due to its convenience, non-invasiveness, and patient compliance. However, conventional solid dosage forms often pose challenges for pediatric, geriatric, and bedridden patients who have difficulty swallowing. To address these limitations, mouth dissolving tablets (MDTs), also known as orally disintegrating tablets (ODTs), have been developed as innovative dosage forms that rapidly disintegrate in the oral cavity without the need for water. MDTs provide several advantages, including improved bioavailability, rapid onset of action, and enhanced patient compliance, especially when formulated with effective taste-masking strategies. Despite these benefits, MDT formulations face challenges in mechanical strength, hygroscopicity, drug loading, and palatability. Various preparation techniques such as lyophilization, direct compression, sublimation, spray drying, and nanonization have been employed to overcome these challenges. Additionally, excipients such as super disintegrants, bulking agents, emulsifiers, and flavoring agents play a crucial role in optimizing MDT performance. Beyond dosage form innovations, inflammation remains a primary therapeutic focus, as it is implicated in a wide range of acute and chronic diseases. Understanding inflammatory pathways and the role of anti-inflammatory agents—including steroidal, nonsteroidal, and natural alternatives—highlights the growing demand for safer, more effective drug delivery systems. Collectively, MDTs represent a significant advancement in pharmaceutical technology, offering improved therapeutic efficacy and patient-centric drug administration, particularly in the management of inflammation-related conditions.

**Keywords:** *Mouth dissolving tablets, orally disintegrating tablets, Bioavailability.*

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KNIMT/2025/ IC-007

# Advances in Transdermal Drug Delivery Systems: Principles, Technologies, and Emerging Innovations

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## Abstract

Transdermal drug delivery systems (TDDS) have transformed modern therapeutics by offering a non-invasive, patient-friendly alternative to oral and injectable routes. This review examines the scientific principles, formulation strategies, and clinical relevance of transdermal patches. Key considerations include skin anatomy, barrier properties, and physiological factors influencing drug permeation. TDDS are classified into matrix, reservoir, and drug-in-adhesive systems, and manufacturing techniques such as solvent casting and hot-melt extrusion have been critically evaluated for their scalability and efficiency. Recent advancements in permeation enhancement include chemical enhancers (terpenes, fatty acids) and physical methods like microneedles and iontophoresis. Evaluation parameters, including in vitro release testing, skin irritation testing, and stability testing, are discussed in line with ICH guidelines. Clinical applications cover pain management (fentanyl), hormone therapy (oestradiol), and nicotine replacement, highlighting successful translational outcomes. Emerging innovations, such as protein-loaded patches, glucose-responsive systems, and competent thermo-responsive formulations, underscore the field's rapid evolution. While TDDS bypasses first-pass metabolism and improves patient compliance, challenges remain, including skin irritation and molecular size limitations. Integrating nanotechnology and biocompatible materials is poised to expand therapeutic possibilities, establishing TDDS as a cornerstone in next-generation drug delivery research.

**Keywords:**

*Transdermal delivery, microneedles, permeation enhancers, bright patches, protein therapeutics*.

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KNIMT/2025/ IC-008

# Solid Self-Microemulsifying Systems by Adsorption: A Lipid-Based Approach for Enhancing Oral Bioavailability of BCS Class II Drugs"

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## Abstract

The oral route remains the most preferred mode of drug administration due to its non-invasive nature, patient compliance, and cost-effectiveness. However, almost 40% of new drug candidates belong to the Biopharmaceutics Classification System (BCS) Class II, exhibiting poor aqueous solubility and dissolution-rate-limited absorption, which leads to variable pharmacokinetics and low bioavailability. Lipid-based formulations such as Self-Microemulsifying Drug Delivery Systems (SMEDDS) have gained prominence for enhancing the solubility and oral absorption of poorly soluble drugs. These isotropic mixtures of oil, surfactant, and co-surfactant form acceptable oil-in-water emulsions upon contact with gastrointestinal fluids, thereby improving dissolution and absorption. Despite these benefits, liquid SMEDDS exhibit challenges, including instability, drug precipitation, and handling difficulties. To overcome these limitations, Solid Self-Micro Emulsifying Drug Delivery Systems (S-SMEDDS) are developed by adsorbing liquid SMEDDS onto suitable solid carriers. This approach maintains self-emulsifying efficiency while enhancing stability, flowability, and manufacturability. The optimized S-SMEDDS are evaluated for physicochemical characteristics, emulsification time, droplet size, dissolution behavior, and stability. S-SMEDDS offer a promising formulation strategy that combines the solubility-enhancing potential of lipid-based systems with the pharmaceutical advantages of solid dosage forms, thereby improving the solubility and oral bioavailability of BCS Class II drugs.

**Keywords:** *Solid SMEDDS, BCS Class II, adsorption technique, bioavailability enhancement, lipid-based formulations*.

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# Design, Synthesis, and Characterization of Novel Apigenin-Isatin Analogue as Anti-Cancer Agents

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## Abstract

The development of hybrid molecules that combine biologically active scaffolds is a promising strategy for obtaining potent anticancer leads with improved selectivity. In this work, we report the rational design, synthesis, structural characterization, in vitro cytotoxic evaluation, and molecular docking of a series of novel apigenin–isatin hybrid analogues. The hybrids were designed to merge the known antiproliferative and kinase-modulating features of apigenin with the privileged isatin pharmacophore. A concise synthetic route was developed that afforded a library of twenty apigenin–isatin analogues in moderate to good yields. Structures were confirmed by IR, 1H/13C NMR, HR-MS, and elemental analysis; purity and melting points were also recorded. Biological activity was assessed using MTT (or SRB) assays against a panel of human cancer cell lines, including breast (MCF-7), lung (A549), and cervical (HeLa) models, with a non-malignant cell line included to assess effects with IC50 values in the low-to-mid micromolar range and favorable selectivity indices compared with the reference drug. Mechanistic indicators (cell morphology, cell cycle arrest markers) suggested that the lead compounds induced apoptosis and interfered with proliferative signaling. Complementary molecular docking studies were performed to rationalize activity and probe potential molecular targets. Docking against representative cancer-relevant proteins (e.g., topoisomerase II / selected kinase domains, or the tubulin binding site) revealed favorable binding energies and key interactions — hydrogen bonds, π–π stacking, and hydrophobic contacts — between the isatin–apigenin hybrids and active-site residues, supporting the observed in vitro potency. Collectively, these findings identify apigenin–isatin hybrids as promising anticancer scaffolds. Lead compounds merit further preclinical exploration, including detailed mechanism-of-action studies, ADME profiling, and in vivo efficacy models.

**Keywords:** *apigenin, isatin, hybrid molecules, anticancer, synthesis, NMR, molecular docking, cytotoxicity, MTT.*

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# AI-ML ASSISTED ANALYTICAL METHODS FOR STANDARDIZATION OF HERBALS

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**Abstract**

The combination of artificial intelligence (AI) and machine learning (ML) in herbal formulations offers tremendous potential to improve the discovery of herbal medications, personalize medicine to individual needs, and enhance healthcare. The steady demand for herbal products underscores the importance of strict quality control procedures to ensure their efficacy and safety. This work offers a novel AI-ML-based approach for quality control testing in herbal standardization by using machine learning algorithms to assess intricate phytochemical profiles. To standardize herbal formulations, this study also explores the potential of a machine-learning-based strategy for quality control testing. Various AI-ML-based methodologies and existing techniques, combined with AI-ML systems, are compiled in this work to analyze complex datasets comprising chromatographic results, spectral data, and chemical profiles from a variety of herbal samples. The AI-ML-based models successfully identify critical bioactive components and adulteration, thereby increasing the precision of quality evaluation. One can achieve high predictive accuracy by training these models on a diverse range of herbal species, underscoring the method's practicality. These cutting-edge methods could improve customer safety, help comply with legal standards, and strengthen the quality control process. The literature indicates that incorporating AI-based techniques into herbal standardization can significantly improve product reliability and foster consumer trust.

**Keywords:** *Herbals, quality control testing, standardization, artificial intelligence, machine learning*.

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# Formulation and Evaluation of Herbal Press-coated Tablets for Controlled Drug Delivery

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**Abstract**

The present research focuses on the formulation and evaluation of herbal press-coated tablets for controlled, targeted drug delivery. Press-coated tablet technology offers a promising approach for modifying drug release by employing a core tablet surrounded by a polymeric barrier, enabling site-specific or time-dependent release. In this study, an herbal active compound was incorporated into the core tablet via wet granulation, while various hydrophilic and hydrophobic polymers were evaluated for the press coat. The prepared formulations were assessed for pre- and post-compression parameters, including hardness, friability, disintegration time, and weight variation, to ensure uniformity and mechanical stability. In vitro dissolution studies were conducted to determine the release profile and to evaluate the effect of coating polymers on drug release kinetics. The optimized formulation demonstrated a controlled-release profile suitable for targeted therapeutic delivery, suggesting its potential to improve the efficacy and bioavailability of herbal actives. This study highlights the significance of press-coated systems as an advanced oral delivery platform for herbal drugs, offering enhanced stability and patient compliance.

**Keywords:** *Herbal formulation, Press-coated tablets, Controlled release, Targeted Delivery, Polymer Coating.*

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# Optimization-Driven Fabrication of Smart Sponge Hydrogel Films for Controlled Drug Delivery Emphasizing Wound Healing

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## Abstract

Hydrogels have gained significant attention in wound care due to their high moisture retention, biocompatibility, and structural similarity to the natural extracellular matrix. Their three-dimensional, cross-linked network supports oxygen permeability, absorbs wound exudates, and provides an effective barrier against microbial invasion, promoting faster tissue regeneration. Both natural (e.g., chitosan, alginate, gelatin) and synthetic (e.g., PVA, PEG) hydrogels are utilized to achieve optimal mechanical stability and bioactivity. Recent advancements focus on "smart" hydrogels responsive to pH, temperature, or enzymes for controlled drug release and targeted therapy. The incorporation of bioactive agents, such as silver nanoparticles, antioxidants, and growth factors, further enhances healing and antibacterial performance. Despite progress, issues like durability and manufacturing consistency persist. Nevertheless, multifunctional and stimuli-responsive hydrogels represent a promising next-generation approach for effective wound management and regenerative medicine applications. Future innovations aim to create self-adaptive hydrogel systems capable of real–time monitoring and personalized healing. Moreover, 3D printing and bio-printing technologies are being explored to design patient–specific hydrogel dressings with precise structural control. The incorporation of natural bioactives and sustainable polymers further enhances biocompatibility while reducing toxicity.

