# DISHA MEDFUSION-2025

International Conference

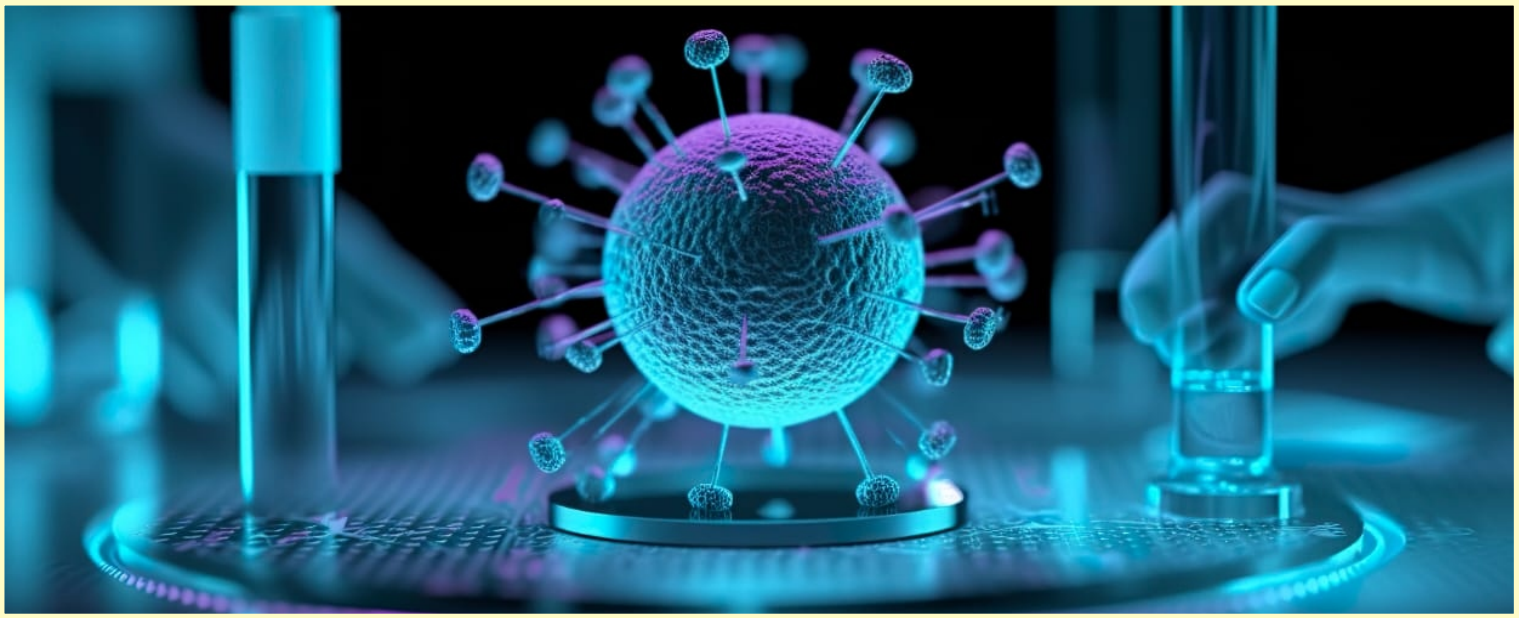
On

Pharmaceuticals, Microbiology, and Intellectual Property

Collaborating for Global Health Solutions

10th February 2025

# Book of Abstracts



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**The Book of Abstracts**

International Conference
on
Pharmaceuticals, Microbiology & Intellectual Property:
Collaborating for Global Health Solutions

**Disha Medfusion-2025**

**10th February 2025**

**Organized By**

Disha Group of Institutions
In Collaboration with
P.R.S. Educational Trust

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# Disha Medfusion-2025

February 10, 2025
Venue: Block B, Seminar Hall,
Disha Group of Institutions, Dhampur, Bijnor

## Programme Schedule

| Time | Events | |
|---|---|---|
| 10:00 am to 10:05 am | Lamp Lightening & Saraswati Vandana | |
| 10:05 am to 10:10 am | Felicitation of Guests | |
| 10:10 am to 10:15 am | Welcome Address by Chief Patrons | |
| 10:15 am to 10:25 am | Introduction of Disha Group of Institutions | **Mr. Anirudh Agarwal,** Joint Secretary, Disha Group of Institutions |
| 10:25 am to 10:30 am | Introduction of PRS Educational Trust | **Ms. Akanksha Sharma,** Scientific Writer, PRS Educational Trust |
| 10:30 am to 10:35 am | Address by Guest | **Mrs. Neha Vaish,** Drug Inspector, Pilibhit, U.P. |
| 10:35 am to 10:40 am | Professional Remark by Co-chairperson | **Dr. Pawan Kumar Jalwal** (Baba Mast Nath University) |
| 10:40 am to 10:45 am | Professional Remark Chairperson | **Prof. (Dr.) M. Shahar Yar,** SPER, Jamia Hamdard |
| 10:45 am to 10:55 am | Address by Chief Guest | **Prof. (Dr.) Vibhu Sahani,** Professor & Head, Department of Pharmacy, LLRM Medical College, U.P. |
| 10:55 am to 11:00 am | Conferment of Prof. S.K. Singh Memorial Award | |
| 11:00 am to 11:05 am | Vote of thanks | **Prof. (Dr.) Sanjay Singh,** Siddhartha Institute of Pharmacy, Dehradun |
| 11:05 am to 11:20 am | **High Tea** | |
| | **Keynote Address** | |
| 11:20 am to 11:50 am | **1. Prof. (Dr.) Shaweta Sharma,** SMAS, Galgotias University | |
| 11:50 am to 12:20 pm | **2. Prof. (Dr.) Neeraj Kumar Fuloria,** AIMST University Malaysi | |
| 12:20 pm to 01:00 pm | **3. Ms. Sumita Bhatia,** AIMST University Malaysia | |
| 01:00 pm to 02:00 pm | **Lunch** | |
| 02:00 pm to 02:30 pm | **4. Dr. Arun Rastogi,** CEO, Omar Surgiwear and Formulation, Shahjahanpur, U.P. | |
| 02:30 pm to 03:00 pm | **5. Dr. Jaspreet Singh,** Co-founder, IPQuad, New Delhi | |
| 03:30 pm to 04:00 pm | **6. Mr. Pulkit Guglani,** Director, Global Forcasting, Takeda Oncology, USA | |
| 04:00 pm to 04:25 pm | Valedictory Function | |
| 04:25 pm to 04:30 pm | Vote of Thanks | **Dr. Anuj Agarwal,** Disha Group of Institutions, Dhampur |

# International Conference
on
# Pharmaceuticals, Microbiology & Intellectual Property: Collaborating for Global Health Solutions


# Disha Medfusion-2025

Organized by
**Disha Group of Institutions**
In Collaboration with
**P.R.S. Educational Trust**

**10th Feb. 2025**
**Hybrid Mode**

Venue:
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# Disha Medfusion-2025

## Disha Group of Institutions

Disha Group of Institutions, established in 2006, is a leading name in higher education in Dhampur (Bijnor). With state-of-the-art infrastructure and a commitment to academic excellence, we provide a nurturing environment for students to grow and thrive. Our diverse range of programs, experienced faculty, and modern facilities are designed to equip students with the knowledge and skills needed to excel in their chosen fields. By fostering innovation, creativity, and holistic development, we aim to shape future leaders and professionals who contribute meaningfully to society. At Disha Group of Institutions, we are dedicated to creating a brighter future through transformative education.

## P. R. S. Educational Trust

The Pharmacy education in India is plagued by significant obstacles and defects in this specialised and globalised world. There seems to be an immediate need to start an academic activity to achieve curriculum revision that keeps up with current and upcoming developments in the Pharmacy profession. All around the world, innovation has taken on a guiding role in every facet of life. A country's capacity to develop and utilise knowledge capital impacts its ability to empower and enable its people by enhancing human capacities. Despite unceasing success in pharmaceutical research and education, there are still unclear ideas about how to educate youngsters in the current environment. The absence of learning opportunities, traditional teaching methods, a lack of clarity about the future, and a lack of a dear path or set of goals have caused uncertainty and delirium among the students in the current context. The P.R.S. Educational Trust was established in 2016 by Smt. Pramod Sharma and a group of enthusiastic, hardworking, and workaholic individuals with the sole purpose of putting value-based education within everyone's grasp. By offering career development opportunities, education and training, certification programmes, publications that share knowledge, networking opportunities, and other Important resources, P.R.S. Educational Trust supports and promotes the health care industry as a whole as well as emerging professionals. P.R.S. is an international membership organisation of Pharmaceutical professionals who are committed to elevating the profession and giving the Pharma/healthcare community the greatest level of support, information, guidance, and standards. P.R.S. members are professionals who play crucial roles in many of the rapidly expanding fields of biotechnology, pharmaceuticals, and medical devices. By offering career advancement opportunities, education and training, certificates, knowledge-sharing, publishing, networking, and other important resources, PRS assists the healthcare sector and developing professionals as a whole.

## Objectives of DISHA MEDFUSION-2025

The primary objective of “Pharmaceuticals, Microbiology, and Intellectual Property: Collaborating for Global Health Solutions” is to foster interdisciplinary collaboration to address critical global health challenges. By bringing together experts from the Pharmaceutical industry, Microbiology, Research, and intellectual property (IP) law, the conference aims to bridge knowledge gaps, drive innovation, and ensure equitable access to healthcare solutions worldwide.

**The event is designed to,**

- Advance Scientific Understanding: Highlight breakthroughs in Microbiology and Pharmaceutical sciences that address pressing health concerns such as antimicrobial resistance and infectious diseases.
- Promote Strategic Collaboration: Facilitate partnerships among academia, industry, and regulatory bodies to accelerate the development of impactful healthcare solutions.
- Navigate IP Challenges: Explore the role of intellectual property in protecting innovations while ensuring global accessibility to critical medicines and technologies.

- Encourage Policy Dialogue: Provide a platform to discuss regulatory frameworks, ethical considerations, and sustainable business models that balance innovation and inclusivity.
- Through expert keynotes, interactive sessions, and collaborative workshops, the conference aspires to empower participants with actionable insights and practical strategies. The ultimate goal is to cultivate a global community dedicated to leveraging science, innovation, and policy to create transformative health solutions for a better and healthier future.

## About the Conference

"Pharmaceuticals, Microbiology and Intellectual Property: Collaborating for Global Health Solutions" is a groundbreaking event bringing together experts from the Pharmaceutical, Microbiology, and Intellectual property (IP) sectors to address pressing global health challenges. As the world continues to face evolving health crises, innovative collaborations are key to fostering effective solutions. This conference offers a unique platform to explore the intersections of drug development, microbiological advancements, and the critical role of IP in protecting and promoting innovations. Participants will engage in dynamic discussions on topics such as antimicrobial resistance, cutting-edge biotechnological innovations, and the balance between incentivizing innovation and ensuring global access to medicines. Special focus will be placed on navigating regulatory landscapes and fostering partnerships between academia, industry, and government. Keynote speakers include renowned scientists, legal experts, and industry leaders who will share insights into how interdisciplinary approaches can accelerate progress. Interactive panel discussions, workshops, and networking sessions provide opportunities to exchange ideas, build collaborations, and shape the future of global health solutions. Whether you are a researcher, industry professional, policymaker, or legal expert, this conference offers a rare opportunity to gain actionable knowledge, forge strategic partnerships, and contribute to a healthier world. Join us at "DISHA MEDFUSION-2025" to be at the forefront of innovation and impact. Together, we can create pathways for a healthier and more sustainable future.

## Submission of Abstract

Scientific Research and Review papers on unpublished/original work are invited from delegates for poster/oral presentation on the following subjects.

| | |
|---|---|
| 1. Pharmacology | 7. Pharmaceutical Chemistry |
| 2. Pharmacovigilance | 8. Pharmaceutical Analysis |
| 3. Clinical Pharmacy | 9. Pharmacognosy |
| 4. Pharmacy Practice | 10. Industrial Pharmacy |
| 5. Drug Regulatory Affairs | 11. Pharmaceutical Biotechnology |
| 6. Pharmaceutics | 12. Artificial Intelligence in Pharma sector |
| 13. Antimicrobial Resistance (AMR) | 14. Vaccines & pharmaceuticals in Emerging Health Challenges |
| 15. Microbes as Biosource in industries | 16. Clinical Microbiology |

Delegates are requested to submit their abstract via e-mail to conference.prseducationaltrust@gmail.com on or before 31st Jan 2025. The abstract should not be exceeding 200 words and should be prepared in Times New Roman Font. Title should be in bold case (font size 14), full names of the authors followed with their affiliation in normal font (font size 12). The presenting author name should be bold and marked with asterisk along with affiliation and e-mail address. It is mandatory for the presenting author to be registered for the Conference.

# Disha Medfusion-2025

## Instructions for Oral Presentation

- Oral Presentation will be in Hybrid Mode.
- The time limit for oral presentation will be 8 minutes followed by discussion for 2 minutes.
- Number of slides must be in between 5-10.
- It is highly recommended that only one presenter will present the oral presentation.

## Instructions for E-Poster Presentation

- Poster presentation will also be in Hybrid mode.
- Only e-poster will be applicable.
- The time limit for poster presentation will be 3 minutes followed by discussion for 2 minutes.
- File format-PDF file- 1 page recommended.

**Note: The selected abstracts will be considered for publication in the International Journal of Pharma Professional's Research, a peer-reviewed journal.**

## Registration Details

| Category | Registration Till 31st Jan 2025 | On the Spot Registration 10th Feb 2025 |
|---|---|---|
| Students (Diploma/UG/PG) | 800 Rs. | 1000 Rs. |
| Research Scholar (PhD) | 1000 Rs. | 1200 Rs. |
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## ***SCIENTIFIC ABSTRACTS INDEX***

**Table of Contents**


| Abstract Id | Title/Authors & Affiliation | Page No. |
|---|---|---|
| DIST/2025/01 | **Next-Generation Drug Discovery: Bridging Microbiology and Pharmaceuticals**<br>Mohd Danish*, Nidhi Rajput | 1. |
| DIST/2025/02 | **Advanced Formulation Strategies for Combating Infectious Diseases**<br>Mohd Musharraf*, Nidhi Rajput | 2. |
| DIST/2025/03 | **AI-Driven Drug Development: A Synergy of Microbiology and Pharma**<br>Muhmmad Anas*, Nidhi Rajput | 3. |
| DIST/2025/04 | **Personalized Medicine: Innovations in Microbial Therapeutics**<br>Sachin Kuimar*, Nidhi Rajput | 4. |
| DIST/2025/05 | **The Role of Nanotechnology in Pharmaceutical Drug Delivery**<br>Ruchi*, Nidhi Rajput | 5. |
| DIST/2025/06 | **Enhancing Antibiotic Efficacy Through Smart Drug Formulations**<br>Rohit Kumar*, Anuj Kumar Sharma | 6. |
| DIST/2025/07 | **Biopharmaceuticals and Microbial Engineering for Targeted Therapies**<br>Anshul Chauhan*, Anuj Kumar Sharma | 7. |
| DIST/2025/08 | **From Research to Reality: Fast-Tracking Drug Approvals for Emerging Diseases**<br>Sourabh Kumar*, Anuj Kumar Sharma | 8. |
| DIST/2025/09 | **Evaluation of Antipyretic Potential of Stem Bark of *Kydia calycina*** | 9. |

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| | | |
|---|---|---|
| | Nidhi Rajput* | |
| DIST/2025/10 | **Role of Pharmacogenomics in Precision Antimicrobial Therapy**<br>Shahnewaz*, Anuj Kumar Sharma | 10. |
| DIST/2025/11 | **Exploring Probiotics as the Next Frontier in Drug Development**<br>Areeb Khan*, Anuj Kumar Sharma | 11. |
| DIST/2025/12 | **Microbial Resistance and the Global Health Crisis: Strategies for Control**<br>Umair Ahmad*, Monu Kumar | 12. |
| DIST/2025/13 | **Unlocking the Power of Microbiota for Future Therapeutic Solutions**<br>Mohd Zubair Ansari*, Monu Kumar | 13. |
| DIST/2025/14 | **Next-Generation Vaccines: Harnessing Microbial Innovation**<br>Km. Kausar Jahan*, Monu Kumar | 14. |
| DIST/2025/15 | **Phage Therapy: A Renaissance in Infectious Disease Treatment**<br>Barirah Fatima*, Monu Kumar | 15. |
| DIST/2025/16 | **The Role of Synthetic Biology in Revolutionizing Antimicrobial Development**<br>Samreen Alam*, Monu Kumar | 16. |
| DIST/2025/17 | **Overcoming Superbugs: Novel Approaches to Antimicrobial Resistance**<br>Mohd Salman*, Nitish Kumar | 17. |
| DIST/2025/18 | **Microbial Genomics: A Pathway to Innovative Drug Discovery**<br>Nitin Kumar*, Nitish Kumar | 18. |
| DIST/2025/19 | **Exploring Metagenomics for New-Age Pharmaceutical Solutions** | 19. |

ISBN: 978-93-6135-396-3

| | | |
|---|---|---|
| | Mohd Farman*, Nitish Kumar | |
| DIST/2025/20 | **Gut Microbiome and Its Impact on Drug Metabolism and Efficacy**<br>Ibrahim Raza Zaidi *, Nitish Kumar | 20. |
| DIST/2025/21 | **Biofilm Disruption Strategies: A New Era in Antimicrobial Research**<br>Abhinay Rajput*, Nitish Kumar | 21. |
| DIST/2025/22 | **The Future of Intellectual Property in Pharmaceutical Innovations**<br>Nikhil Chauhan*, Surya Pratap Sisodia | 22. |
| DIST/2025/23 | **Patents and Public Health: Striking a Balance in Global Drug Access**<br>Akshay Kumar Prajapati*, Surya Pratap Sisodia | 23. |
| DIST/2025/24 | **Open-Source Drug Discovery: A Paradigm Shift in Pharma Research & Development**<br>Nitin Kumar*, Surya Pratap Sisodia | 24. |
| DIST/2025/25 | **Intellectual Property Laws and Their Impact on Antimicrobial Research**<br>Mohd Rihan*, Surya Pratap Sisodia | 25. |
| DIST/2025/26 | **Global Health Equity: Challenges in Pharmaceutical Patent Policies**<br>Mohd Arbaz*, Surya Pratap Sisodia | 26. |
| DIST/2025/27 | **Data Exclusivity and Its Role in Biopharmaceutical Development**<br>Kartik Kumar*, Kapil Kumar | 27. |
| DIST/2025/28 | **IP Challenges in CRISPR-Based Therapeutics and Microbial Engineering**<br>Tushar Semal*, Kapil Kumar | 28. |
| DIST/2025/29 | **The Role of TRIPS Agreement in Shaping Global Pharma Innovation**<br>Vandana Kamboj*, Kapil Kumar | 29. |

**ISBN: 978-93-6135-396-3**

| | | |
|---|---|---|
| DIST/2025/30 | **Bridging Innovation and Accessibility: A Legal Perspective on Pharma Patents**<br><br>Yash Kumar*, Kapil Kumar | 30. |
| DIST/2025/31 | **Compulsory Licensing: A Solution for Affordable Life-Saving Medicines?**<br><br>Vikrant Kumar*, Kapil Kumar | 31. |
| DIST/2025/32 | **AI-Powered Microbial Drug Discovery: Transforming Healthcare**<br><br>Gourav Saini*, Shivam Kumar | 32. |
| DIST/2025/33 | **Machine Learning in Drug Resistance Prediction and Control**<br><br>Khushi Vashistha*, Shivam Kumar | 33. |
| DIST/2025/34 | **AI-Driven Formulation Design for Personalized Pharmaceuticals**<br><br>Rukshar*, Shivam Kumar | 34. |
| DIST/2025/35 | **Bioinformatics in Pharmaceutical Microbiology: An Efficient Approach**<br><br>Sabiha Kanwal Ansari*, Shivam Kumar | 35. |
| DIST/2025/36 | **CRISPR Technology in Pharmaceutical and Microbial Engineering**<br><br>Kashaf Rehman*, Shivam Kumar | 36. |
| DIST/2025/37 | **AI and Big Data: Optimizing Drug Trials for Infectious Diseases**<br>David Sharma*, Shivam Kumar | 37. |
| DIST/2025/38 | **Digital Microbiology: Smart Solutions for Pathogen Detection**<br><br>Nakul Kumar*, Prakul Kumar | 38. |
| DIST/2025/39 | **Blockchain in Pharmaceutical Intellectual Property Management**<br><br>Jayveer Singh*, Prakul Kumar | 39. |
| DIST/2025/40 | **AI-Enhanced Drug Repurposing Strategies for Emerging Infections**<br>Ajay Kumar*, Prakul Kumar | 40. |
| DIST/2025/41 | **Virtual Screening and AI in Novel Antibiotic Development** | 41. |

ISBN: 978-93-6135-396-3

| | | |
|---|---|---|
| | Divyanshu Kumar*, Prakul Kumar | |
| DIST/2025/42 | **Ensuring Pharma Supply Chain Resilience for Global Health Emergencies**<br>Vivek Kumar*, Prakul Kumar | 42. |
| DIST/2025/43 | **Role of 3D Printing in Decentralized Drug Manufacturing**<br>Priyanshu Kumar*, Lalit Kumar | 43. |
| DIST/2025/44 | **Blockchain and IoT in Pharmaceutical Supply Chain Security**<br>Shaurya Kumar*, Lalit Kumar | 44. |
| DIST/2025/45 | **Strengthening Biopharmaceutical Logistics for Pandemic Preparedness**<br>Ikhlas Zafar*, Lalit Kumar | 45. |
| DIST/2025/46 | **AI and Automation in Pharmaceutical Manufacturing: A Disruptive Force**<br>Mohd Uzair*, Lalit Kumar | 46. |
| DIST/2025/47 | **Smart Packaging for Pharmaceutical Traceability and Safety**<br>Navneet Kumar*, Sharmistha Singh | 47. |
| DIST/2025/48 | **Counterfeit Drug Prevention: The Role of Technology and IP Protection**<br>Mohd Zeeshan*, Sharmistha Singh | 48. |
| DIST/2025/49 | **Digital Twins in Pharma: Optimizing Manufacturing and Drug Safety**<br>Vaishali*, Sharmistha Singh | 49. |
| DIST/2025/50 | **Cold Chain Innovations for Global Vaccine Distribution**<br>Mohd Sameer*, Sharmistha Singh | 50. |
| DIST/2025/51 | **Sustainable Drug Production: A Step Towards Green Pharmaceuticals**<br>Nadeem*, Sharmistha Singh | 51. |
| DIST/2025/52 | **Ethical Challenges in AI-Driven Drug Discovery**<br>Mohd Abubakra[1]*, Navneet Thakker[2] | 52. |
| DIST/2025/53 | **Global Drug Regulation Harmonization: A Path to Faster Approvals**<br>Mohd Ayan Irfan Siddiqui[1]*, Navneet Thakker[2] | 53. |
| DIST/2025/54 | **Pharmacovigilance in the Age of AI and Digital Health**<br>Sohan Singh[1]*, Navneet Thakker[2] | 54. |
| DIST/2025/55 | **Ethical Dilemmas in Access to Experimental Drug Therapies**<br>Sartaj Ali[1]*, Navneet Thakker[2] | 55. |
| DIST/2025/56 | **Transparency in Clinical Trials: The Need for Open Data Policies**<br>Farman Alam[1]*, Navneet Thakker[2] | 56. |
| DIST/2025/57 | **Digital Health Policies and Their Role in Pharma Innovation**<br>Sofiya Naaz[1]*, Gurjeet Singh[2] | 57. |