**Keywords:** *Stimuli-responsive, Biocompatibility, Regenerative medicines, Bioactive agent.*

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# Formulation and Characterization of Nano cochleate- Based Drug Delivery System for Enhanced Oral Bioavailability of Anti diabetic drug

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## Abstract

This study focuses on the formulation and characterization of a nanocochleate-based drug delivery system designed to enhance the oral bioavailability of antidiabetic drugs. Nanocochleates, composed of negatively charged phospholipid bilayers stabilized by divalent cations such as calcium, provide a robust, biocompatible platform for drug encapsulation. The antidiabetic drug was incorporated into the lipid matrix via solvent evaporation, followed by cochleate formation via controlled calcium-ion addition. The resulting nanocochleates were characterized for particle size, zeta potential, encapsulation efficiency, and in vitro drug release profile. Morphological analysis confirmed the cylindrical, rolled-up structure typical of cochleates. In vitro studies have demonstrated sustained drug release and improved stability under gastrointestinal conditions. Furthermore, in vivo pharmacokinetic studies in animal models have shown a significant increase in oral bioavailability compared to conventional formulations. These findings suggest that nanocochleates are promising carrier systems for enhancing the therapeutic efficacy of orally administered antidiabetic agents.

**Keywords**: *drug delivery, zeta potential*

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# AI and CADD Synergy in Designing Novel Peptide Anti-TB Leads

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## Abstract

Tuberculosis (TB) remains one of the world's most challenging infectious diseases, necessitating innovative strategies for effective drug discovery. The present study focuses on integrating Artificial Intelligence (AI) with Computer-Aided Drug Design (CADD) to design and develop novel peptide-based scaffolds exhibiting enhanced anti-tuberculosis activity. The clinical potency and target affinity of the designed peptides were predicted using AI-driven algorithms, molecular descriptors, and quantitative structure–activity relationship models. Molecular docking and dynamic simulations further validated the binding interactions with Mycobacterium tuberculosis target proteins. This study emphasizes the importance of structure-activity relationships, stability, and pharmacokinetic properties in identifying reliable lead candidates. The hybrid AI–CADD approach significantly accelerates the prediction and optimization of potent therapeutic molecules. This interdisciplinary framework offers a promising avenue for developing efficient, selective, and safe anti-TB agents with reduced experimental costs and time. Furthermore, this strategy enhances the precision of hit-to-lead optimization and supports early-stage toxicity screening. These findings provide a foundation for future AI-guided peptide drug discovery against resistant TB strains.

**Keywords:** *Artificial intelligence, CADD, peptide scaffolds, anti-tuberculosis agents, QSAR modeling, molecular docking, drug design, computational pharmacology.*

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# Investigating Various Herbal Drugs and Their Combinations in the Management of Hyperlipidemia: "A Review"

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**Abstract**

Hyperlipidemia, characterized by abnormal elevations in serum lipids and lipoproteins, is a major predisposing factor for atherosclerosis and cardiovascular disease. Conventional drug therapy plays a vital role in lipid management, with statins serving as the gold standard treatment by inhibiting HMG-CoA reductase and effectively lowering LDL levels. Fibrates activate PPAR-α to enhance lipid catabolism, whereas bile acid sequestrants, niacin, ezetimibe, and novel PCSK9 inhibitors provide complementary lipid-lowering mechanisms. However, the long-term use of synthetic drugs is often associated with side effects, such as hepatic stress and myopathy, prompting interest in herbal alternatives. Herbal formulations containing bioactive constituents, such as flavonoids, saponins, and polyphenols, exhibit lipid-lowering, antioxidant, and anti-inflammatory activities. Plants such as *Withania coagulans*, *Cucurbita pepo*, *Curcuma longa*, *Trigonella foenum-graecum*, and *Allium sativum* have demonstrated hypolipidemic potential by modulating lipid-metabolizing enzymes and improving the oxidative balance. The combination of these herbs shows synergistic efficacy, leading to reduced total cholesterol, LDL, and triglyceride levels, along with elevated HDL levels. Recent molecular studies suggest that both synthetic and herbal interventions can modulate key inflammatory mediators, such as TNF-α and IL-6, suggesting a broader cardioprotective potential. Integrative approaches that combine standard drugs with validated herbal extracts may offer a safer and more effective strategy for long-term hyperlipidemia management.

**Keywords:** *Hyperlipidemia, Statins, Fibrates, Herbal medicine, Polyherbal formulations, Antioxidant activity.*

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# Analytical Method Development and Validation of a Simultaneous Estimation Method of an Antibacterial Drug by Various Spectroscopic and Chromatographic Methods

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## Abstract

The present investigation focuses on the Analytical Method Development and Validation for the Simultaneous Estimation of Antibacterial Drugs Using Various Spectroscopic and Chromatographic Techniques. The primary objective of this study was to formulate a robust, reproducible, precise, and scientifically reliable approach for the concurrent estimation of selected antibacterial compounds within combined pharmaceutical dosage matrices. Advanced UV–visible spectrophotometric and High-Performance Liquid Chromatographic (HPLC) techniques were meticulously optimized for solvent composition, analytical wavelength selection, and chromatographic parameters to achieve superior resolution and peak symmetry. Method validation was rigorously conducted in accordance with the International Council for Harmonization (ICH) Q2(R1) guidelines, encompassing essential analytical performance characteristics, including linearity, precision, accuracy, specificity, ruggedness, robustness, limit of detection (LOD), and limit of quantitation (LOQ). The calibration curves exhibited excellent linearity ($r^2 > 0.999$) across the validated concentration ranges, indicating a strong proportional relationship between the analyte concentration and the analytical response. Recovery assessments substantiated method accuracy, yielding percent recovery values within the statistically acceptable interval (98–102%). At the same time, precision studies demonstrated minimal relative standard deviation (%RSD) and corroborated the method's intra- and inter-day reproducibility. In conclusion, the developed analytical procedures provide reliable, cost-effective, and rapid alternatives for the simultaneous estimation of antibacterial drugs. These validated methods are suitable for routine quality control analysis and stability studies of pharmaceutical formulations containing multiple antibacterial agents.

Keywords: Analytical method development, Method validation, UV–Visible spectrophotometry, High-Performance Liquid Chromatography (HPLC), ICH Q2 (R1) guidelines, Linearity, Accuracy, Precision, Robustness.

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# Emerging Trends and Technological Innovations in Colon-Targeted Drug Delivery Systems"

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## Abstract

Colon-Targeted Drug Delivery Systems (CTDDS) have emerged as a significant research focus in pharmaceutical sciences, aiming to overcome the limitations of conventional oral drug delivery by enabling site-specific release in the colon. The colon's unique physiological features—near-neutral pH, prolonged transit time, and dense microbial flora—offer a favorable environment for local and systemic drug delivery. CTDDS holds immense potential for treating diseases such as inflammatory bowel disease (IBD) and colorectal cancer by improving therapeutic efficacy and minimizing systemic toxicity. Recent advancements in this field include the development of pH-sensitive polymers, enzyme-triggered prodrugs, time-controlled release systems, and bioadhesive formulations. Cutting-edge innovations, such as nanoparticle-based carriers, 3D-printed multi-drug systems, and stimuli-responsive hydrogels, have further expanded research possibilities. Despite notable progress, challenges such as limited colonic fluid volume, variable motility, and absorption barriers persist. Comprehensive in vitro and in vivo evaluation methods are essential for optimizing these systems. Overall, CTDDS represents a transformative step toward achieving precision drug delivery for colonic and systemic disorders.

**Keywords:** *Colon-targeted delivery, pH-sensitive systems, nanoparticles, inflammatory bowel disease, intelligent hydrogels.*

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# Quercetin Nanoformulations: Bridging Natural Compounds and Clinical Applications in Arthritis and Asthma

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## Abstract

Quercetin, a plant-derived flavonoid commonly found in fruits and vegetables, has shown significant promise in managing chronic inflammatory diseases such as asthma and arthritis. Its potent antioxidant and anti-inflammatory properties have been confirmed in both preclinical and clinical studies. However, its therapeutic potential is limited by poor water solubility, low bioavailability, and rapid metabolic clearance. To overcome these challenges, nanotechnology-based delivery systems have emerged as effective methods to improve quercetin's stability, absorption, and targeted delivery. Nano formulations—including liposomes, nanogels, micelles, solid lipid nanoparticles (SLNs), polymeric nanoparticles, gold nanoparticles, and cyclodextrin complexes—provide better encapsulation efficiency, sustained drug release, and longer systemic circulation. These systems have shown increased cellular uptake and therapeutic effectiveness in models of respiratory and joint inflammation. This review highlights recent advances in quercetin-loaded nanocarriers and their potential to enhance treatment outcomes in asthma and arthritis, presenting a promising strategy for phytochemical-based treatments of chronic inflammatory conditions.

**Key words:** *Quercetin, nanoformulations, drug-delivery systems, antioxidant, anti-inflammatory*.

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# Pharmacological evaluation of *Dolichandrone falcate* extract for gastroprotective activity.

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## Abstract

Gastric ulcers are common, treatable clinical conditions that affect patients' quality of life and place an economic burden on the healthcare system. It occurs due to weakened defensive mechanisms in the gastric mucosa. Changing lifestyles, including smoking, alcohol consumption, over-the-counter use of NSAIDs, and H. pylori infection, have increased the prevalence of gastric ulcers. Alcoholics have the risk of upper gastrointestinal bleeding compared to non-alcoholics, and this risk is further potentiated with the concurrent use of NSAIDs. Alcohol causes congestion, hemorrhagic lesions with microvascular damage, oedema, and exfoliation of the epithelium. The main aim of this research work is to investigate the gastroprotective properties of Dolichandrone Falcata.

**Keywords:** *Antioxidant activity, Gastro-protective Activity, Dolichandrone falcate*

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# Development and Characterization of Nanostructured Lipid Carrier-Based Emulsomes Containing Transdermal Gel of Lopinavir for Management of Viral Infection

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## Abstract

Nanocarriers, with their tunable surface characteristics and internal structures, offer enhanced delivery options for both small-molecule drugs and biologics. In recent years, research has emphasized the design of specific nanocarriers to minimize systemic exposure and reduce unintended side effects. The study aimed to develop a carrier technology that could deliver lopinavir topically without causing side effects or toxicity. Nanocarrier emulsomes have the potential to increase drug solubility and bioavailability, decrease dosage requirements, and enhance pharmacological activity. Particle size and, by extension, PDI and zeta potential are positively correlated with solid core concentration and lipid content, according to the results. To optimize the impact of different surfactant concentrations on penetration rate or drug entrapment efficiency within the solid lipid core, the results for all dependent variables led to the selection of formulation LEMs4.

**Keywords: -** *Nanoparticals, Nanocarriers, Emulsomes, Lopinavir.*

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# Phytochemical Evaluation and Medicinal Potential of Anthraquinone Glycosides in Cassia Varieties.

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## Abstract

Anthraquinone glycosides, which are structurally composed of an aglycone generated from anthracene connected to sugar moieties, are abundant in the genus Cassia (Dave & Ledwani, 2012). Several Cassia species have been shown to contain these substances, including rhein, emodin, chrysophanol, and aloe-emodin (Charoenchai & Chankana, 2023). For instance, in Cassia tora, four anthraquinones—aloe-emodin, emodin, chrysophanol, and physcion—were identified using HPLC following ethanol extraction (Charoenchai & Chankana, 2023). In Cassia fistula, Sakulpanich & Gritsanapan (2009) reported an average total anthraquinone glycoside content of approximately 1.52% w/w in leaf extracts (0.62–2.01%). Extraction typically utilizes hydroalcoholic or methanolic solvents, followed by purification via column chromatography, TLC, and HPLC for separation and quantification (Dave & Ledwani, 2012; Sakulpanich & Gritsanapan, 2009). Spectroscopic methods (UV, IR, NMR) facilitate structural determination

**Keywords:** *Cassia, glycosides of anthraquinones, extraction, profiling by HPLC, phytochemical analysis*

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KNIMT/2025/ IC-022

# Pharmacological evaluation of Momordica Charantia leaves extract for Antioxidant and Anticonvulsant activity.

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## Abstract

The present study was designed to evaluate the antioxidant and anticonvulsant potential of the leaf extract of Momordica charantia (family: Cucurbitaceae), a plant traditionally used in Ayurvedic medicine for its diverse therapeutic benefits. The leaves were shade-dried, powdered, and sequentially extracted with solvents of increasing polarity. Preliminary phytochemical screening revealed the presence of alkaloids, flavonoids, phenolics, saponins, and glycosides. The antioxidant activity of the extract was assessed using in vitro assays, including DPPH radical scavenging, hydrogen peroxide scavenging, and ferric reducing antioxidant power (FRAP). The results demonstrated a significant, dose-dependent antioxidant effect comparable to that of standard ascorbic acid, indicating strong free radical-scavenging potential. Anticonvulsant activity was evaluated using experimental animal models, including maximal electroshock (MES) and pentylenetetrazole (PTZ) induced seizure tests in mice. The ethanolic extract at doses of 200 mg/kg and 400 mg/kg significantly reduced seizure duration and delayed onset of convulsions, suggesting membrane stabilization and enhancement of GABAergic transmission. Overall, the findings suggest that Momordica charantia leaf extract possesses notable antioxidant and anticonvulsant properties, possibly due to the presence of bioactive phytoconstituents, including flavonoids and phenolic compounds. These results support the traditional use of M. charantia and warrant further isolation and characterization of the active compounds responsible for its pharmacological effects.

**Keywords:** *Momordica charantia, antioxidant activity, anticonvulsant, phytochemical screening, free radical scavenging, MES, PTZ*

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KNIMT/2025/ IC-023

# Gene Therapy in Breast Cancer: Current Advances and Future Perspectives

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## Abstract

Breast cancer remains one of the leading causes of cancer-related mortality among women worldwide. Despite significant advancements in early detection and conventional therapies such as surgery, chemotherapy, radiotherapy, and hormonal treatments, challenges such as drug resistance, tumor recurrence, and metastasis persist. Gene therapy has emerged as a promising strategy offering targeted and personalized treatment options for breast cancer. This approach involves delivering genetic material to modify, replace, or silence specific genes involved in tumor initiation and progression. Current advances include the use of viral and non-viral vectors for gene delivery, CRISPR-Cas9–based genome editing, RNA interference (RNAi), and gene silencing targeting oncogenes such as *HER2*, *BRCA1/2*, and *TP53*. Additionally, suicide gene therapy, oncolytic virotherapy, and immunomodulatory gene approaches have shown encouraging preclinical and early clinical results in this context. Nanocarrier-based gene delivery systems further enhance specificity, stability, and cellular uptake while minimizing systemic toxicity. However, the clinical translation of gene therapy faces significant challenges, including delivery efficiency, immune responses, ethical concerns, and high production costs. Future directions focus on developing safer delivery platforms, combining immunotherapy or targeted drugs, and personalized gene-based interventions guided by genomic profiling. Overall, gene therapy represents a revolutionary frontier in breast cancer management, offering hope for more effective, precise, and durable therapeutic outcomes.

**Keywords: -** *Breast cancer, Gene therapy*

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KNIMT/2025/ IC-024

# AI in Healthcare

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**Abstract**

Artificial Intelligence (AI) integration is a transformative step in the healthcare industry, enhancing diagnostic accuracy, optimizing treatment strategies, and improving patient outcomes. This study provides a comprehensive review of AI applications in healthcare, drawing on indexed literature from PubMed, Springer, Scopus, and EMBASE, along with the challenges it faces and its applications. AI technologies, including machine learning (ML) and deep learning (DL), enable advanced data analysis, early disease detection, and personalized medicine. Further, it helps develop a guidelines framework by analyzing a vast amount of data within a short time frame. Tools such as predictive models, virtual assistants, and automated systems enable efficient, precise clinical decision-making. Though it has transformative potential, it still faces significant challenges, including data privacy, ethical concerns, bias, and accountability, which remain key obstacles to its worldwide adoption. The finding highlights that continuous research on ethical framework development and refinement of technology is essential for the development of AI with maximum benefits. In this article, we explain how AI-driven digitalization will change our healthcare system by 2030.

**Keywords**: *Artificial Intelligence, Machine learning, deep learning*

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# Role of AI in drug design

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## Abstract

The integration of Artificial Intelligence (AI) into drug design has revolutionized the pharmaceutical research landscape by accelerating the discovery and development of novel therapeutics. Traditional drug discovery processes are often time-consuming, costly, and require extensive experimental validation. AI techniques, such as machine learning, deep learning, and neural networks, enable the analysis of large and complex biological datasets to identify potential drug targets, predict molecular interactions, and optimize lead compounds with improved efficacy and safety profiles. Furthermore, AI-driven algorithms support virtual screening, de novo drug design, and structure–activity relationship (SAR) modelling, significantly reducing the reliance on trial-and-error experimentation. The application of AI also extends to personalized medicine, where predictive models can tailor drug therapy to patients' individual genetic and metabolic profiles. Despite its immense potential, challenges remain regarding data quality, model interpretability, and regulatory acceptance. Nevertheless, the integration of AI with computational chemistry, bioinformatics, and pharmacology marks a transformative step toward faster, more cost-effective, and more precise drug design.

**Keywords: -** *Artificial Intelligence, SAR, Bioinformatics*

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KNIMT/2025/ IC-026

# Wafers as novel drug delivery systems

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**Abstract**

Drug delivery is the method or process to deliver pharmaceutical compound in the most convenient form to achieve maximum therapeutic effect in human or animal for the only purpose to treat the disease oral root is still widely acceptable route but the drawback is a significant number of patient having difficulty in following tablet or capsule therefore for the convenience of patient wafers are developed wafers are oral disintegrated film has leads to development of wafers which is modified in the recent past year wafers follows the trans mucosal root, Oral films, are fast dissolving doses from, oral administration buccal and or dispersible doses form (ODFs)includes oral lyophilisation or wafers wafers adhere to mucosa for sustain drug release due to small in size, little dose, of thickness of buccal wafers over other doses form is most acceptable form and pleasant flash release oral wafers drugs are alternated approach for the tablet and capsule, and liquid dosage form (LDF) of the semi-synthetic and synthetic polymer as film volume formed in low concentration can be used in the preparation or development of buccal wafers it is the cost effective, non-irritating, preferred mainly by patient it maintain the efficacy of (APIs) by dissolving within minute .

**Keywords: -** *Wafer, Buccal Lyophilization, Freeze-drying, Drug delivery, Oral lyophilizates*

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# Micro-Needles - A Breakthrough in Drug Delivery Strategy

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## Abstract

The most widely used methods for transdermal administration of drugs are hypodermic needles, topical creams, and transdermal patches. The effect of most therapeutic agents is limited by the stratum corneum, the skin's barrier that allows only a few molecules to reach the site of action. A new delivery system called microneedles enhances drug delivery through this route and helps overcome various problems. A microneedle is a micron-sized needle with a height of 10-2000 micrometers and a width of 10-50 micrometers, capable of penetrating the epidermis to reach the dermis without pain. Microneedles are widely used in transdermal drug delivery systems (TDDS) because they are efficient, safe, convenient, and painless. Various types of microneedles can be fabricated, including solid, coated, dissolving, and hollow microneedles. Microneedles are fabricated using microelectromechanical systems (MEMS) that employ silicon, metals, polymers, or polysaccharides. In recent years, microneedles have been widely used across a range of fields, from drug and vaccine applications to cosmetics, therapy, diagnostics, tissue engineering, sample extraction, cancer research, and wound healing. Benefits associated with microneedle-based delivery of drugs include minimal training for use and painless insertion with no side effects like swelling and lipodystrophy at the administering site. The use of microneedles to deliver particle-based drugs is gaining importance due to the combined advantages of particulate drugs and pain-free immunization.

**Keywords:** *Transdermal drug delivery system; Microneedle; Classification; Microelectromechanical system; Lipodystrophy*

Proceedings of the e-International Conference Global Perspective on Next Generation Pharmaceutical Science, Technology and Healthcare

KNIMT/2025/ IC-028

# Formulation and Evaluation of Huperzine A-Encapsulated Nanoliposomes for Targeted Neuroprotection

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**Abstract**

Huperzine A is a natural alkaloid known for its inhibitory activity against acetylcholinesterase and its neuroprotective effects. Its therapeutic application in neurodegenerative diseases such as Alzheimer's disease is limited due to poor bioavailability and rapid metabolism. The present study was undertaken to develop and evaluate nanoliposomal formulations of Huperzine A to enhance its brain targeting and neuroprotective potential. Nanoliposomes were prepared by the thin-film hydration method and characterized for particle size, zeta potential, entrapment efficiency, and in vitro drug release. The optimized formulation yielded nanosized spherical vesicles with high drug encapsulation efficiency and sustained release. In vivo studies demonstrated improved memory performance and reduced oxidative stress markers in treated animals compared to those receiving pure drug. Histopathological studies confirmed better neuronal protection in the nanoliposome-treated group. The study concluded that nanoliposomal delivery of Huperzine A offers a promising strategy for targeted neuroprotection in the management of neurodegenerative disorders.

**Keywords:** *Huperzine A, Nanoliposomes, Neuroprotection, Alzheimer's disease, Brain targeting, Drug delivery*

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# Sexually Transmitted Diseases

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## Abstract

Sexually transmitted infections (STIs), previously known as Sexually Transmitted Diseases (STDs), involve the transmission of an organism between sexual partners through different routes of sexual contact, either oral, anal, blood, or vagina. Sexually Transmitted Diseases (STDs) are infections that spread primarily through sexual contact, including vaginal, anal, and oral sex. A variety of microorganisms, such as bacteria, viruses, fungi, and parasites, cause them. The most common STIs include both curable (gonorrhea, chlamydia, syphilis, trichomonas) and treatable (herpes viruses, human papillomavirus, human immunodeficiency virus). STDs remain a significant public health concern worldwide, particularly among sexually active adolescents and young adults. Many infections are asymptomatic, leading to underdiagnosis and continued transmission. Untreated STDs can result in serious complications such as infertility, ectopic pregnancy, chronic pelvic pain, and increased risk of HIV infection. Prevention strategies include consistent condom use, regular screening, timely treatment, and vaccination (for HPV and Hepatitis B). Having fewer sexual partners reduces your risk of exposure to STDs. Engage in a long-term relationship with a partner who is also only having sex with you, and talk to your partners about their sexual history and STD status before engaging in sexual activity. Avoid risky behaviors: Substance use can lower inhibitions, so avoid alcohol or drugs before and during sex and public awareness programs. Early diagnosis and education are key to reducing the global burden of STDs and promoting sexual health.