**ISBN: 978-93-6135-396-3**

| | | |
|---|---|---|
| DIST/2025/58 | **Patient-Centered Drug Development: Integrating Public Health Needs**<br>Vansh Chauhan[1]*, Gurjeet Singh[2] | 58. |
| DIST/2025/59 | **The Role of Regulatory Sandboxes in Pharma Innovation Acceleration**<br>Saniya Parveen[1]*, Gurjeet Singh[2] | 59. |
| DIST/2025/60 | **Policy Frameworks for Emerging Biopharmaceutical Technologies**<br>Insha Parveen[1]*, Gurjeet Singh[2] | 60. |
| DIST/2025/61 | **Ethical Considerations in Genetic-Based Pharmaceutical Interventions**<br>Meenakshi Saini[1]*, Gurjeet Singh[2] | 61. |
| DIST/2025/62 | **The Rise of Edible Vaccines: Opportunities and Challenges**<br>Mohd Ayan Tasleem[1]*, Amit Kumar Rishi[2] | 62. |
| DIST/2025/63 | **Phytopharmaceuticals: Unlocking the Potential of Natural Medicine**<br>Mohit Kumar*, Amit Kumar Rishi[2] | 63. |
| DIST/2025/64 | **Marine Microbiomes as a Treasure Trove for New Drug Discovery**<br>Divyansh Rajput*, Amit Kumar Rishi[2] | 64. |
| DIST/2025/65 | **From Traditional Medicine to Biopharma: Bridging the Gap**<br>Muskan Thoriya*, Anuj Agarwal | 65. |
| DIST/2025/66 | **Microbial Factories: Engineering Bacteria for Drug Synthesis**<br>Muskan*, Anuj Agarwal | 66. |
| DIST/2025/67 | **The Promise of RNA Therapeutics in Next-Gen Drug Development**<br>Hammad Siddiqui*, Anuj Agarwal | 67. |
| DIST/2025/68 | **Biosensors in Pharma: Real-Time Monitoring of Drug Efficacy**<br>Suhail Ahmad Saifi*, Anuj Agarwal | 68. |
| DIST/2025/69 | **Smart Pills and Digital Medicine: Transforming Patient Adherence**<br>Ravikant*, Anuj Agarwal | 69. |
| DIST/2025/70 | **AI-Powered Drug Delivery Systems: The Future of Precision Medicine**<br>Jatin Kumar*, Shavej Husain | 70. |
| DIST/2025/71 | **Plant-Based Biologics: The Next Wave in Pharmaceutical Innovation**<br>Shivam Kumar*, Shavej Husain | 71. |
| DIST/2025/72 | **mRNA Vaccines Beyond COVID-19: Expanding Applications**<br>Lavish Kumar*, Shavej Husain | 72. |

ISBN: 978-93-6135-396-3

| | | |
|---|---|---|
| DIST/2025/73 | **Vaccine Development in the Post-Pandemic Era: Lessons Learned**<br>Mohd Farman*, Shavej Husain | 73. |
| DIST/2025/74 | **The Role of Nanotechnology in Next-Generation Vaccines**<br>Tarun Sharma*, Preeti Vishnoi | 74. |
| DIST/2025/75 | **Universal Flu Vaccines: Are We Ready for the Future?**<br>Tanishka*, Preeti Vishnoi | 75. |
| DIST/2025/76 | **Vaccine Hesitancy: Overcoming Barriers with Science and Policy**<br>Khusbu Chauhan*, Preeti Vishnoi | 76. |
| DIST/2025/77 | **Personalized Vaccinology: Tailoring Immunization Strategies**<br>Saniya Parveen*, Preeti Vishnoi | 77. |
| DIST/2025/78 | **Biomanufacturing 4.0: The Next Revolution in Vaccine Production**<br>Vanshika Rani*, Preeti Vishnoi | 78. |
| DIST/2025/79 | **Climate Change and Infectious Disease: The Role of Pharma in Preparedness**<br>Diksha Rani*, Preeti Vishnoi | 79. |
| DIST/2025/80 | **Vaccine Equity: Addressing Global Disparities in Immunization Access**<br>Aashu Kumar*, Preeti Vishnoi | 80. |
| DIST/2025/81 | **DNA Vaccines: The Future of Pandemic Preparedness**<br>Rahat Izhar*, Jolly Chauhan | 81. |
| DIST/2025/82 | **Green Chemistry in Pharmaceutical Manufacturing: A Sustainable Future**<br>Shilpa Thukral* | 82. |
| DIST/2025/83 | **Tackling Antibiotic Pollution: Pharma's Role in Environmental Safety** | 83. |

**ISBN: 978-93-6135-396-3**

| | | |
|---|---|---|
| | Azmi*, Jolly Chauhan | |
| DIST/2025/84 | **Biodegradable Drug Packaging: Innovations for a Sustainable Future**<br><br>Juveriya*, Jolly Chauhan | 84. |
| DIST/2025/85 | **Microbial Bioremediation of Pharmaceutical Waste: A Novel Approach**<br><br>Khushi Rajput*, Jolly Chauhan | 85. |
| DIST/2025/86 | **Circular Economy in Pharma: Reducing Waste and Enhancing Sustainability**<br><br>Niketa Chauhan*, Jolly Chauhan | 86. |
| DIST/2025/87 | **Water Purification Strategies for Eliminating Pharmaceutical Contaminants**<br><br>Mehvish*, Jolly Chauhan | 87. |
| DIST/2025/88 | **Sustainable Pharma Supply Chains: Minimizing Carbon Footprint**<br><br>Deepanshi*, Jolly Chauhan | 88. |
| DIST/2025/89 | **Nanotechnology in Drug Waste Management: Transforming Pharma Sustainability**<br><br>Aysha Bano*, Mansi | 89. |
| DIST/2025/90 | **The Impact of Pharmaceuticals on Aquatic Ecosystems: A Call for Action**<br><br>Mantasha Parveen*, Mansi | 90. |
| DIST/2025/91 | **Eco-Friendly Drug Development: Strategies for Minimizing Toxicity**<br><br>Abid*, Mansi | 91. |
| DIST/2025/92 | **The Future of Pharma 4.0: Integrating IoT, AI and Robotics**<br><br>Usma*, Mansi | 92. |
| DIST/2025/93 | **Digital Pharmacies: Revolutionizing Drug Accessibility** | 93. |

ISBN: 978-93-6135-396-3

| | | |
|---|---|---|
| | Harshita Kholi*, Mansi | |
| DIST/2025/94 | **Predicting Future Pandemics: The Role of AI and Microbiology**<br>Mantasha*, Mansi | 94. |
| DIST/2025/95 | **Quantum Computing in Drug Discovery: A New Frontier**<br>Chandni*, Mansi | 95. |
| DIST/2025/96 | **3D Bioprinting of Human Tissues for Pharmaceutical Testing**<br>Zoya Iqrar*, Reshu | 96. |
| DIST/2025/97 | **The Microbiome Revolution: Unlocking New Avenues in Healthcare**<br>Madiha*, Reshu | 97. |
| DIST/2025/98 | **The Rise of Biologics and Their Impact on Global Healthcare**<br>Pallavi*, Reshu | 98. |
| DIST/2025/99 | **Decentralized Clinical Trials: The Future of Pharma Research**<br>Suhani Sharma*, Reshu | 99. |
| DIST/2025/100 | **The Impact of Space Research on Pharmaceutical Innovations**<br>Kanika Singh*, Reshu | 100. |
| DIST/2025/101 | **AI-Powered Drug Testing: Accelerating Safe and Effective Treatments**<br>Disha Kumari*, Reshu | 101. |
| DIST/2025/102 | **Artificial Intelligence in Health Care**<br>Pallavi* | 102. |
| DIST/2025/103 | **COVID-19: Spread and Prevention**<br>Navneet Kaur* | 103. |
| DIST/2025/104 | **Antibiotic Resistance**<br>Saiba* | 104. |

**ISBN: 978-93-6135-396-3**

| | | |
|---|---|---|
| DIST/2025/105 | **Bisphenol A (BPA) and Human Health: Risks, Mechanisms, and Implications**<br><br>Suhani Sharma* | 105. |
| DIST/2025/106 | **Microorganisms in Health and Drug Industries**<br><br>Alina Sofiya* | 106. |
| DIST/2025/107 | **Clinical Microbiology**<br><br>Mohd. Affan Nizami* | 107. |
| DIST/2025/108 | **Waste Water Treatment for Protection of Human Health & Environment**<br><br>Sara Sumbul* | 108. |
| DIST/2025/109 | **Tuberculosis**<br><br>Niketa* | 109. |
| DIST/2025/110 | **Artificial Intelligence in Pharma Sector**<br><br>Riya Parveen* | 110. |
| DIST/2025/111 | **Strategic Management in the Intersection of Pharmaceuticals, Microbiology, and Intellectual Property for Global Health Solutions**<br><br>Sameer Ahmed* | 111. |
| DIST/2025/112 | **Phytochemical Screening and In-Vitro Anti-Urolithiatic Activity of *Impereta cylindrica* Leaves**<br><br>Muhammed Ameen M P*, Navyashree K, Naheza Kousa, Fathima SM | 112. |
| DIST/2025/113 | **Evaluation of Effect of *Pongamia Pinnata* on Oral Pathogens-An *In-Silico* Study**<br><br>Vishnu A. Kangralkar*, Mohammed Ziyad | 113. |
| DIST/2025/114 | **Liposomal Delivery of *Mucuna pruriens, Bacopa monnieri, Curcuma longa* Extacts as Natural Polyherbal and Prophylactic Remedy to** | 114. |

ISBN: 978-93-6135-396-3


| | | |
|---|---|---|
| | **Beat Symptoms of Parkinson's Disease**<br><br>Omveer Singh*, Vrish Dhwaj Ashwlayan, Kanika Tyagi | |
| DIST/2025/115 | **Exploration of Quinazoline-1,2,3-triazole Inhibitors as Potential EGFR-Targeting Agents in Lung Cancer**<br><br>Sunil Kumar[1*], Deepak Kumar[2] | 115. |
| DIST/2025/116 | **Recent Advances in Herbal Approaches for the Treatment of Mouth Ulcers- A Comprehensive Review**<br><br>Rupal Choudhary*, Ankit Kumar, Aditi Singhal | 116. |
| DIST/2025/117 | **Preliminary Anticancer Bioassay: Challenges and Opportunity for the Detection of Anticancer Principle from Herbs**<br><br>Sarang Sunil Mahamuni* | 117. |
| DIST/2025/118 | **Artificial Intelligence in Pharma Sector**<br><br>S.Valarmathi*, N. Harikrishnan, S. Nandha Kumar | 118. |
| DIST/2025/119 | **Pharmacognostic and Phytochemical Evaluation of *Cucumis melo* L**<br><br>Somesh Thapliyal* | 119. |
| DIST/2025/120 | **Green Synthesis of Silver and Copper Nanoparticles: A Sustainable Approach**<br><br>Raji M K*, Sunbee Prakash | 120. |
| DIST/2025/121 | **Assessment & Phytochemical Screening of Anti-Lithiatic Activity in *Pedalium murex* L as a Binding Agent in Magnesium Trisilicate and Calcium Oxalate Tablet**<br><br>Ranjith Kumar M, Sarathi. A, Thendral Raj.P, P. Veeramani* | 121. |
| DIST/2025/122 | **Telmisartan Cocrystals: Formation and Characterization Using Different Coformers to Increase Telmisartan Solubility**<br><br>Chelsi Bishnoi*, Simran Arora, Sharda Sambhakar | 122. |
| DIST/2025/123 | **Fluoxetine-Loaded Proniosomes: Formation and Evaluation for Effective Transdermal Delivery** | 123. |