**Key points*:* -** Gonorrhea, Chlamydia, Syphilis, Trichomonas, Herpes viruses, Human Papillomavirus, Human Immunodeficiency Virus.

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# Optimization of a Liposomal Gel Containing Miconazole Nitrate for Deep Skin Penetration

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## Abstract

Topical antifungal therapy is often limited by poor drug penetration into deeper layers of the skin, thereby reducing its effectiveness. This study aimed to develop and optimize a liposomal gel formulation of Miconazole nitrate to improve skin delivery and antifungal activity. Liposomes were prepared using the thin-film hydration method with varying ratios of phosphatidylcholine or (Soy Lecithin) and cholesterol. The formulations were evaluated for particle size, surface charge, and drug entrapment efficiency to select the optimal liposomal system. The selected liposomes were incorporated into a carbopol-based gel and assessed for pH, viscosity, spreadability, in vitro drug release, and stability. Skin permeation studies using Franz diffusion cells showed that the liposomal gel enhanced drug penetration compared to a conventional gel. Additionally, the formulation demonstrated sustained release and significant antifungal activity against Candida albicans. The results indicate that liposomal gels can be an effective strategy for the topical delivery of Miconazole nitrate, improving therapeutic outcomes in fungal skin infections.

**Keywords:** *Miconazole nitrate, Liposomal gel, Topical delivery, Skin penetration, Antifungal activity, Optimization*

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# Optimization of Fluconazole Tablets Using Novel Excipients for Enhanced Dissolution and Bioavailability

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**Abstract**

Fluconazole is commonly used for systemic fungal infections, but its effectiveness can be limited by low dissolution and inconsistent absorption. This study focused on formulating and optimizing Fluconazole tablets using novel excipients to improve dissolution rate and oral bioavailability. Tablets were prepared by direct compression and wet granulation, incorporating excipients that enhance solubility and wettability. Pre-compression parameters, including bulk density, tapped density, and flow properties, were evaluated to ensure suitability for tablet manufacturing. Post-compression evaluations included hardness, friability, weight variation, disintegration time, and uniformity of drug content. In vitro dissolution studies demonstrated that tablets formulated with selected novel excipients showed faster and more complete drug release compared to conventional formulations. Stability studies under accelerated conditions confirmed that the optimized tablets maintained their physical and chemical properties. These results indicate that employing novel excipients in Fluconazole tablets can significantly improve dissolution and bioavailability, providing a practical option for systemic antifungal therapy with enhanced therapeutic outcomes.

**Key-Words:** *Fluconazole, Tablet formulation, Novel excipients, Dissolution enhancement, Oral bioavailability, Systemic antifungal therapy*

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KNIMT/2025/ IC-032

# Synergistic Hepatoprotective Effect of *Curcuma longa* and *Silymarin against* Paracetamol-Induced Hepatotoxicity in Experimental Animals

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**Abstract**

The liver plays a significant role in metabolism and detoxification; however, excessive exposure to hepatotoxins, such as paracetamol, can induce hepatic injury. The present study aims to explore the synergistic hepatoprotective effect of *Curcuma longa* and Silymarin against Paracetamol-induced hepatotoxicity in experimental animals. Ethanolic extract of Curcuma longa rhizomes, known for its antioxidant and anti-inflammatory properties, was combined with Silymarin, a well-established hepatoprotective drug, to enhance therapeutic efficacy. Experimental animals were divided into six groups: control, paracetamol control, Curcuma longa, Silymarin, combination, and standard treatment. Hepatotoxicity was induced by a single oral dose of paracetamol (2 g/kg). The efficacy of treatments was assessed using biochemical parameters, including serum AST, ALT, ALP, and total bilirubin, as well as antioxidant markers (SOD, CAT, and GSH) in liver tissue. Histopathological examination of hepatic sections was performed to evaluate structural restoration. The combination of *Curcuma longa* and Silymarin showed significant improvement in liver function markers and antioxidant defence compared to individual treatments, indicating a synergistic protective effect. The findings suggest that co-administration of *Curcuma longa* and Silymarin offers enhanced hepatoprotection through combined antioxidant, anti-inflammatory, and membrane-stabilizing actions, supporting their potential as a complementary therapeutic approach for drug-induced liver damage.

**Key-words:** *Curcuma longa, Silymarin, synergistic effect, paracetamol, oxidative stress, hepatoprotective.*

Proceedings of the e-International Conference Global Perspective on Next Generation Pharmaceutical Science, Technology and Healthcare

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# A Comprehensive Review on Herbal Agents with Anti-Diabetic and Antioxidant Activities

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## Abstract

Diabetes mellitus is a multifactorial metabolic disorder characterized by chronic hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The limitations and side effects of current synthetic drugs have driven increasing interest in plant-based therapies as effective and safer alternatives for diabetes management. Numerous medicinal herbs have been scientifically validated for their antidiabetic potential through diverse pharmacological mechanisms. Herbs such as Gymnema sylvestre, Momordica charantia (bitter melon), Trigonella foenum-graecum (fenugreek), Syzygium cumini (jamun), Withania somnifera (ashwagandha), Tinospora cordifolia (giloy), Aegle marmelos (bael), and Ocimum sanctum (tulsi) demonstrate significant hypoglycemic, antioxidant, and β-cell protective effects. The bioactive compounds — including gymnemic acids, charantin, trigonelline, alkaloids, flavonoids, and polyphenols — exert their action via multiple pathways such as inhibition of α-amylase and α-glucosidase, stimulation of insulin secretion, activation of AMP-activated protein kinase (AMPK), upregulation of GLUT4-mediated glucose uptake, and suppression of advanced glycation end-products (AGEs). Additionally, these herbs exhibit potent antioxidant activity by enhancing endogenous enzymes like SOD, CAT, and GSH, thereby reducing oxidative stress associated with diabetes complications. The combined or synergistic use of such phytochemicals has shown promising results in improving lipid metabolism, reducing inflammation, and protecting pancreatic β-cells. Collectively, the evidence suggests that herbal medicines provide a multi-targeted, natural, and sustainable approach for the prevention and management of diabetes mellitus.

**Key Words:** Anti-diabetic activity; Herbal medicine; AMPK activation; α-amylase inhibition; GLUT4 translocation; Oxidative stress; Antioxidant enzymes; Natural therapy; β-cell protection.

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KNIMT/2025/ IC-034

# AI In Drug Discovery

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**Abstract**

The process of drug discovery is evolving by incorporating innovative technologies like data science, informatics, and artificial intelligence (AI) to expedite the development of effective treatments, all while minimizing expenses and the use of animal testing. The process of drug discovery is evolving by incorporating innovative technologies like data science, informatics, and artificial intelligence (AI) to expedite the development of effective treatments, all while minimizing expenses and the use of animal testing. Artificial intelligence (AI) possesses the capability to transform the drug discovery process, enhancing efficiency, precision, and rapidity. Nevertheless, the effective implementation of AI relies on the accessibility of high-quality data, the resolution of ethical issues, and the acknowledgment of the constraints associated with AI-driven methodologies. The integration of AI in drug discovery has significantly advanced due to technological innovations, including the utilization of neural networks for molecule design and the implementation of knowledge graphs to comprehend target biology. Numerous AI-focused drug discovery firms have successfully advanced molecules into clinical trials, with some instances demonstrating markedly expedited timelines and decreased costs, thereby generating considerable optimism within the R&D sector. Furthermore, a variety of established pharmaceutical firms have initiated collaborative discovery ventures with AI companies to investigate this technology. Nevertheless, it remains early in the evolution of AI in drug discovery, with numerous unresolved questions regarding its effects and future possibilities.

**Keywords:** *Artificial intelligence, Target biology. Ethical issue, Drug discovery, R&D*

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# In Silico Drug Design Targeting Leptin Receptor for NAFLD Therapy

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## Abstract

Non-Alcoholic Fatty Liver Disease (NAFLD) is a common chronic liver disorder affecting nearly 32% of adults worldwide, with a higher prevalence in males (40%) than females (26%). Its rising incidence is linked to obesity, insulin resistance, and metabolic syndrome. The leptin receptor (LEPR), a major regulator of lipid metabolism and energy balance, represents a promising therapeutic target for NAFLD. In this study, in silico approaches were employed to identify potential LEPR-targeting compounds using computer-aided drug design (CADD) tools, including Swiss ADME, Molinspiration, and DruMAP. These platforms were utilized to assess drug-likeness, bioactivity scores, and ADMET properties. The selected compounds demonstrated favorable binding affinities and acceptable pharmacokinetic profiles, indicating their potential as lead molecules for the development of effective NAFLD therapies.

**Keywords:** *NAFLD, leptin receptor, in silico, CADD, Swiss ADME, Mol Inspiration, Dru MAP, ADMET*

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# Diabetic Cardiomyopathy

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## Abstract

Diabetic cardiomyopathy (DC) is one of the severe secondary complications of diabetes mellitus in humans. Vinpocetine is an alkaloid having pleiotropic pharmacological effects. The present study is designed to investigate the effect of vinpocetine on DC in rats. Rats were fed a high-fat diet for 9 weeks, followed by a single dose of streptozotocin after the second week to induce DC. Haemodynamic evaluation was performed to assess the rat's functional status using the Biopac system. Cardiac echocardiography, biochemical, oxidative stress parameters, and inflammatory cytokine levels were analysed in addition to haematoxylin–eosin and Masson's trichome staining to study histological changes, cardiomyocyte diameter, and fibrosis, respectively. Phosphodiesterase-1 (PDE-1), transforming growth factor-β (TGF-β), and p-Smad 2/3 expression in cardiac tissues were quantified using western blot/RT-PCR. Vinpocetine treatment, alone or in combination with enalapril, decreased glucose levels compared with diabetic rats. Vinpocetine improved the echocardiographic parameters and cardiac functional status of rats. Vinpocetine decreased the cardiac biochemical parameters, oxidative stress, inflammatory cytokine levels, cardiomyocyte diameter, and fibrosis in rats. Interestingly, expressions of PDE-1, TGF-β, and p-Smad 2/3 were ameliorated by vinpocetine alone and in combination with enalapril. Vinpocetine is a well-known inhibitor of PDE-1, and its protective effect in DC is exerted by inhibiting PDE-1 and subsequently suppressing TGF-β/Smad2/3 expression.

**Keywords:** *diabetic cardiomyopathy; vinpocetine; phosphodiesterase-1; TGF-β; oxidative stress.*

Proceedings of the e-International Conference Global Perspective on Next Generation Pharmaceutical Science, Technology and Healthcare

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# Formulation and Evaluation of Cyclodextrin Inclusion Complexes of Cefpodoxime Proxetil -An Approach to Improve Antibacterial Activity of Cefpodoxime Proxetil

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## Abstract

Cefpodoxime proxetil, a third-generation cephalosporin, is used to treat respiratory and urinary tract infections. Cefpodoxime proxetil has poor aqueous solubility, and dissolution is the rate-limiting step in the absorption of poorly aqueous soluble drugs. The present study aims to improve the solubility, Dissolution rate, and antibacterial activity of the drug by formulating its inclusion complexes with β-cyclodextrin and hydroxypropyl-β-cyclodextrin by kneading and Physical mixture methods. The solubility study showed that the inclusion complexes of Cefpodoxime proxetil exhibited enhanced solubility compared to plain Cefpodoxime proxetil. Differential scanning calorimetry study was carried out using DSC Q1000 calorimeter by conventional MDSC method, the pure drug shows an endothermic peak in its thermogram and the same peaks was disappeared in the formulation, thermograms which confirms the formation of complexes of Cefpodoxime proxetil with cyclodextrins, X-ray diffraction study was carried out using with power X-ray diffractometer XRD-6000, the pure drug shows sharp and intense peaks in its diffractogram dure to its crystalline nature and the same peak s were reduced in height and even absent in the formulation prepared and suggests that conversion of crystalline Cefpodoxime proxetil into amorphous form after formulating its cyclodextrin inclusion complexes which is the reason for the increased solubility and enhanced dissolution rate. Infrared spectral analysis showed the drug remained intact in the 6.8 pH phosphate buffer. Hydroxypropyl-β-cyclodextrin was found to be more effective at increasing drug dissolution. The inclusion complex of cefpodoxime proxetil with hydroxypropyl-β-cyclodextrin in a 1:3 molar ratio, prepared by the kneading method, released 99.99 ± 1.63% of the drug within 30 minutes, with a T70 of 4.01 minutes, showing the highest dissolution compared with cyclodextrin and the pure drug Cefpodoxime proxetil. The antibacterial activity of Cefpodoxime proxetil was carried out by the cup-plate method using Muller-Hinton agar media against gram-positive (S. aureus and B. subtilis) and gram-negative (E. coli and P. vulgaris) organisms. The zones of inhibition of $ClCC_9$ for the same organisms are 42, 44, 32, and 36mm, respectively. The result showed that the drug's antibacterial activity improved upon inclusion in a 1:3 molar ratio with hydroxypropyl-β-cyclodextrin.

**Keywords**: *Cefpodoxime proxetil; Cyclodextrin; Inclusion complex; Solubility; In vitro dissolution; Antibacterial activity.*

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# HIV: The invisible threat.

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## Abstract

It is a type of condition in humans in which there is a blunder of the immune system that allows deadly infection and can lead to cancer. This Human immunodeficiency virus (HIV)is caused by sexually (unprotected anal or vaginal sex with a person who has HIV) and asexually (mother to child during breastfeeding, blood to blood contact, etc). HIV causes AIDS. As we know, our body has an immune system that fights pathogens. As we know, our immune system has white blood cells that protect us against infections. White blood cells have CD4+T cells, and when the person gets infected with HIV, this infection leads to a low level of CD4+T Cells through many mechanisms, such as Pyroptosis, Proptosis. When the level of CD4+ T cells falls below a critical threshold, cellular immunity (which identifies infected cells and cancerous cells and kills them) is lost, leading to many health problems or even death. Actually, there are no specific symptoms of this infection. We can guess that when people get infected with HIV, they may experience flu-like symptoms after a week. Sometimes they see fever, rashes, and a severe sore throat together. There is no cure for HIV If you get infected with this, you cannot run from it. Many medicines can be used to control and prevent its complications, ie, ART. HIV is not transmitted through being around the person who has HIV or by sharing food, saliva, sweat, or tears.

**Key words:** *HIV, Pyroptosis, CD4+T cells, Proptosis, Cellular immunity*

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# AI for Identifying Drug Repurposing Opportunities

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## Abstract

Drug repurposing—the process of finding new therapeutic uses for existing drugs —has emerged as a strategic and cost-effective approach in pharmaceutical research. With the advent of Artificial Intelligence (AI), this process has become significantly faster, more accurate, and data-driven. An AI algorithm can analyze massive datasets, including electronic health records, genomics, clinical trials, and biomedical literature, to uncover hidden patterns and associations between drugs and diseases. An AI algorithm can analyze massive datasets, including electronic health records, genomics, clinical trials, and biomedical literature, to uncover hidden patterns and associations between drugs and diseases. Techniques such as machine learning, deep learning, and natural language processing are enabling researchers to predict potential drug-disease links that may not be evident in personalized and precision medicine. This presentation explores how AI is revolutionizing drug repurposing, its advantages, current challenges, and the promising future it holds for personalized and precision medicine.

**Keywords**: *Artificial Intelligence, Machine Learning, Drug repurposing & Drug Discovery, Deep learning, Biomedical Data*

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# Global Perspective on Next-Generation Pharmaceutical Science, Technology, and Healthcare.

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**Abstract**

The pharmaceutical and healthcare industries are undergoing a rapid transformation driven by technological innovation, data science, and global collaboration. The integration of artificial intelligence (AI), machine learning, and computational biology has accelerated the drug discovery and development process, reducing both time and cost while improving predictive accuracy. Simultaneously, next-generation therapeutics such as mRNA vaccines, gene-editing tools, and cell-based therapies are revolutionizing disease management by enabling personalized, targeted treatment approaches. In manufacturing, the shift towards continuous and modular production systems, supported by real-time analytics and automation, is enhancing product quality and supply chain resilience. Furthermore, the rise of digital therapeutics (DTx) and telemedicine is reshaping healthcare delivery by enabling remote monitoring, patient engagement, and hybrid care models. However, these advancements bring challenges related to ethical governance, data privacy, equitable access, and regulatory harmonization across nations. This paper presents a global overview of these emerging trends, their implications for the pharmaceutical and healthcare sectors, and the need for collaborative frameworks that ensure innovation remains inclusive, safe, and sustainable. The future of pharmaceutical science lies not only in technological excellence but also in its ability to bridge gaps — between disciplines, between innovation and accessibility, and ultimately, between science and society.

**Keywords:** *AI in drug discovery, mRNA therapeutics, digital health, continuous manufacturing, global health equity, next-generation pharmaceuticals*

Proceedings of the e-International Conference Global Perspective on Next Generation Pharmaceutical Science, Technology and Healthcare

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# Phytochemical and Pharmacological Evaluation of *Vitex peduncularis* for Management of Liver Dysfunction

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**Abstract**

Liver diseases such as cirrhosis and hepatocellular carcinoma (HCC) represent a critical global health challenge, contributing substantially to morbidity and mortality worldwide. Cirrhosis, marked by irreversible fibrotic transformation of liver tissue, commonly arises from chronic alcohol abuse, viral hepatitis, or toxic insults. HCC, the most prevalent form of primary liver cancer, accounts for approximately 250,000 new cases annually. Oxidative stress, driven by the overproduction of reactive oxygen species (ROS) and free radicals, is a unifying pathological feature of many liver disorders. Oxidative stress inflicts extensive cellular damage and underpins conditions such as alcoholic liver disease, non-alcoholic fatty liver disease, and chronic hepatitis. Conventional pharmacotherapies, including corticosteroids, anabolic steroids, and antiviral agents, are often limited by adverse effects and hepatotoxicity, underscoring the urgent need for safer and more efficacious alternatives. Promising avenues include bioactivity-guided isolation of phytochemicals, advancements in tissue and organ culture for disease modeling, and recombinant technologies, exemplified by yeast-derived hepatitis B vaccines. A deeper insight into oxidative mechanisms and innovative therapeutic strategies is imperative for transforming the management of liver diseases. Liver is a chronic, progressive condition driven by diverse etiological factors, including autoimmune hepatitis, metabolic syndrome, viral hepatitis, non-alcoholic steatohepatitis (NASH), non-alcoholic fatty liver disease (NAFLD), and excessive alcohol intake. In many cases, the disease advances to end-stage liver failure, necessitating complex clinical interventions. At present, liver transplantation remains the sole definitive treatment; however, its utility is constrained by a severe scarcity of suitable donors, exorbitant costs, risks of immune rejection, and the lifelong dependency on immunosuppressive therapy. These limitations underscore the urgent need for innovative therapeutic strategies, early diagnostic tools, and robust preventive measures to mitigate the global burden of liver disease.

**Keywords:** *Liver diseases, vaccines, NAFLD*, Non-alcoholic steatohepatitis

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# STANDARDIZATION AND PHYTOCHEMICAL SCREENING OF DIURETIC POTENTIAL OF ACHYRANTHES ASPERA AND AZADIRACHTA INDICA LEAF EXTRACTS

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**Abstract**

Various types of medicinal plants are found worldwide. Many diseases and conditions are prevented and treated with medicinal herbs. The pharmaceutical industry is making new drug Discoveries Day by day. Two of these medicinal plants are *Achyranthes Spera* and *Azadirachta Indica, which are used for broad-spectrum treatment like urinary disorders, edema, kidney stones, Inflammation, fever, and gastrointestinal* disturbance. *Achyranthes aspera,* known *as Apamarga,* is particularly renowned for its diuretic properties, which aim to promote urine output, relieve fluid retention, and support kidney function. Like *Azadirachta Indica,* commonly known as *neem,* this is used to treat infections, diseases, inflammation, disorders, diabetes, hepatic dysfunction, and renal abnormalities. the leaves of *Neem* have been employed as a diuretic to facilitate the elimination of excess fluids and salts from the body, aiding in the Management of edema and urinary disorders. The study investigates the comparative diuretic Potential of the leaf extracts of Achyranthes aspera and Azadirachta Indica, two medicinal plants used for therapeutic purposes. The proposed study is expected to yield standardized leaf extracts of *Achyranthes aspera* and *Azadirachta indica* with well-defined physicochemical and phytochemical Characteristics. Qualitative and quantitative *Phytochemical screening* will identify the presence of Bioactive constituents such as alkaloids, *flavonoids, saponins, tannins*, and *Phenolic* compounds, which are likely to contribute to the diuretic activity. The In-Vivo evaluation is anticipated to demonstrate Significant diuretic potential of one or both extracts, reflected in increased urine volume, electrolyte Excretion, and changes in urine parameters compared to the control. Furthermore, comparative Analysis may reveal differences in efficacy between the two plants or possible synergistic effects in Combination. Overall, the study aims to provide scientific validation of the traditional use of these Plants as diuretics and to lay the groundwork for the potential development of safe and effective herbal Diuretic formulations.

**Keywords:** *Phytochemical screening, diuretic potential, diuretic activity, herbal diuretic formulation.*

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KNIMT/2025/ IC-043

# Formulation Development and Evaluation of Fast Dissolving Sublingual Wafers of An Antiemetic Drug

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**Abstract**

This study aimed to develop and evaluate fast-dissolving sublingual wafers containing granisetron, a 5-$HT_3$ receptor blocker frequently used to control nausea and vomiting, especially in patients undergoing chemotherapy or surgery. The sublingual route was selected to avoid the drawbacks of traditional oral forms, such as delayed drug action and first-pass liver metabolism, while improving usability for children and elderly patients. Initial studies examined the drug's solubility, melting point, UV absorbance, and FTIR compatibility with excipients. The resulting wafers were assessed for key properties, including thickness, folding endurance, disintegration time, tensile strength, drug content uniformity, and in vitro release behaviour. Optimized formulations showed quick disintegration, consistent drug distribution, and effective release profiles. Overall, Granisetron sublingual wafers demonstrated the potential to provide faster relief, better absorption, and improved patient compliance with treatment.