**ISBN: 978-93-6135-396-3**

| | | |
|---|---|---|
| | Aashi Sharma*, Mamta, Sharda Sambhakar | |
| DIST/2025/124 | **Isolation and Structure Elucidation of Phytoconstituent from *Moringa concanensis* Leaf Extract**<br><br>Vaishali Patil, Tanvi Dodiya* | 124. |
| DIST/2025/125 | **Method Development and Validation of Simultaneous Estimation of Phytomarkers in Ayurvedic Formulation by High-Performance Thin Layer Chromatography**<br>Janvi Patel, Disha Prajapati*, Tanvi Dodiya | 125. |
| DIST/2025/126 | **Formulation and Evaluation of *Calotropis gigantea* Latex Based Transdermal Patches**<br><br>A.M. Renosa Sarun[1], V.G.Akilandeswari[2], J. Deepthi[1] and N. Dhiyasri[1] | 126. |
| DIST/2025/127 | **Development and Validation of UV- Spectrophotometric and Method for the Estimation of Cerebroprotein Hydrolysate in Bulk and Pharmaceutical Dosage Form**<br><br>P. Veeramani, D. Santhosh Kumar, Anish, Mohamed Rasul, S. Sangeetha | 127. |
| DIST/2025/128 | **The Potential of Herbal Treatments for Folliculitis**<br><br>Payal Dhama*, Neha Sharma, Aditi Singhal | 128. |
| DIST/2025/129 | **The Evolution of Antifungal Infection Management: Bridging Gaps in Research and Practice**<br><br>Shivi Pal*, Ankit Kumar, Vishi Khattri | 129. |
| DIST/2025/130 | **Pharmacological Neuroprotective Evaluation of Herbal Drug in Experimental Zebra Fish Model of Alzheimer's Disease**<br><br>Adeeb[1]*, Nazia siddiqui[2], Dr. alok sharma[1] | 130. |
| DIST/2025/131 | **A Comprehensive Review on Bilosomal Gel for Topical Drug Delivery**<br><br>Shantanu Tripathi*, Anita Singh, Vishi Khatri | 131. |

ISBN: 978-93-6135-396-3


| | | |
|---|---|---|
| DIST/2025/132 | **Effects of Combined Ethanolic Extracts of *Citrullus colocynthis* (L) and *Plumbago zeylanica* in Human Breast Cancer Cell Lines**<br><br>Dheivendran.S[1*], G. Geetha[2], Dharani.P[1], Selvakani.A[1] | 132. |
| DIST/2025/133 | **Flavonol-based Nanotherapeutics in Management of Allergic Dermatitis**<br><br>Bharti Pandey*, Dr. Manu Sharma | 133. |
| DIST/2025/134 | **A Novel Therapeutic Approach for Neuroprotection utilizing Nose-to-Brain Delivery**<br><br>Dipali Dubey*, Manu Sharma | 134. |
| DIST/2025/135 | **Synthesis, Anti-Inflammatory Activity, and COX-1/2 Inhibition Profile of Some Novel Non-Acidic Polysubstituted Pyrazoles**<br><br>Qumar Negar***,** Ravi Prakash Kumar | 135. |
| DIST/2025/136 | **Application of Liquisolid Technique in Enhancing Solubility of BCS Class II Drug from Orodispersible Tablets**<br><br>Neeba Babu*, Sujith S Nair | 136. |
| DIST/2025/137 | **Biorefinery Potential of Waste Peel and Seed of *Persea americana***<br><br>Sukumar Purohit* | 137. |
| DIST/2025/138 | **Formulation Development and Characterization of Sustained Release Microspheres of Aceclofenac and Omeprazole**<br><br>Abhishek Kumar* | 138. |
| DIST/2025/139 | **Design, Creation, and Evaluation of Silver Nanoparticles for Possible Topical Uses Using Plant Leaf Extract**<br><br>Rajesh Dodiya*, Meenakshi Patel, Lalit Lata Jha | 139. |
| DIST/2025/140 | **Approaches for Controlled Delivery of Plant Derived Natural Products**<br><br>Juveriya Sultana*, D Saritha | 140. |
| DIST/2025/141 | **Improved Solubility of Ivacaftor by Preparing Liquisolid Ivacaftor** | 141. |

**ISBN: 978-93-6135-396-3**


| | | |
|---|---|---|
| | **Tablet Using the Box-Behnken Design**<br><br>Manisha Dnyanoba Chate*, S.R. Lahoti | |
| DIST/2025/142 | **Analytical Method Development and Validation of a New HPTLC Method for the Simultaneous Estimation of Phytoconstituents in an Ayurvedic Formulation**<br><br>Sakshi Srivastava[1], Jaya Jignesh Patel[2*] | 142. |
| DIST/2025/143 | **Benefits and Challenges of Utilizing Artificial Intelligence in Pharmaceutical Drug Discovery and Development**<br><br>Sreedhar Ranjan Das* | 143. |
| DIST/2025/144 | **Microsponges-Based Topical Herbal Gel for the treatment of Cellulitis: A Novel Approach for Enhanced Drug delivery**<br><br>Km. Baby[*], Anita Singh, Kartik Sharma | 144. |
| DIST/2025/145 | **Prevalence of Vulvovaginal Candidiasis in the 18 to 55 Years Age in a Semi Urban Area in North India**<br><br>Sumita Bhatia[*] | 145. |
| DIST/2025/146 | **A Comprehensive Review of Nanotechnology Based Nanoemulsion Delivery Systems for Targeted Drug Delivery and Enhanced Therapeutic Efficacy**<br><br>Mukesh Kumar* | 146. |
| DIST/2025/147 | **Detection and Estimation of Quercetin and Gallic Acid in Marketed Poly Herbal Formulation by HPTLC Method**<br><br>N. Tamilselvi[1]*, R. Arivukarasu[2], K. Gayathri[1], S. Monika[1], M. Indhumathi[1], M. Ramya[1] | 147. |
| DIST/2025/148 | **Antimicrobial Activity of Silver Nanoparticles Synthesised by Biological Method**<br><br>Sundaramoorthi C*[1], Shivapranav S[2] | 148. |
| DIST/2025/149 | **Investigating the Potential of Chitosan as a Carrier for Antifungal Dry Powder Inhalation Formulation** | 149. |

ISBN: 978-93-6135-396-3

| | | |
|---|---|---|
| | Sushil Kumar Singh*[1], Shyam Sunder Pancholi[2] | |
| DIST/2025/150 | **SLN Loaded Hydrogel on Wound Healing**<br>Aditi Singh*[1], Brijesh Singh[2], Shikha Shrivastava[1] | 150. |
| DIST/2025/151 | **Formulation and Evaluation of Gastroretentive Tablets of Acyclovir**<br>J.Padmapreetha* | 151. |
| DIST/2025/152 | **Novel Analytical Method Development and Validation for Simultaneous Estimation of Antidepressant Drugs**<br>Revati Mudaliar*, Dilip Maheshwali | 152. |
| DIST/2025/153 | **Role of Inflammatory Pathway in the Pathogenesis of Type 2 Diabetes**<br>Anant Kumar[1*], Arvind Kumar[2], Vaishali[2], Bhuwanendra Signh[3], Himja Pundir[3], Supriya<br>Garg[3], Pratiksha Tyagi[3], Harshit Jain, Km Nargis[1] | 153. |
| DIST/2025/154 | **Diabetes and Herbal Remedies**<br>Himja Pundir[1*], Bhuwanendra Singh[1], Anant Kumar[2], Arvind Kumar[3], Vaishali[3] | 154. |
| DIST/2025/155 | **Different Models for Studying Wound Healing and their Respective Evaluation Parameters**<br>Priyankul Kumar* | 155. |
| DIST/2025/156 | **Formulation and Evaluation of a Polyherbal Gel for Anti-Arthritic Relief**<br>Supriya Garg[1*], Vaishali[2], Arvind Kumar[2], Bhuwanendra Singh[1], Anant Kumar[3] | 156. |
| DIST/2025/157 | **Unravelling the Molecular Mechanisms and Pharmacological Properties of Carvarol and Thymol in Diabetes Mellitus: Current Challenges and Future Prospects**<br>Tarmeen Ali* | 157. |

**ISBN: 978-93-6135-396-3**


| | | |
|---|---|---|
| DIST/2025/158 | **Comparative Analysis of Genotypic and Phenotypic Techniques for Rapid Identification of MRSA in Clinical Specimens**<br><br>Versha Rajput* | 158. |
| DIST/2025/159 | **Phytochemical Screening and Evaluations of *In-vitro* Antioxidant Activities of Ethanolic Extracts of *Cocos nucifera* (l.) Leaves**<br><br>P. Veeramani*, Harshini. C, Deepika. S, Akshaya. K, Gunal. R, Ranjith Kumar | 159. |
| DIST/2025/160 | **Pharmacy Practice in the Multidisciplinary Healthcare Team: Collaboration and Patient Outcomes**<br><br>Bhawana Rawat* | 160. |
| DIST/2025/161 | **Stress Management**<br><br>Gunjan Rani Chaudhary* | 161. |
| DIST/2025/162 | **Pharmacological, and Phytochemical Profile of *Tectona grandis* Linn (Verbenaceae) – A Comprehensive Review**<br><br>Ajeet Singh* | 162. |
| DIST/2025/163 | **Therapeutic and Pharmaceutical Potential of Nigella sativa and Its Bioactive Constituents in Chronic Inflammatory Diseases: Progress, Challenges, and Future Perspectives**<br><br>Iram Jahan* | 163. |
| DIST/2025/164 | **Chloroquine as an Antimalarial Drug**<br><br>Kanishka Chauhan* | 164. |
| DIST/2025/165 | **Vaccines and Pharmaceuticals in Emerging Health Challenges**<br><br>Preety Vishnoi*, Jolly Chauhan | 165. |
| DIST/2025/166 | **Antimicrobial Resistance in Bacteria**<br><br>Jolly Chauhan* | 166. |
| DIST/2025/167 | **Formulation Development and Evaluation of Bi-Layer Tablets Containing Metformin Hydrochloride and Sitagliptin Phosphate for** | 167. |

ISBN: 978-93-6135-396-3

| | | |
|---|---|---|
| | **the Management of Type 2 Diabetes Mellitus**<br><br>Akash Bera* | |
| DIST/2025/168 | **Formulation Development and Evaluation of Immediate Release Bilayer Tablets Containing Amlodipine Besylate and Losartan Potassium for the Management of Hypertension**<br><br>Santanu Routh* | 168. |
| DIST/2025/169 | **Formulation Development and Evaluation of Immediate Release Bilayer Tablets Containing Aspirin and Clopidogrel as Antiplatelet Drugs for the Prevention of Cardiovascular Events**<br><br>Jitendra Maity* | 169. |
| DIST/2025/170 | **Research innovations and Intellectual Property rights**<br><br>Shaweta Sharma*[1], Akhil Sharma[2] | 170. |

ISBN: 978-93-6135-396-3

***DIST/2025/01***

# Next-Generation Drug Discovery: Bridging Microbiology and Pharmaceuticals

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**Abstract:**

Drug discovery is being revolutionized by the combination of pharmaceutical sciences and microbiology, which is providing creative ways to fight new infectious diseases and antibiotic resistance. While improving drug design and development, developments in synthetic biology, artificial intelligence (AI), and microbial genomics are accelerating forward the discovery of new medicinal molecules. AI-driven drug screening improves the effectiveness of compound selection, whereas microbial genomics allows for specific pathogen targeting by revealing resistance mechanisms. Furthermore, synthetic biology lessens dependency on conventional chemical synthesis by enabling the creation of microbial strains for sustainable medication manufacturing. The development of novel antibiotics and immunomodulators is aided by the abundance of bioactive chemicals found in natural microbial metabolites. Furthermore, by clarifying microbial interactions that affect drug metabolism and therapeutic efficacy, microbiome research is transforming personalized medicine. Predictive modeling for drug reactions is made easier by the combination of big data analytics and machine learning, which enhances treatment results. Notwithstanding these developments, issues including complicated regulations, moral dilemmas, and obstacles to interdisciplinary cooperation still need to be resolved. To advance next-generation drug research, it will be essential to fortify collaborations across academic institutions, industry, and regulatory bodies. This abstract highlight the importance of microbiology in pharmaceutical discovery and the necessity of teamwork in creating innovative treatments for global health issues.