**Keywords:** *fast-dissolving, usability, granisetron.*

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KNIMT/2025/ IC-044

# Artificial Intelligence in Pediatric Cardiology (CHD)

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**Abstract**

Artificial intelligence (AI) and data science are increasingly augmenting cognition-intensive tasks in pediatric cardiology, including diagnosis, risk stratification, and perioperative management for congenital heart disease (CHD). We conducted a scoping review of Scopus, Embase, and PubMed (2002–2024) and found that machine learning and neural networks applied to cardiac MRI, echocardiography, CT, and ECG enhance feature detection and classification, supporting higher diagnostic accuracy; AI-based prediction models improve perioperative risk estimation and postoperative outcomes; and leveraging maternal risk factors in electronic medical records enables earlier, potentially prenatal CHD identification. Multimodal integration across images, signals, and clinical data further strengthens performance. However, broad adoption remains limited by immature or under-validated algorithms, heterogeneous data quality, gaps in physician training, workflow integration challenges, and concerns about over-mechanization and loss of the "human touch." Overall, accumulating evidence indicates that with rigorous validation, transparency, and clinician-centred implementation, AI can advance precision cardiology in paediatrics by improving diagnostic accuracy, enabling risk-aligned management, and reducing error while complementing, not replacing, clinical judgment.

**Keywords:** *Pediatric cardiology, pediatric cardiac surgery, artificial intelligence, congenital heart disorders*

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# CROSSING, THE, UNCROSSABLE, ADVANCES, IN, NANOPARTICLE, DRUG, DELIVERY, SYSTEM, FOR, THE, BLOOD-BRAIN, BARRIER

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**Abstract**

Serving as a tightly regulated and dynamic boundary, the Blood-Brain Barrier (BBB) controls the molecular traffic between the central nervous system (CNS) and systemic circulation. Essential for maintaining neural homeostasis, this barrier excludes nearly all biologics and limits the penetration of more than 98% of small-molecule drugs, highlighting its role as a significant obstacle to CNS drug delivery. Because it cannot cross under normal physiological conditions, this presents a considerable barrier in treating CNS disorders such as Alzheimer's disease, Parkinson's disease, and glioblastoma. Nanoparticle-mediated drug delivery has become a transformative approach to overcoming this limitation. This review outlines the structural and physiological components of the BBB—endothelial cells, tight junctions, astrocytes, and pericytes—that collectively maintain its function. It also explores the potential of dendrimers, liposomes, cyclodextrins, and gold nanoparticles to cross the BBB via passive diffusion, receptor-mediated transcytosis, and carrier-mediated transport. Key design parameters—including particle size, surface charge, shape, and ligand functionalization—that influence CNS penetration, circulation time, and cellular uptake are discussed. Applications in neurodegenerative diseases and brain tumors are reviewed, demonstrating significant improvements in therapeutic precision and efficacy. Furthermore, emerging innovations such as focused ultrasound, BBB-on-a-chip models, and AI-assisted nanoparticle design offer substantial promise for future advancements in nanotechnology.

**Keywords**: *Nanoparticle, drug delivery, Blood-Brain Barrier, targeted brain therapy, neurodegenerative disease*

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# Melt Solid Dispersion-Based Pelletization of Etodolac Using PVP K30 and Functional Excipients: A Scalable, Solvent-Free Strategy for Immediate-Release Drug Delivery

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**Abstract**

The low aqueous solubility of etodolac limits its dissolution and absorption. In this study, melt-solid dispersions of etodolac with PVP K30 were prepared and converted into immediate-release pellets via extrusion-spheronization. Eight solid dispersions (ESD1-ESD8) were prepared and incorporated into eight pellet batches (EF1-EF8) containing MCC, lactose, SLS, and croscarmellose sodium. The techniques used included shake-flask solubility, mixer torque rheometry (MTR) to determine the wet mass endpoint, differential scanning calorimetry (DSC), scanning electron microscopy (SEM), laser diffraction particle sizing, flow indices (bulk and tapped density, Hausner ratio, Carr's index), drug content analysis, and USP dissolution testing in pH 1.2. Solid dispersions increased solubility from 299 µg/mL (pure drug) to 317-458 µg/mL (EF8 highest: 457.58 ± 1.93 µg/mL); this improvement was statistically significant ($t = 5.39$, $p = 0.001$). The MTR suggested that an ideal binder plasticity range is between 20-25%. The pellets showed great manufacturability with Hausner ratios from 1.009 to 1.119 and Carr's index ranging from 0.85 to 10.64%. They also had a narrow size distribution, with means between 1034 and 1269 µm, and maintained consistent drug content levels between 98.27% and 102.34%. Dissolution was significantly better than that of pure etodolac; EF8 achieved 99.99% release at 30 min, while EF7 reached 89.32%. The results suggest that a PVP K30-based solid dispersion, combined with balanced wetting and disintegration and a controlled pellet microstructure, produces rapid and reliable etodolac release in a scalable, solvent-free process.

**Keywords:** *Etodolac; PVP K30; amorphous solid dispersion; extrusion-spheronization; mixer torque rheometer; immediate release; dissolution enhancement; pellets.*

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# Pathophysiology of Diabetes

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**Abstract**

Diabetes mellitus is a persistent and diverse metabolic disorder with a complex underlying cause. It is marked by high blood sugar levels (hyperglycemia), caused by abnormalities in insulin function or both. Hyperglycemia appears in various forms, with different symptoms, and disrupts the metabolism of carbohydrates, fats, and proteins. Prolonged hyperglycemia can cause several macrovascular and microvascular diabetic complications, which are mainly responsible for diabetes-related illness and death. Hyperglycemia is the primary biomarker used to diagnose diabetes. This review focuses on the classification of diabetes and its underlying mechanisms, including the different types.

Keywords: *Diabetes mellitus, endocrinopathies, gestational diabetes, maturity-onset diabetes of the young, neonatal diabetes*

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# ALZHEIMER'S SCLEROSIS

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**Abstract**

At this conference, we aim to highlight the key developments in Alzheimer's disease research. The earliest stage of Alzheimer's disease (cellular phase) happens similarly to accumulating AB (Amyloid beta), and also includes the spread of tau pathology. Also, the risk of Alzheimer's disease is 50-80% depending on the genetic factors. More than 40% Alzheimer's disease cases have connected genetic risk Loci already known, in which the APOE alleles are the strongest connection with the disease. According to the novel biomarker, including plasma assays for Amyloid B and phosphorylated proteins, which also provide great help for research and clinical use. The research indicates that multidomain lifestyle-hazed prevention trials can indeed provide cognitive benefits for individuals with an increased risk of dementia. These trials often focus on interventions that address multiple lifestyle factors simultaneously, such as diet, physical activity, and mental activities (e.g., memory-enhancing games), which have shown positive impacts on intellectual functioning in older adults, including those at risk of developing dementia.

**Key points:** *Alzheimer's disease, Amyloid beta*

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# DRUG DESIGN AND PROCESS CHEMISTRY

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**Abstract:**

Drug Design is the process of discovering and developing new medicines based on the knowledge of a biological target. It involves understanding the structure and function of disease-causing molecules and creating compounds that can interact with them effectively. The main goal of drug design is to produce a drug that shows maximum therapeutic effect with minimum side effects. Modern drug design uses computer-aided techniques such as Computer-Aided Drug Design (CADD), molecular modeling, and structure-activity relationship (SAR) studies. There are two main approaches: structure-based drug design, where the target's 3D structure is known, and ligand-based drug design, which relies on known active compounds. Drug design plays a vital role in pharmaceutical research, reducing the time and cost required for drug discovery. It helps identify potential drug molecules, improve their selectivity, and predict their pharmacokinetic and pharmacodynamic properties. Thus, drug design is an essential step in developing safe and effective medicines for various diseases.

**Keywords**- SAR, CADD, Structure-based drug design, ligand-based drug design.

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# COMPREHENSIVE APPROACHES TO GERIATRIC CARE: MEETING THE COMPLEX NEEDS OF OLDER ADULTS

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The management of elderly patients presents increasing challenges in contemporary clinical practice due to the rising aging population and the complex interplay of medical, functional, and psychosocial factors. Older adults frequently experience multiple chronic illnesses, frailty, cognitive decline, and sensory impairments that demand comprehensive and individualized care. Polypharmacy, altered drug metabolism, and increased susceptibility to adverse drug reactions further complicate therapeutic decision-making. Effective geriatric care extends beyond disease management and requires a holistic approach that integrates physical health, mental well-being, and social support. Comprehensive geriatric assessment serves as a cornerstone for identifying medical, functional, and psychosocial needs, enabling the formulation of personalized care plans. Preventive measures such as fall prevention, vaccination, nutritional support, and early screening for cognitive impairment or depression are critical in maintaining independence and reducing hospitalizations. Moreover, effective communication and empathy play pivotal roles in ensuring adherence, addressing ethical concerns, and involving caregivers in shared decision-making. Interdisciplinary collaboration among physicians, nurses, pharmacists, physiotherapists, and social workers enhances continuity of care and improves patient outcomes. By adopting a patient-centered and compassionate approach, clinicians can better meet the multifaceted needs of elderly patients, promoting dignity, comfort, and an improved quality of life. Thus, addressing the complex needs of the elderly requires not only clinical expertise but also empathy, coordination, and a commitment to holistic, person-centered care.

**Keywords:** Geriatric care, Comprehensive assessment, Polypharmacy, Elderly patients, Holistic approach, Interdisciplinary collaboration

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# Modulation of Ischemic Preconditioning by Alantolactone in Diseased Rat Hearts

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**Abstract**

**Objective**: This study investigates the therapeutic role of alantolactone (AL) in modulating ischemic preconditioning (IPC)-mediated cardioprotection in hyperlipidaemic (HL) rat hearts, with particular focus on its influence on the mitochondrial permeability transition pore (MPTP). While IPC effectively reduced infarct size in normal rat hearts, its protective effect was markedly attenuated under hyperlipidaemic conditions. AL alone did not confer significant cardioprotection in HL rats subjected to ischemia-reperfusion (IR) injury; however, it enhanced IPC-mediated protection. The addition of atractyloside (Atr), an MPTP opener, during reperfusion abolished AL-enhanced IPC effects, underscoring the pivotal role of MPTP modulation.

**Methods**: The modulatory effect of AL on IPC in diseased hearts. Myocardial injury biomarkers (CK-MB, LDH), oxidative stress markers, mitochondrial function and integrity, and histopathological changes were systematically assessed.

**Results**: IPC attenuated oxidative stress and preserved endogenous antioxidants (GSH, SOD, catalase) in normal hearts post-IR, but this effect was blunted in HL hearts. AL treatment restored antioxidant balance and improved mitochondrial integrity in HL hearts, while Atr negated these protective benefits. Histopathological evaluation revealed reduced inflammation and myonecrosis in IPC-treated normal hearts, with AL potentiating these effects in HL hearts. Furthermore, AL facilitated IPC-induced attenuation of PI3K expression, suggesting involvement of prosurvival signaling pathways.

**Conclusion**: Alantolactone therapeutically modulates IPC-mediated cardioprotection in diseased rat hearts by inhibiting MPTP opening, restoring antioxidant defence, and improving mitochondrial function. **Keywords**: *Alantolactone, Ischemic Preconditioning (IPC), Cardioprotection, Hyperlipidemia, Mitochondrial Permeability Transition Pore (MPTP).*

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# Phytopharmaceuticals for Hepatoprotection: A Green Approach to Liver Health and Environmental Sustainability

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## Abstract

There is a growing correlation between environmental stressors such as pollution, industrial chemicals, and lifestyle variables and the rising prevalence of liver illnesses. In this regard, standardized, scientifically proven plant-based medications known as phytopharmaceuticals have two benefits: treatment effectiveness and environmental sustainability. This review examines the hepatoprotective potential of phytopharmaceuticals, highlighting their modes of action, including hepatocyte regeneration, enzyme regulation, antioxidant activity, and anti-inflammatory effects. It also emphasizes green-chemistry-based formulation methods that are environmentally friendly, such as solvent-free extraction, biodegradable carriers, and green nanotechnology. Important phytoconstituents such as andrographolide, curcumin, and silymarin have case studies that highlight their pharmacological importance and the development of formulations. Phytopharmaceuticals are significant because they promote biodiversity, reduce pharmaceutical waste, and align with circular economy principles. Standardization, regulation, and clinical translation continue to present difficulties despite significant advancements. AI-based screening, climate-resilient farming, and environmentally friendly production methods are some potential future directions. This review emphasizes how phytopharmaceuticals support global ecological health through green drug development in addition to protecting the liver.

**Keywords:** *Hepatocyte regeneration, enzyme control, biodegradable carriers, curcumin, phytopharmaceuticals.*

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# Formulation and Evaluation of Novel in Situ Gel System of Aceclofenac in the Management of Rheumatoid Arthritis

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**Abstract**

Rheumatoid arthritis (RA) is a dreaded disease characterized by joint pain, inflammation, and stiffness, leading to severe mobility problems. Non-steroidal anti-inflammatory drugs (NSAIDs) remain a mainstay for symptomatic management. Among them, aceclofenac, a phenylacetic acid derivative, is widely prescribed for its potent anti-inflammatory, analgesic, and antipyretic effects, and for better gastrointestinal tolerance than traditional NSAIDs, such as diclofenac and ibuprofen. The pharmacological profile of aceclofenac and its selective COX-2 inhibition make it a preferred agent for the long-term management of RA-related pain and inflammation. This study aimed to formulate a topical gel containing 1.5% Aceclofenac, 1% Benzyl Alcohol, 3% Linseed oil, 10% Methyl Salicylate, 0.01% Capsaicin, and 5% Menthol, and to evaluate it. Recent research focuses on in situ gel systems of Aceclofenac for localized and sustained delivery to inflamed joints. Such systems offer enhanced residence time, controlled release, reduced dosing frequency, and minimized systemic adverse effects. In-situ gels are triggered by physiological stimuli (pH, temperature, or ions), enabling sol–gel transition at the site of administration.

**Key words:** *NSAIDs, in situ gels, COX-2 inhibition, rheumatoid arthritis.*

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# Design and Evaluation of Buccal Mucoadhesive Tablets of a Hypertensive Drug

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## Abstract

The present study focuses on the design and evaluation of buccal mucoadhesive tablets of Lercanidipine Hydrochloride, an antihypertensive drug belonging to the dihydropyridine class of calcium channel blockers. The buccal route was selected to overcome the limitations of oral administration, such as low bioavailability and first-pass hepatic metabolism. Lercanidipine was formulated with various polymers, including Carbopol 940, Hydroxypropyl Methylcellulose (HPMC), and Sodium Carboxymethylcellulose (SCMC), to achieve prolonged drug release and enhanced mucoadhesive strength. Preformulation studies were conducted to assess drug–excipient compatibility (FTIR), solubility, and analytical parameters by UV spectroscopy, with λmax at 307 nm. Tablets were prepared by direct compression and evaluated for physical parameters, including hardness, friability, weight variation, content uniformity, swelling index, surface pH, and in vitro drug release. The optimized formulation (LEMT1) demonstrated desirable mucoadhesive strength, swelling behaviour, and sustained release for up to 12 hours, with drug content uniformity of 97.67%-103.03%. The study concludes that Lercanidipine Hydrochloride buccal tablets can serve as an effective alternative to conventional oral dosage forms by improving bioavailability, reducing dosing frequency, and enhancing patient compliance through controlled and prolonged drug release.

**Keywords**: Lercanidipine Hydrochloride, Buccal mucoadhesive tablets, Bioavailability, Controlled release, Antihypertensive drug.

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# Diabetes and the Role of Neurotechnology in Its Management

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**Abstract**

Diabetes mellitus remains one of the most challenging metabolic disorders of the 21st century, affecting millions globally. Despite advances in pharmacological treatment, effective glucose regulation and patient compliance remain significant concerns. The integration of neurotechnology — a field combining neuroscience, engineering, and artificial intelligence — has opened new possibilities in diabetes management. Neurotechnology enables the development of brain–computer interfaces, neural sensors, and innovative insulin delivery systems that respond to real-time physiological and neurological signals. These innovations aim to mimic natural pancreatic responses and improve glycemic control. Furthermore, neuroimaging and neurofeedback techniques provide deeper insights into how the brain regulates hunger, stress, and metabolic activity, which are closely linked to the progression of diabetes. Pharmacy and biomedical research play a vital role in translating these technologies into practical therapeutic applications by designing neuro-responsive drugs, bio-sensing devices, and personalized treatment approaches. In conclusion, integrating neurotechnology into diabetes care represents a transformative step toward next-generation healthcare, offering more accurate, adaptive, and patient-centered solutions for long-term disease management.

**Keywords**: Diabetes mellitus, Neurotechnology, Brain–computer interface, Smart insulin, Pharmacy innovation, Personalized therapy

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# Synthesis, Characterization, Biological activity of some novel acetamide derivatives (Anti-tubercular activity)

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## Abstract

Tuberculosis (TB), caused by Mycobacterium tuberculosis, remains a leading cause of morbidity and mortality worldwide, exacerbated by the emergence of multidrug-resistant (MDR) and extensively drug-resistant (XDR) strains. In response to the urgent need for novel therapeutic agents, this study focuses on the design, synthesis, and characterization of novel acetamide derivatives with potential anti-tubercular activity. A series of substituted acetamide compounds was synthesized via amide bond formation using acyl chlorides and appropriately substituted aromatic amines. The chemical structures of the synthesized compounds were confirmed by comprehensive spectral analysis, including Fourier-transform infrared spectroscopy (FT-IR), proton and carbon nuclear magnetic resonance ($^{1}$H NMR and $^{13}$C NMR), and mass spectrometry (MS). The biological evaluation was performed using the Microplate Alamar Blue Assay (MABA) to assess in vitro anti-tubercular activity against the standard M. tuberculosis H37Rv strain. Several derivatives demonstrated significant inhibitory effects, with minimum inhibitory concentrations (MICs) ranging from 0.78 to 12.5 µg/mL, indicating promising tuberculostatic potential. Structure–activity relationship (SAR) analysis highlighted the critical influence of electron-withdrawing and lipophilic substituents on the aromatic ring in enhancing antimycobacterial efficacy.Compounds bearing halogens, nitro, and trifluoromethyl groups exhibited the most potent activity, suggesting favorable interactions with target biomolecules involved in mycobacterial cell wall synthesis and metabolism. Overall, the study presents a successful approach to developing novel acetamide-based scaffolds as potential anti-TB agents. These findings warrant further pharmacological optimization, molecular docking studies, and in vivo evaluations to advance the most active compounds as candidates for future anti-tubercular drug development.

**Keywords:** *Acetamide derivatives, Anti-tubercular activity, Mycobacterium tuberculosis, Synthesis, Characterization, MIC, FT-IR, NMR,*

Proceedings of the e-International Conference Global Perspective on Next Generation Pharmaceutical Science, Technology and Healthcare

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# Polyphenols-Based Nanoemulsion Mediated Brain Delivery for Reduction of Oxidative Stress in Neurological Disorders

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## Abstract

Neurological disorders such as Alzheimer's disease, Parkinson's disease, and other neurodegenerative conditions are often associated with elevated oxidative stress, leading to neuronal damage and cognitive decline. Polyphenols, naturally occurring antioxidants found in plants, possess remarkable neuroprotective, anti-inflammatory, and free-radical-scavenging properties. However, their therapeutic potential is limited due to poor bioavailability, low stability, and restricted permeability across the blood–brain barrier (BBB). The present study focuses on the development of a **polyphenol-based nanoemulsion system** to enhance brain delivery and therapeutic efficacy against oxidative stress-induced neuronal damage. The nanoemulsion formulation was optimized for particle size, zeta potential, encapsulation efficiency, and stability. In vitro and ex vivo studies demonstrated improved permeation across the BBB and enhanced antioxidant activity compared to free polyphenols. Furthermore, in vivo evaluations indicated a significant reduction in oxidative biomarkers and neuronal apoptosis, highlighting effective neuroprotection. This nanoemulsion-based delivery platform provides a promising strategy to overcome the pharmacokinetic limitations of polyphenols and offers a potential therapeutic approach for managing oxidative stress-related neurological disorders.

**Keywords:** *Nanoemulsion, Polyphenols, Neurological disorder, BBB, mucoadhesive,*

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# Molecular Docking and QSAR Studies of Triazole Derivatives as Potential Antibacterial Agents

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## Abstract

The increasing prevalence of antibiotic-resistant bacteria has necessitated the discovery of novel antibacterial agents with improved efficacy and safety profiles. Triazole derivatives have emerged as promising scaffolds in medicinal chemistry due to their broad pharmacological potential and structural versatility. In the present study, a combination of molecular docking and Quantitative Structure–Activity Relationship (QSAR) analyses was employed to investigate the antibacterial potential of selected triazole derivatives. A series of triazole compounds was retrieved from literature and chemical databases, followed by structure optimization and descriptor generation. Molecular docking studies were performed against key bacterial target enzymes, including DNA gyrase and dihydrofolate reductase, to predict binding affinities and interaction patterns. The results revealed that several triazole derivatives exhibited strong binding energies, forming stable hydrogen bonds and hydrophobic interactions with crucial amino acid residues of the target proteins. QSAR modelling was subsequently performed using statistical methods to establish correlations between molecular descriptors and antibacterial activity. The developed QSAR model demonstrated good predictive performance, with significant correlation coefficients ($R^2$ and $Q^2$), highlighting the physicochemical features responsible for activity. Furthermore, ADMET profiling confirmed that the most active compounds possessed favourable pharmacokinetic and drug-likeness properties. Overall, the integrated computational approach provides a comprehensive understanding of the structural requirements for antibacterial efficacy in triazole derivatives. The findings offer valuable insights for the rational design of potent triazole-based antibacterial agents and lay a foundation for further experimental validation.