**Keywords:** Drug discovery, microbiology, pharmaceuticals, microbial genomics, synthetic biology, artificial intelligence, infectious diseases

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***DIST/2025/02***

# Advanced Formulation Strategies for Combating Infectious Diseases

Mohd Musharraf*, Nidhi Rajput

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**Abstract:**

Innovative medication formulation techniques are required to improve therapeutic efficacy and patient outcomes due to the growing threat of infectious illnesses, which is exacerbated by antibiotic resistance. The development of antimicrobial treatments is being transformed by developments in nanotechnology, targeted drug delivery, and bioengineered formulations. Liposomes, polymeric nanoparticles, and lipid-based formulations are examples of nanocarrier-based drug delivery methods that provide improved bioavailability, controlled drug release, and targeted pathogen eradication. Encapsulation technologies ensure long-lasting therapeutic benefits by shielding active pharmaceutical ingredients (APIs) from deterioration. Furthermore, biopolymer-based drug carriers and smart hydrogels minimize systemic toxicity by offering localized and prolonged antibacterial activity. By enhancing solubility, stability, and efficacy, technology integration in formulation design further enhances pharmacological attributes. Site-specific drug administration is made possible by sophisticated inhalable, transdermal, and injectable formulations, which are essential for infections of the skin, bloodstream, and respiratory tract. Additionally, combination medication formulations reduce the development of resistance by improving antibacterial synergy. Notwithstanding these developments, issues including cost-effectiveness, regulatory approval, and large-scale manufacturing still exist. To turn these discoveries into therapeutic uses, pharmaceutical experts, microbiologists, and regulatory agencies must improve their interdisciplinary cooperation.

**Keywords:** Nanocarriers, drug delivery, antimicrobial resistance, bioengineered formulations, controlled release

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*DIST/2025/03*

# AI-Driven Drug Development: A Synergy of Microbiology and Pharma

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**Abstract:**

Pharmaceutical companies are undergoing a revolution thanks to the use of artificial intelligence (AI) in medication research, which speeds up the creation of new treatments, improves formulations, and advances precision medicine. Artificial Intelligence (AI) connects the pharmaceutical and microbiological sciences to more effectively fight infectious diseases and antibiotic resistance by utilizing big data analytics, machine learning, and bioinformatics. AI-powered algorithms make it easier to screen microbially generated chemicals in large quantities while more accurately predicting their toxicity and bioactivity. Furthermore, deep learning algorithms quickly generate next-generation antimicrobials by analyzing microbial genetics to find new drug targets and resistance mechanisms. Research durations and expenses are decreased by computational drug repurposing, which also makes it possible to identify current medications with possible antibacterial qualities. Additionally, by improving solubility, stability, and targeted drug delivery, AI improves formulation design. AI and lab automation combine to speed up experimental procedures, increase the effectiveness of drug screening, and lower human error. The quality of the data, legal restrictions, and moral dilemmas continue to be major obstacles to broad adoption in spite of these developments. Unlocking the full potential of AI-driven medication development requires enhancing partnerships between pharmaceutical scientists, microbiologists, and AI specialists. This collaboration holds the potential to revolutionize the treatment of infectious diseases by opening up opportunities to more efficient, individualized, and easily available therapies.

**Keywords:** Artificial intelligence, microbial drug discovery, machine learning, antimicrobial resistance, computational drug repurposing, AI-driven formulation

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***DIST/2025/04***

# Personalized Medicine: Innovations in Microbial Therapeutics

Sachin Kuimar*, Nidhi Rajput

Disha Institute of Pharmacy, Dhampur

**Abstract:**

By using microbial therapies to provide patient-specific and focused treatments, personalized medicine is transforming healthcare. The creation of precision-based therapies that maximize therapeutic efficacy while minimizing side effects is being made easier by developments in synthetic biology, artificial intelligence, and microbiome research. Novel approaches to the treatment of infectious diseases, metabolic disorders, and immune-related ailments are provided by microbial therapies, such as designed probiotics and medications based on the microbiome. Drug metabolism is modulated by the human microbiota, which affects toxicity profiles and therapeutic responses. Researchers may customize therapies according to a person's microbial composition by combining metagenomics with AI-driven predictive modeling, which ensures more accuracy in drug administration. Additionally, bacteriophage therapy is showing promise as a substitute for traditional antibiotics because it targets specific pathogens without interfering with the good microbiome. To effectively fight antibiotic-resistant diseases, customized bacteriophage combinations are being created. Furthermore, prebiotic and postbiotic-induced gut microbiota modification is becoming more popular as an adjunctive strategy to improve immune response and general health. Large-scale manufacturing, long-term safety evaluations, and regulatory approval are still obstacles in the way of these developments. For microbial therapies to be incorporated into traditional customized medicine, cooperation between microbiologists, physicians, and pharmaceutical scientists is crucial.

**Keywords:** Personalized medicine, microbial therapeutics, microbiome, bacteriophage therapy, precision healthcare

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***DIST/2025/05***

# The Role of Nanotechnology in Pharmaceutical Drug Delivery

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**Abstract:**

Pharmaceutical medication delivery has been transformed by nanotechnology, which has improved focused treatment strategies, bioavailability, and therapeutic efficacy. Lipid-based formulations, liposomes, dendrimers, and polymeric nanoparticles are examples of nanocarrier-based systems that provide better patient compliance, decreased toxicity, and controlled drug release. These nanoscale delivery systems optimize pharmacokinetics and reduce systemic negative effects by facilitating site-specific medication activity. Effective treatment of neurological illnesses is made possible by nanotechnology's capacity to cross biological barriers, such as the blood-brain barrier, which is one of its main advantages in medication delivery. Furthermore, nanoformulations increase the stability and solubility of medications that are not very water soluble, increasing their clinical utility. Stimuli-responsive nanocarriers, which release medications in response to pH, temperature, or enzymatic activity, are recent developments that guarantee precisely controlled therapy. Targeted nanoparticles coupled with ligands or antibodies improve therapeutic results by enabling selective drug accumulation in tumor tissues during cancer treatment. Additionally, non-invasive administration solutions for chronic disorders are provided via inhalable and transdermal nano-drug delivery systems. Regulatory approvals, long-term safety assessment, and large-scale manufacturing are still obstacles in the way of its potential. For broad clinical adoption, overcoming these obstacles via interdisciplinary cooperation and technical innovation will be essential.

**Keywords:** Nanotechnology, drug delivery, nanocarriers, targeted therapy, controlled release, biomedical applications

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***DIST/2025/06***

# Enhancing Antibiotic Efficacy Through Smart Drug Formulations

Rohit Kumar*, Anuj Kumar Sharma

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**Abstract:**

A major threat to world health is the emergence of antimicrobial resistance (AMR), which calls for creative ways to improve the effectiveness of antibiotics. Antibiotic therapy is being revolutionized by smart drug formulations that incorporate nanotechnology, controlled release mechanisms, and targeted delivery systems. These formulations improve bioavailability, minimize resistance development, and reduce side effects. Liposomes, polymeric nanoparticles, and lipid-based formulations are examples of nanocarrier-based drug delivery systems that allow for accurate targeting of bacterial infections while preventing antibiotics from degrading too quickly. One of the main challenges in traditional antibiotic therapy is addressed by these formulations, which improve medication penetration into biofilms and intracellular bacteria. Furthermore, localized and sustained antibiotic release is ensured by stimuli-responsive drug delivery systems that are activated by pH, enzymes, or temperature. This lowers the frequency of dose and improves patient compliance. Utilizing combination drug formulations, in which antibiotics are co-encapsulated with adjuvants or antimicrobial peptides, is another promising strategy for restoring the effectiveness of already available medications against resistant bacteria. Additionally, formulation design driven by artificial intelligence (AI) is improving pharmacological characteristics, guaranteeing improved stability, solubility, and therapeutic results. Even with major progress, issues including cost-effectiveness, regulatory permissions, and large-scale production still exist. For smart antibiotic formulations to be quickly implemented in clinical practice, interdisciplinary cooperation between microbiologists, pharmaceutical scientists, and clinicians is crucial.

**Keywords:** Antibiotic resistance, smart drug formulations, nanocarriers, targeted drug delivery, controlled release

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***DIST/2025/07***

# Biopharmaceuticals and Microbial Engineering for Targeted Therapies

Anshul Chauhan*, Anuj Kumar Sharma

Disha Institute of Pharmacy, Dhampur

**Abstract:**

Biopharmaceuticals, which use biological processes to generate drugs, are a breakthrough way to treat complex disorders. In this paradigm, microbial engineering is essential because it makes it possible to produce targeted treatments. Microorganisms like bacteria and yeast are engineered to create therapeutic proteins, monoclonal antibodies, and gene-editing tools with great specificity and efficiency thanks to developments in synthetic biology and genetic engineering. These modified microorganisms aid in the creation of biologics that are customized to meet the needs of specific patients and treat ailments like autoimmune diseases and cancer. By combining metabolic route optimization, computer modeling, and high-throughput screening, these procedures become more accurate and scalable. Microbial engineering also aids in the creation of biosensors and delivery methods that enhance medication targeting and reduce adverse effects. By decreasing dependency on conventional chemical synthesis, this multidisciplinary discipline not only speeds up the drug discovery process but also supports sustainable production techniques. Microbial engineering is still a key source of innovation as biopharmaceuticals continue to revolutionize personalized medicine by providing novel solutions to unmet medical standards.

**Keywords:** Biopharmaceuticals, microbial engineering, targeted therapies, synthetic biology, biologics production, personalized medicine

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***DIST/2025/08***

# From Research to Reality: Fast-Tracking Drug Approvals for Emerging Diseases

Sourabh Kumar*, Anuj Kumar Sharma

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**Abstract:**

Fast drug development and approval procedures are essential given the rise of new and reemerging diseases. The strict requirements of public health emergencies are frequently too great for the traditional drug approval processes. Innovative approaches such as adaptive clinical trials, real-world evidence integration, and regulatory flexibility are necessary to close the gap between research and clinical application. Therapeutic candidate selection and validation are further accelerated by developments in biomarker identification, artificial intelligence, and computer modeling. Drug approvals have been accelerated by the cooperation of academia, industry, and regulatory bodies, as seen by the quick reactions to international health crises. Concurrently, maintaining safety and effectiveness is crucial, requiring strong post-market monitoring and risk control systems. Global regulatory harmonization and public-private collaborations are essential for resolving resource shortages and coordinating approval criteria across geographical boundaries. The healthcare ecosystem may better prepare for and respond to new diseases by streamlining the bench-to-bedside process, which will eventually improve patient outcomes and the resilience of global health.

**Keywords:** Drug approvals, emerging diseases, adaptive clinical trials, regulatory flexibility, fast-tracking, public health

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***DIST/2025/09***

# Evaluation of Antipyretic Potential of Stem Bark of *Kydia calycina*

Nidhi Rajput*

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**Abstract:**

The present investigation "Evaluation of antipyretic potential of *Kydia calycina* stem bark" was focused on the dried extract of stem bark. *Kydia calycina*, a member of the Malvaceae family known as Pulao, Boranga, or Pula, has been reported for its traditional uses as a medicinal plant. The presence of potentially active nutrients and their multifunctional properties make *Kydia calycina* stem and bark perfect candidates for the production of phytopharmaceutical products. It is used traditionally as a remedy in different disease conditions like skin disease, hyperglycemia, antihyperlipidemic, analgesic, anti-inflammatory, anticancer, antioxidant, antiulcer, antifungal, immunomodulatory, febrifuge, wound healing, industrial uses, and nutritional important, etc.

**Keywords:** Antipyretic, *Kydia calycina*, skin disease, hyperglycemia, antihyperlipidemic, analgesic, anti-inflammatory

ISBN: 978-93-6135-396-3

***DIST/2025/10***

# Role of Pharmacogenomics in Precision Antimicrobial Therapy

Shahnewaz*, Anuj Kumar Sharma

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**Abstract:**

Precision antimicrobial therapy is greatly aided by pharmacogenomics, the study of how genetic variations affect drug response. By identifying genetic markers that forecast a person's responsiveness to antimicrobial drugs, this field enhances treatment effectiveness and reduces adverse medication reactions. Clinicians can address differences in medication metabolism, effectiveness, and toxicity by customizing antimicrobial regimens based on a patient's genetic profile by incorporating pharmacogenomic data. Genetic variations in transporters, drug targets, and enzymes that break down drugs have a big influence on the pharmacokinetics and pharmacodynamics of antibiotics. The metabolism of certain antibiotics, for instance, is impacted by changes in the CYP450 enzyme family, which in turn affects medication levels and treatment results. Pharmacogenomics also optimizes antimicrobial stewardship by guaranteeing proper antibiotic selection and dosage, which reduces the possibility of resistance. The integration of pharmacogenomic testing into clinical practice has been facilitated by improvements in bioinformatics tools and high-throughput sequencing. A key component of personalized medicine, pharmacogenomics has the potential to transform the treatment of infectious diseases by facilitating precision antimicrobial therapy, which optimizes therapeutic benefits while lowering the risks of resistance and adverse effects.

**Keywords:** Pharmacogenomics, antimicrobial therapy, genetic markers, CYP450 enzyme, bioinformatics tools

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***DIST/2025/11***

# Exploring Probiotics as the Next Frontier in Drug Development

Areeb Khan*, Anuj Kumar Sharma

Disha Institute of Pharmacy, Dhampur

**Abstract:**

Live microorganisms with health advantages, or probiotics, are becoming a viable area for medication research. Probiotics have long been used to support gut health, but they are also being studied for their potential to cure and prevent a variety of illnesses, including as infections, autoimmune diseases, and metabolic disorders. Targeted probiotic medicines have been made possible by the substantial impact that gut microorganisms have on human health, which has been revealed by advances in microbiome research. Engineered probiotics are being created using synthetic biology approaches to improve microbial balance, deliver medicinal compounds, and modify immune responses. These next-generation probiotics adhere to the tenets of personalized therapy by providing accuracy and functionality catered to specific microbiomes. Multidisciplinary strategies, including as genetic profiling, bioprocess optimization, and clinical validation, are being used to solve issues such strain-specific efficacy, regulatory approval, and large-scale production. Additionally, probiotic medication candidates offer chances for affordable and sustainable treatments, lowering dependency on conventional pharmaceutical production. As the research develops, probiotics have the potential to revolutionize drug discovery by utilizing the human microbiome's medicinal properties.

**Keywords:** Probiotics, microbiome, drug development, synthetic biology, personalized medicine, therapeutic microbes

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***DIST/2025/12***

# Microbial Resistance and the Global Health Crisis: Strategies for Control

Umair Ahmad*, Monu Kumar

Disha Institute of Pharmacy, Dhampur

**Abstract:**

The efficiency of antimicrobial treatments and the capacity to treat infectious diseases are at risk due to microbial resistance, which has become a serious worldwide health concern. Methicillin-resistant Staphylococcus aureus (MRSA) and multidrug-resistant Mycobacterium tuberculosis are two examples of resistant strains that have evolved more quickly as a result of the overuse and abuse of antibiotics in healthcare, agriculture, and animal husbandry. This concerning trend raises death rates, puts public health systems at risk, and drives up healthcare expenses. Promoting antimicrobial stewardship, creating innovative treatment drugs, and improving diagnostic tools for quick pathogen identification are the main strategies to fight microbial resistance. To target resistant microorganisms, novel strategies like bacteriophage therapy, antimicrobial peptides, and CRISPR-based tools are being investigated. Monitoring resistance trends and carrying out coordinated treatments also depend on improving surveillance systems and encouraging international cooperation. While research funding encourages the development of next-generation antibiotics, public education initiatives and legislative measures seek to decrease the abuse of antibiotics. A multifaceted, interdisciplinary strategy that incorporates scientific innovation, policy reform, and international collaboration is needed to address microbial resistance. The world community can lessen the effects of microbial resistance and ensure that antimicrobial treatments continue to be effective for upcoming generations through bringing these measures into practice.

**Keywords:** Microbial resistance, global health, antimicrobial stewardship, novel therapies, surveillance

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***DIST/2025/13***

# Unlocking the Power of Microbiota for Future Therapeutic Solutions

Mohd Zubair Ansari*, Monu Kumar

Disha Institute of Pharmacy, Dhampur

**Abstract:**

The varied population of microorganisms that live in and on the human body, known as the microbiota, has become a key factor in both health and illness. Immunity, metabolism, and brain function are just a few of the physiological systems that the microbiome has a significant impact on, according to new research. The microbiota is now a viable target for novel therapeutic approaches because to this expanding understanding. Probiotics, prebiotics, and postbiotics are some of the tactics used to control microbial balance and restore health in order to harness the power of microbiota. Faecal microbiota transplantation (FMT) and engineered microbial consortia are two more microbiota-based treatments being investigated for the treatment of inflammatory bowel disease, metabolic disorders, and even neurological diseases. The identification of therapeutic microbial strains and their bioactive metabolites is made easier by cutting-edge techniques like metagenomics and metabolomics, opening the door for precision medicine strategies. Regulatory obstacles, individual differences in microbiome makeup, and the requirement for thorough clinical validation are some of the obstacles that still need to be overcome despite its potential. Technological developments and cooperative research projects are still revealing the therapeutic potential of bacteria, opening up revolutionary prospects for sustainable and individualized healthcare solutions.

**Keywords:** Microbiota, microbiome, therapeutic solutions, probiotics, precision medicine, fecal microbiota transplantation

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***DIST/2025/14***

# Next-Generation Vaccines: Harnessing Microbial Innovation

Km. Kausar Jahan*, Monu Kumar

Disha Institute of Pharmacy, Dhampur

**Abstract:**

By utilizing microbial innovation, next-generation vaccines are revolutionizing vaccination and tackling global health issues. These cutting-edge vaccines target a wider range of illnesses and seek to increase accessibility, safety, and efficacy. The creation of microbial platforms, such as recombinant bacteria, viruses, and yeast, for vaccine development has been made possible by developments in synthetic biology, genomics, and bioinformatics. By producing highly precise antigens, these platforms improve immune responses and lessen side effects. As seen by the quick development of COVID-19 vaccines, novel strategies like mRNA vaccines, vector-based vaccinations, and nanoparticle delivery methods are transforming the field. Furthermore, microbial engineering makes it easier to produce needle-free and thermostable vaccines, which enhances dissemination in environments with limited resources. Vaccines that are customized to a person's genetic and microbiological makeup are becoming increasingly effective preventative measures against infectious illnesses and cancer. Even if next-generation vaccines have a lot of potential, issues including scalability, regulatory approval, and fair distribution need to be resolved. To fully realize the potential of microbial innovation, cooperation between researchers, industry stakeholders, and policymakers is crucial. By offering efficient, long-lasting, and customized responses to present and emerging disease threats, these vaccines have the potential to revolutionize public health.

**Keywords:** Next-generation vaccines, microbial innovation, synthetic biology, mRNA vaccines, personalized vaccines, public health

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***DIST/2025/15***

# Phage Therapy: A Renaissance in Infectious Disease Treatment

Barirah Fatima*, Monu Kumar

Disha Institute of Pharmacy, Dhampur

**Abstract:**

Phage therapy, which involves using bacteriophages therapeutically to treat bacterial infections, is becoming more popular as a substitute for conventional antibiotics. Given the growing threat to world health posed by multidrug-resistant bacteria, phages provide a focused, long-lasting, and creative way to fight these infections. Bacteriophages, as opposed to broad-spectrum antibiotics, minimize collateral damage by selectively infecting and lysing bacterial cells while preserving the beneficial microbiome. Recent developments in synthetic biology and genomics have improved the creation of phage-based medicines. To combat complicated infections, phages are being engineered to have increased stability, specificity, and host range. Multiple phages are combined to create phage cocktails, which attack various bacterial strains at once to combat bacterial resistance. Phages are also being used into combination treatments, which enhance the effectiveness of antibiotics by operating in concert with them. Phage therapy holds great potential, but there are still obstacles to overcome, including regulatory barriers, large-scale manufacturing, and comprehension of the relationship between phages and host immune systems. The safety and effectiveness of phage-based therapies are being improved by clinical trials and international partnerships. This renewed focus on bacteriophages offers a transformative approach to infectious disease treatment, with the potential to address one of the most pressing health crises of the modern era.

**Keywords:** Phage therapy, bacteriophages, multidrug-resistant bacteria, synthetic biology, targeted treatment, infectious diseases

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***DIST/2025/16***

# The Role of Synthetic Biology in Revolutionizing Antimicrobial Development

Samreen Alam*, Monu Kumar

Disha Institute of Pharmacy, Dhampur

**Abstract:**

Synthetic biology has great potential to change how we create antimicrobial drugs by using modified biological systems to tackle the increasing issue of antibiotic resistance. Synthetic biology makes it possible to precisely manipulate genetic material in order to create new antimicrobial compounds, treatment approaches, and drug delivery systems that can get around the drawbacks of conventional antibiotics. Important methods including protein design, pathway engineering, and gene synthesis allow for the production of customized compounds that target particular bacterial activities, providing more potent treatments with fewer adverse effects. Additionally, synthetic biology makes it easier to investigate nontraditional sources of antimicrobials, like peptides, bacteriophages, and created microorganisms, which may offer substitutes for conventional antibiotics. The development of antibiotics with distinct modes of action is also made possible by this strategy, which lowers the possibility of resistance. Discovering effective antimicrobial drugs is accelerated by the combination of high-throughput screening and computer modeling, which presents a viable way to address the critical public health issue of antibiotic resistance. The creation of antimicrobials may ultimately be transformed by synthetic biology, offering more efficient, scalable, and sustainable infection treatments.