**Keywords:** *Triazole derivatives, Antibacterial activity, Molecular docking, QSAR, DNA gyrase, ADMET, Drug design*

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# Carvedilol- Loaded Emulsomes: A Novel Nanocarrier Strategy for Hypertension Management

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**Abstract**

Hypertension is among the most prevalent non-communicable diseases worldwide and is a major risk factor for cardiovascular morbidity and mortality. Despite advances in pharmacological therapies, limitations such as poor drug bioavailability, dosing frequency, and adverse effects remain critical challenges. Carvedilol, a third-generation non-selective β-blocker with additional $\alpha_1$-blocking and antioxidant properties, plays a significant role in the treatment of hypertension, heart failure, and post-myocardial infarction management. However, its therapeutic efficacy is limited by extensive first-pass metabolism, resulting in low oral bioavailability. Nanocarrier-based delivery systems, particularly emulsomes, have emerged as a promising solution for lipophilic drugs like carvedilol. Emulsomes, composed of a solid lipid core stabilized by phospholipid bilayers, combine the advantages of liposomes and solid lipid nanoparticles, offering enhanced drug loading, protection from degradation, controlled release, and improved pharmacokinetics. This research synthesizes current knowledge on carvedilol pharmacology and evaluates the potential of emulsomes as a novel delivery platform. Findings suggest that carvedilol-loaded emulsomes may enhance bioavailability, reduce dosing frequency, and improve therapeutic outcomes in hypertension management. Further preclinical and clinical investigations are warranted to validate safety, optimize formulation, and explore translational applicability in cardiovascular therapy.

**Keywords:** *Hypertension, Carvedilol, Emulsomes, Nanocarriers, Drug Delivery, Cardiovascular Therapy*

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# Hepatoprotective effect of methanolic extract of Origanum majoranaon paracetamol-induced liver toxicity in rats

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## Abstract

Origanum majorana is a medicinal plant with traditional claims but ignored investigation regarding its hepatoprotective effects. The current study is aimed to investigate the hepatoprotective potential of Origanum majorana methanol, water extract and isolated compound (hesperetin) on paracetamol-induced liver injury. The phytochemical screening was done which showed the presence of potential constituents including flavonoids and phenols. For investigating the hepatoprotective effect of Origanum majorana extract, rats were given different treatments for seven consecutive days. The normal control was administered with normal saline, group 2 received paracetamol and group 3 (Standard) was given silymarin as reference drug. In group 4 and 5 (Treated), methanolic extract (100 and 200mg/kg); group 6 and 7 (Treated) aqueous extract (100 and 200mg/kg); group 8 (hesperetin) were administered. Different serum biomarkers and histopathological studies were performed to assess the recovery caused by paracetamol in comparison to diseased group. The treatment of Origanum majorana methanolic extract and (hesperetin) significantly improve the serum biomarkers and restored the hepatic injury towards normal, indicating the hepatoprotective potential. Thus, we can conclude that Origanum majorana and isolated compound (hesperetin) have significantly reversed the damage caused by paracetamol in hepatotoxic rat model

Key words: *Origanum majorana, paracetamol-induced liver injury, Hepatoprotective effect, hesperetin*

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KNIMT/2025/ IC-061

# Phytomedicine

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**Abstract**

Phytomedicine, also known as herbal medicine, is the scientific study and therapeutic application of plant-derived compounds for the prevention and treatment of diseases. It bridges traditional herbal knowledge with modern pharmacological research, emphasizing the use of whole plants or their parts such as leaves, roots, bark, and flowers. The bioactive phytochemicals present in medicinal plants—such as alkaloids, glycosides, flavonoids, and terpenes—exhibit diverse pharmacological actions including anti-inflammatory, antimicrobial, and antioxidant effects. Historically, herbal medicine dates back to ancient civilizations like India, China, and Egypt, forming the foundation of systems such as Ayurveda and Traditional Chinese Medicine. Various ecological factors, including climate, soil composition, altitude, and biotic interactions, influence the growth and efficacy of medicinal plants. Common examples of medicinal plants include Aloe vera, Turmeric, Ginger, Basil, Giloy, and Ashwagandha. Herbal drugs offer several advantages, such as affordability, accessibility, and fewer side effects compared to synthetic drugs. However, improper use or lack of standardization can lead to adverse reactions, including hepatotoxicity and cardiotoxicity. Overall, phytomedicine represents a vital link between nature and modern healthcare, offering sustainable and effective alternatives for promoting human health.

**Keywords**- *Phytomedicine, phytochemicals, cardiotoxicity, sustainable*

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# Application of Artificial Intelligence in Drug Discovery and Patient-Centred Pharmacy Practice

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**Abstract**

Artificial Intelligence (AI) is playing an increasingly transformative role across the pharmaceutical sector by enhancing both drug discovery and patient-focused healthcare services. Traditional drug discovery is often prolonged, highly expensive, and associated with a high failure rate during advanced stages of development. AI-based computational models such as machine learning and deep learning can rapidly analyse large chemical and biological datasets to identify new targets, predict molecular interactions, and optimise candidate molecules.

In pharmacy practice, AI assists healthcare professionals in delivering more personalised, data-driven, and preventive care. AI-enabled clinical decision support systems help pharmacists monitor therapy outcomes, predict adverse reactions, and recommend appropriate interventions in real time. Additionally, telepharmacy and virtual counselling platforms provide timely pharmaceutical care in rural and underserved regions, promoting equity in healthcare delivery. By improving medication adherence and enabling patient-specific therapy optimisation, AI strengthens the overall quality of care.

However, the integration of AI into pharmacy faces challenges such as concerns regarding data privacy, algorithm transparency, legal frameworks, and the need for skill enhancement among practicing pharmacists. Addressing these challenges through strong digital health policies and professional capacity-building programs will be crucial for scaling its adoption. Overall, AI offers immense potential for building a smarter, safer, and patient-centred healthcare model driven by innovation and evidence-based practice.

**Keywords**: *Artificial Intelligence, Drug Discovery, Machine Learning, Patient-Centred Care, Telepharmacy, Clinical Decision Support System, Pharmaceutical Innovation*.

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# Advancing Leishmaniasis Treatment: Nanoemulgel Formulations for Targeted, Effective, and Safer Therapy

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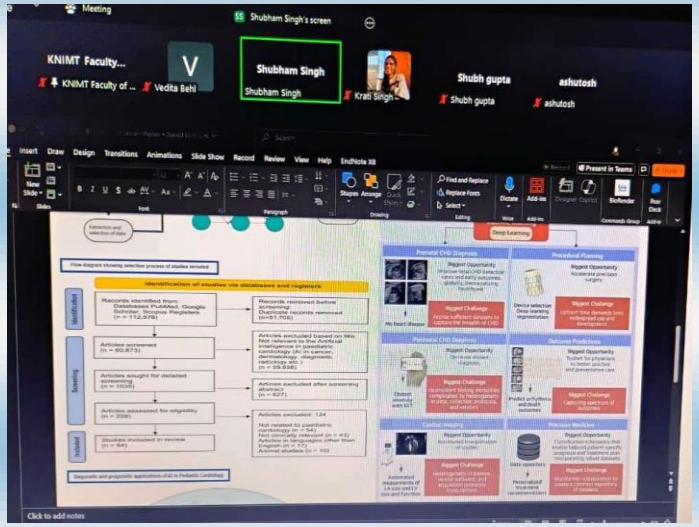
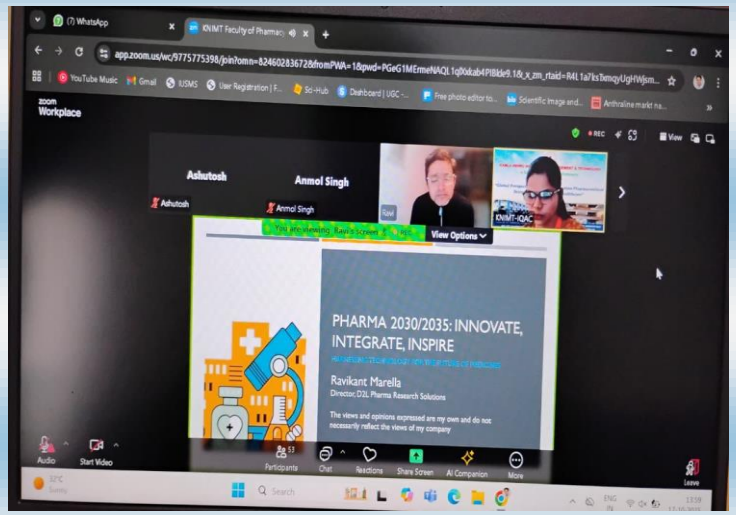
**Abstract**

Leishmaniasis is a neglected tropical disease caused by protozoan parasites of the genus Leishmania affects over countries, with Afghanistan, Algeria, Brazil, Pakistan, Peru, Saudi Arabia and Syria accounting for 90% of all cases for 90% of cutaneous leishmaniasis (CL) cases globally. the primary causative agent for CLinclude *Leishmania major*, *Leishmania tropica*, *Leishmania mexicana, Leishmania braziliensis*, *Leishmania panamensis.* The present treatment strategies of leishmaniasis limited by the challenges such as high toxicity, elevated cost, and the emergence of drug resistance. Therefore, for combating leishmaniasis, novel therapeutic approaches need to be designed for better patient compliance, and lower toxicity at affordable cost. This study focused on the development and evaluation of nanoemulgel formulation for the localized treatment of leishmaniasis. Nanoemulgels were prepared by encapsulating the anti-leishmanial drug within gel matrix and were characterized for particle size, polydispersity index, zeta potential, and viscosity. After the characterization, *in vitro* studies conducted for assessment of drug release profile, stability and toxicity While *in-vivo* studies were conducted for the therapeutic evaluation in animal models against leishmaniasis. Preliminary findings suggest that nanostructured emulgel systems could significantly improve the localized delivery of anti-leishmanial drugs to the affected skin areas, reducing systemic side effects and improving patient compliance. *In vivo* results showed a marked reduction in parasite burden at the site of infection compared to free drug formulations, indicating superior therapeutic efficacy and reduced systemic side effects. These findings highlight the potential of nanoemulgels as a promising strategy for improving the management of leishmaniasis. Further *in vivo* studies in higher animals and clinical trials are essential to validate these results and optimize the formulation for clinical application. Artificial intelligence (AI) is playing an increasingly vital role in revolutionizing the diagnosis, treatment, and drug discovery for leishmaniasis.

**Keywords**: *Leishmaniasis, Nanoemulgel, Anti leishmanial activity*

# Glimpse of e-International Conference




## Courses Offered

| | |
|---|---|
| **Diploma in Pharmacy (60 Seats)** | **BTE Code: 2779** |
| **B. Pharm (100 Seats)** | **AKTU Code:186** |

## College Gallery