**Keywords:** Synthetic biology, antimicrobial agents, antibiotic resistance, gene synthesis, bacteriophages, drug development

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***DIST/2025/17***

# Overcoming Superbugs: Novel Approaches to Antimicrobial Resistance

Mohd Salman*, Nitish Kumar

Disha Institute of Pharmacy, Dhampur

**Abstract:**

A major threat to world health is antimicrobial resistance (AMR), as "superbugs" have evolved to resist the effects of current antibiotics. Innovative methods are being investigated to create novel antibacterial tactics and therapies in order to overcome this obstacle. These include developing specialized drugs that can more successfully target resistant strains or engineering microorganisms using synthetic biology. Furthermore, the use of viruses that specifically infect and kill bacteria in bacteriophage therapy has shown promise as a substitute for conventional antibiotics. The application of antimicrobial peptides, which are tiny proteins that can rupture bacterial membranes and provide a novel class of medications, is another creative method. Moreover, nanotechnology is utilized to develop nanoscale agents capable of delivering medications directly to bacterial targets, hence improving efficacy and minimizing side effects. In addition to novel medication research, precision medicine and antibiotic stewardship initiatives are being incorporated into healthcare systems to reduce the overuse and misuse of antibiotics, which lead to resistance. These developments, when integrated, provide optimism for combating the escalating threat of superbugs, facilitating more efficacious treatment of infections and safeguarding the viability of antimicrobial medicines for future generations.

**Keywords:** Antimicrobial resistance, superbugs, synthetic biology, bacteriophage therapy, antimicrobial peptides, nanotechnology

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***DIST/2025/18***

# Microbial Genomics: A Pathway to Innovative Drug Discovery

Nitin Kumar*, Nitish Kumar

Disha Institute of Pharmacy, Dhampur

**Abstract:**

Microbial genomics has become a potent tool in the quest for novel drug discovery, especially with increasing antibiotic resistance. Sequencing the genomes of microbes enables scientists to elucidate genetic blueprints that provide critical insights into microbial roles, pathogenicity, and resistance mechanisms. This genetic data facilitates the identification of new therapeutic targets and the formulation of more precise and effective antibacterial medicines. Moreover, microbial genomics enables the investigation of previously unexamined microbial species, some of which may contain distinctive bioactive chemicals with potential as novel drugs. High-throughput sequencing technology and bioinformatics tools expedite this process by facilitating the swift analysis of extensive genomic data, resulting in the identification of potential treatment options. Comprehending microbial interactions at the genome level facilitates the development of pharmaceuticals that can alleviate or counteract resistance, hence diminishing the probability of treatment failure. As microbial genomics advances, it promises to transform drug discovery, providing novel pathways for the creation of targeted, customized therapies to combat both current and emerging infectious diseases.

**Keywords:** Microbial genomics, drug discovery, antimicrobial resistance, bioinformatics, bioactive compounds, sequencing technologies

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***DIST/2025/19***

# Exploring Metagenomics for New-Age Pharmaceutical Solutions

Mohd Farman*, Nitish Kumar

Disha Institute of Pharmacy, Dhampur

**Abstract:**

Metagenomics, the analysis of genetic material obtained directly from environmental samples, is transforming the quest for contemporary pharmacological remedies. Metagenomics circumvents the necessity of culturing microorganisms, thereby offering profound insights into the extensive diversity of microbial life found in various habitats, including soil, water, and the human microbiome. This method facilitates the identification of innovative bioactive chemicals, enzymes, and antibacterial agents that may be utilized to formulate new pharmaceuticals. Metagenomics enables the discovery of bacteria that generate distinctive secondary metabolites, which have potential in the treatment of various diseases, including cancer and infections caused by antibiotic-resistant pathogens. By analyzing the genetic material of these different microbial communities, researchers may uncover currently inaccessible therapeutic potentials. Moreover, metagenomics facilitates the comprehension of the functional roles of microbial communities, allowing for the development of tailored, environment-specific pharmacological interventions. This new area has great potential for creating new treatments. It provides sustainable options compared to traditional drug discovery and helps tackle important health issues like antibiotic resistance.

**Keywords:** Metagenomics, pharmaceutical solutions, bioactive compounds, antimicrobial agents, microbial diversity, drug discovery

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***DIST/2025/20***

# Gut Microbiome and Its Impact on Drug Metabolism and Efficacy

Ibrahim Raza Zaidi *, Nitish Kumar

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**Abstract:**

The gut microbiome, a diverse assemblage of bacteria inhabiting the human digestive system, is essential for drug metabolism and effectiveness. Studies have demonstrated that the composition and diversity of gut microbiota can profoundly affect the body's absorption, processing, and response to medications. Microbial enzymes can metabolize pharmaceuticals, occasionally modifying their efficacy, toxicity, or adverse effects. This interaction may lead to differences in therapeutic efficacy among individuals, hence contributing to the concept of customized medicine. Certain gut bacteria may augment medicine absorption, whilst others may destroy therapeutic agents, diminishing their efficacy. The microbiome can influence the activation or deactivation of prodrugs, which remain inert until converted by gut microorganisms into active molecules. Dysbiosis in the gut microbiota can exacerbate medication responses and lead to severe drug reactions. Comprehending these microbial interactions creates opportunities for refining medication therapy, particularly through microbiome-based interventions that may improve drug efficacy or reduce side effects. A comprehensive understanding of the gut microbiome's influence on medication metabolism is crucial for the advancement of tailored and effective pharmaceutical therapies.

**Keywords:** Gut microbiome, drug metabolism, efficacy, personalized medicine, dysbiosis, microbial interaction

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***DIST/2025/21***

# Biofilm Disruption Strategies: A New Era in Antimicrobial Research

Abhinay Rajput*, Nitish Kumar

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**Abstract:**

Biofilms, aggregates of microorganisms surrounded by a protective extracellular matrix, present a considerable obstacle in the management of chronic infections due to their role in antimicrobial resistance and the promotion of pathogen persistence. Conventional antibiotics frequently lack the ability to penetrate biofilms efficiently, complicating infection treatment. Nonetheless, biofilm disruption techniques are creating new opportunities in antimicrobial research. These strategies aim to disrupt or diminish biofilms, thereby increasing bacterial vulnerability to antibiotics or immune responses. Techniques including the application of enzymes (e.g., DNases, proteases), small molecules, and nanoparticles are under investigation to dismantle the biofilm matrix, while antimicrobial peptides and bacteriophages are utilized to directly target biofilm-forming bacteria. The repurposing of existing pharmaceuticals, particularly those that inhibit biofilm formation or disrupt bacterial communication (quorum sensing), demonstrates potential in augmenting the efficacy of traditional therapies. The advancement of biofilm-targeting therapies is pertinent to infections associated with medical devices and the management of chronic wounds. With advancements in research, biofilm disruption strategies may emerge as fundamental components of antimicrobial therapies, providing innovative methods to address chronic infections and mitigate the global challenge of antimicrobial resistance.

**Keywords:** Biofilms, antimicrobial resistance, biofilm disruption, quorum sensing, nanoparticles, chronic infections

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***DIST/2025/22***

# The Future of Intellectual Property in Pharmaceutical Innovations

Nikhil Chauhan*, Surya Pratap Sisodia

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**Abstract:**

The future of intellectual property (IP) in pharmaceutical innovations is set for substantial change, propelled by advancements in biotechnology, personalized medicine, and digital health. Conventional patent systems will likely require adaptation to confront emerging challenges, including the swift advancement of innovation and the growing intricacy of biomedical research. The incorporation of artificial intelligence, gene editing technologies such as CRISPR, and synthetic biology into drug discovery and development prompts inquiries regarding ownership and patentability, as these technologies frequently mask the distinctions between natural and engineered products. Moreover, due to escalating concerns regarding accessibility, there is a heightened advocacy for more adaptable intellectual property frameworks that balance the protection of innovation with the necessity of providing affordable access to life-saving medications. Collaborative frameworks, including patent pooling and open-source initiatives, are being investigated to enhance knowledge dissemination while maintaining innovation incentives. The significance of intellectual property in promoting global health equity will increase, as pharmaceutical companies and governments collaborate to tackle urgent health challenges, including antimicrobial resistance and emerging infectious diseases. The future of intellectual property in the pharmaceutical sector will be defined by a dynamic balance among fostering innovation, guaranteeing equitable access, and navigating the intricacies of contemporary science.

**Keywords:** Intellectual property, pharmaceutical innovations, biotechnology, personalized medicine, patent systems, global health equity

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***DIST/2025/23***

# Patents and Public Health: Striking a Balance in Global Drug Access

Akshay Kumar Prajapati*, Surya Pratap Sisodia

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**Abstract:**

The convergence of patents and public health poses a complex challenge in assuring worldwide access to vital medications while promoting innovation in pharmaceutical development. Patents grant pharmaceutical companies exclusive rights to their innovations, thereby incentivizing research and development through financial protection. Nonetheless, this exclusivity may restrict access to life-saving pharmaceuticals, particularly in low-income nations where the expense of patented medications can be prohibitive. Achieving a balance between safeguarding intellectual property and facilitating equitable access to medications is essential for enhancing global health outcomes. Compulsory licensing, enabling governments to circumvent patent restrictions during public health emergencies, and patent pooling, wherein companies collaborate by sharing patents, are increasingly recognized as effective strategies to enhance access. Moreover, tiered pricing strategies, which adjust drug prices according to a country's income level, can enhance the affordability of essential medications in lower-income areas. Collaborative frameworks involving governments, NGOs, and the private sector are essential for addressing this issue, ensuring equitable distribution of pharmaceutical innovation benefits while incentivizing the development of new treatments. Ultimately, identifying a sustainable solution that addresses patents with public health is essential for attaining global health equity.

**Keywords:** Patents, public health, drug access, compulsory licensing, intellectual property, global health equity

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***DIST/2025/24***

# Open-Source Drug Discovery: A Paradigm Shift in Pharma Research & Development

Nitin Kumar*, Surya Pratap Sisodia

Disha Institute of Pharmacy, Dhampur

**Abstract:**

Open-source drug discovery (OSDD) is emerging as a revolutionary method in pharmaceutical research and development, providing a collaborative and transparent framework to expedite the identification of new therapies. Historically, drug development has been an expensive, proprietary endeavor dominated by major pharmaceutical corporations. OSDD, however, alters this paradigm by promoting global collaboration, enabling researchers from academia, nonprofit organizations, and independent scientists to share data, research findings, and methodologies freely. This open access promotes innovation by utilizing a varied array of expertise and resources, potentially accelerating the discovery of new drug candidates, particularly for neglected diseases that have traditionally received minimal attention from the private sector. Open-source initiatives are especially advantageous in tackling global health issues, including antimicrobial resistance and emerging infectious diseases, by fostering a more inclusive, community-driven method for drug discovery. The transparency of open-source models minimizes redundancy and enhances resource optimization. Despite challenges related to funding and intellectual property, the open-source movement has the potential to render drug development more equitable, sustainable, and accessible, thereby transforming the future of pharmaceutical research and development.

**Keywords:** Open-source, drug discovery, pharmaceutical R&D, collaboration, antimicrobial resistance, global health

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***DIST/2025/25***

# Intellectual Property Laws and Their Impact on Antimicrobial Research

Mohd Rihan*, Surya Pratap Sisodia

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**Abstract:**

Intellectual property (IP) laws significantly impact antimicrobial research by affecting the development, commercialization, and accessibility of novel antibiotics and other antimicrobial agents. On one hand, intellectual property protections, such as patents, grant pharmaceutical companies exclusive rights to their inventions, thereby providing financial incentives to invest in the expensive and protracted process of drug discovery and development. Nonetheless, these safeguards can also impede access, especially concerning antibiotics, where elevated costs may restrict availability in low-income areas or hinder the adoption of novel therapies. The existing intellectual property system has been criticized for failing to sufficiently address the pressing demand for novel antibiotics in the context of antimicrobial resistance. The absence of market incentives for antibiotic development, typically utilized short-term or in reduced quantities, has led to a stagnation in antibiotic innovation over recent decades. Alternative models, including push and pull mechanisms or public-private partnerships, are being investigated to promote antimicrobial innovation while ensuring affordable access. Moreover, measures such as compulsory licensing during public health crises seek to remove intellectual property obstacles and guarantee the availability of essential antibiotics in periods of urgent necessity. A reevaluation of intellectual property laws is essential to synchronize incentives with global health priorities, especially in addressing the escalating threat of antimicrobial resistance.

**Keywords:** Intellectual property, antimicrobial research, patents, antimicrobial resistance, drug access, public health

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*DIST/2025/26*

# Global Health Equity: Challenges in Pharmaceutical Patent Policies

Mohd Arbaz*, Surya Pratap Sisodia

Disha Institute of Pharmacy, Dhampur

**Abstract:**

Global health equity continues to be a critical concern, especially regarding pharmaceutical patent regulations. Patents, although crucial for promoting innovation, frequently lead to elevated drug prices, restricting access to life-saving medications in low- and middle-income nations. Patents' exclusivity hinders the availability of affordable generic medications, intensifying inequalities in healthcare access. The World Trade Organization's TRIPS agreement offers flexibilities such as compulsory licensing; however, numerous countries encounter substantial obstacles in effectively employing these mechanisms. Moreover, the emphasis on profit-driven research frequently overlooks diseases common in impoverished areas, exacerbating health disparities. Practices like "evergreening" and restricted technology transfer sustain monopolies and obstruct local manufacturing capacities. The COVID-19 pandemic emphasized the urgent necessity for equitable access to pharmaceuticals, revealing systemic inefficiencies and global inequalities. Confronting these challenges necessitates a comprehensive strategy, encompassing the enhancement of TRIPS flexibilities, the advancement of open innovation frameworks, the execution of equitable pricing mechanisms, and the cultivation of global cooperation during health emergencies. By emphasizing access and equity in pharmaceutical policy, the global community can make substantial progress toward attaining universal health coverage and mitigating healthcare disparities.

**Keywords:** Global health equity, pharmaceutical patents, TRIPS agreement, access to medicines, generic drugs, healthcare disparities

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*DIST/2025/27*

# Data Exclusivity and Its Role in Biopharmaceutical Development

Kartik Kumar*, Kapil Kumar

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**Abstract:**

Data exclusivity is an essential regulatory framework in biopharmaceutical development, safeguarding clinical trial data provided by innovator firms. Data exclusivity incentivizes innovation and offers an additional layer of market protection beyond patents by limiting competitors' access to this data for a specified duration. This protection is especially crucial for biologics, which are difficult to patent because of their intricacy. Data exclusivity periods differ internationally, with the United States offering 5 years for small molecules and 12 years for biologics, whereas the European Union allocates 8 years of data exclusivity, succeeded by 2 years of market exclusivity. Although it promotes innovation, data exclusivity is criticized for postponing the availability of cost-effective generic and biosimilar options, thus affecting global health equity. Extended exclusivity can intensify access inequalities, especially in developing nations where affordable treatments are critically required. Reconciling the necessity for innovation with public health imperatives necessitates policy modifications, including tiered exclusivity durations, endorsement of voluntary licensing, and strategies to accelerate access during public health emergencies. By tackling these challenges, data exclusivity can persist in facilitating biopharmaceutical progress while fostering equitable access to medications globally.

**Keywords:** Data exclusivity, biopharmaceutical innovation, biologics, generic drugs, healthcare access, global health equity

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***DIST/2025/28***

# IP Challenges in CRISPR-Based Therapeutics and Microbial Engineering

Tushar Semal*, Kapil Kumar

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**Abstract:**

CRISPR-based therapeutics and microbial engineering possess transformative potential in healthcare, agriculture, and industry. Nonetheless, the domain encounters considerable intellectual property (IP) obstacles that hinder innovation and commercialization. The fragmented patent landscape, exemplified by conflicts like those between the University of California, Berkeley, and the Broad Institute, generates overlapping claims and licensing intricacies. Developers frequently encounter elevated expenses and extended negotiations to obtain freedom to operate (FTO), particularly as CRISPR applications encompass various sectors and jurisdictions. Ethical and legal considerations, especially in human gene editing, introduce complexities that affect intellectual property policies and licensing practices. Moreover, the application of CRISPR in microbial engineering faces jurisdictional discrepancies concerning the patenting of genetically modified organisms (GMOs). The conflict between open science principles and proprietary frameworks complicates the equilibrium between fostering innovation and guaranteeing widespread access. Resolving these challenges necessitates cooperative solutions, including patent pooling, international standardization of intellectual property regulations, and the promotion of public-private partnerships. By optimizing intellectual property processes and advocating for fair licensing practices, the CRISPR domain can realize its complete potential while addressing the ethical and regulatory intricacies linked to advanced genomic technologies.

**Keywords:** CRISPR, intellectual property, therapeutics, microbial engineering, patent landscape, licensing challenges

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***DIST/2025/29***

# The Role of TRIPS Agreement in Shaping Global Pharma Innovation

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**Abstract:**

The TRIPS Agreement (Trade-Related Aspects of Intellectual Property Rights), instituted by the World Trade Organization, has been instrumental in influencing global pharmaceutical innovation. TRIPS standardizes intellectual property (IP) protections among member states, thereby incentivizing research and development (R&D) by granting exclusivity for new pharmaceuticals via patents. This has stimulated innovation, especially in prosperous countries, promoting progress in life-saving treatments and therapies. Nonetheless, the agreement has faced criticism regarding its effect on global health equity. The two-decade patent protection duration can hinder the introduction of cost-effective generic medications, disproportionately impacting low- and middle-income nations. Although TRIPS encompasses provisions such as compulsory licensing to meet public health requirements, political and procedural obstacles frequently restrict their effective implementation. Moreover, apprehensions remain regarding the agreement's efficacy in tackling neglected diseases common in resource-limited areas. As the pharmaceutical landscape transforms with emerging technologies such as biologics and personalized medicine, TRIPS encounters pressure to evolve. Achieving the dual goals of promoting innovation and guaranteeing equitable access to medications is essential for developing a more inclusive global health system. Increased flexibility and global collaboration can facilitate the alignment of TRIPS with the objective of sustainable pharmaceutical innovation.

**Keywords:** TRIPS Agreement, pharmaceutical innovation, intellectual property, patents, global health equity, compulsory licensing

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***DIST/2025/30***

# Bridging Innovation and Accessibility: A Legal Perspective on Pharma Patents

Yash Kumar*, Kapil Kumar

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**Abstract:**

Pharmaceutical patents are fundamental in promoting innovation by providing exclusivity to developers, allowing them to recover significant research and development expenditures. This exclusivity frequently leads to elevated drug prices, restricting access for at-risk populations, especially in low- and middle-income nations. This duality highlights the legal and ethical dilemmas in reconciling innovation with fair access to pharmaceuticals. International frameworks, such as the TRIPS Agreement, attempt to resolve this tension by imposing patent protections while providing flexibilities like compulsory licensing and parallel importing to meet public health requirements. Notwithstanding these provisions, procedural obstacles and geopolitical influences frequently limit their practical implementation. Emerging trends, such as the proliferation of biologics and precision medicine, complicate the legal framework by broadening the extent and duration of patent protections. Addressing the disparity between innovation and accessibility necessitates the reorganization of pharmaceutical patent policies via strategies such as tiered pricing, optimized utilization of TRIPS flexibilities, and the promotion of voluntary licensing agreements. Enhancing international collaboration and prioritizing public health above profit can establish a legal framework that fosters both innovation and equitable access. A balanced strategy regarding pharmaceutical patents is crucial for promoting health equity while maintaining the incentives vital for drug discovery.

**Keywords:** Pharmaceutical patents, innovation, accessibility, TRIPS Agreement, health equity, compulsory licensing

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***DIST/2025/31***

# Compulsory Licensing: A Solution for Affordable Life-Saving Medicines?

Vikrant Kumar*, Kapil Kumar

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**Abstract:**

Access to vital pharmaceuticals continues to be a considerable global issue, especially in low- and middle-income nations. Compulsory licensing (CL), a legal mechanism under the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), permits governments to permit the manufacture of patented pharmaceuticals without the patent holder's consent during public health emergencies. This mechanism has been crucial in guaranteeing the affordability and accessibility of life-saving medications, especially for diseases like HIV/AIDS, tuberculosis, and cancer. By permitting generic drug manufacturers to produce patented medications at reduced costs, CL facilitates the reconciliation of pharmaceutical innovation with public health requirements. It promotes competition, thereby lowering drug prices and enhancing patient access to vital treatments. The implementation of compulsory licensing encounters obstacles, such as political pressure from patent-holding entities, trade limitations, and apprehensions regarding sustained pharmaceutical innovation. Reconciling intellectual property rights with public health imperatives necessitates a strong legal framework, global collaboration, and transparent negotiation procedures. Fortifying CL policies can improve global healthcare equity, guaranteeing that life-saving medications remain accessible to everyone.

**Keywords:** Compulsory licensing, intellectual property, access to medicines, public health, pharmaceutical patents, drug pricing

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***DIST/2025/32***

# AI-Powered Microbial Drug Discovery: Transforming Healthcare

Gourav Saini*, Shivam Kumar

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**Abstract:**

Artificial intelligence (AI) is transforming microbial drug discovery by expediting the identification of innovative therapeutic compounds, enhancing drug design, and addressing antimicrobial resistance. Conventional drug discovery is frequently laborious and resource-demanding; however, AI-driven methodologies utilize big data analytics, machine learning, and predictive modeling to improve efficiency and accuracy. Algorithms powered by artificial intelligence analyze extensive microbial genomic datasets to identify potential drug targets, forecast antimicrobial activity, and discover novel bioactive compounds. Deep learning models enable the virtual screening of chemical libraries, markedly decreasing the time needed to develop novel antibiotics and antifungal agents. Furthermore, AI improves synthetic biology applications by facilitating the design and optimization of microbial strains for sustainable pharmaceutical production. The most promising application of AI in microbial drug discovery is the prediction of bacterial resistance mechanisms. AI aids in the design of next-generation antimicrobials with enhanced efficacy by elucidating evolutionary resistance pathways. Furthermore, AI-driven automation in high-throughput screening accelerates the evaluation of drug candidates, enhancing success rates in preclinical and clinical trials. Notwithstanding its transformative potential, challenges including data bias, regulatory acceptance, and integration with current pharmaceutical workflows persist. Overcoming these obstacles through interdisciplinary collaboration will be essential to realizing AI's complete potential in microbial drug discovery.

**Keywords:** Artificial intelligence, microbial drug discovery, antimicrobial resistance, machine learning, synthetic biology, predictive modeling

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*DIST/2025/33*

# Machine Learning in Drug Resistance Prediction and Control

Khushi Vashistha*, Shivam Kumar

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**Abstract:**

Machine learning (ML) is transforming the prediction and management of drug resistance, providing robust tools to address one of the most critical issues in contemporary medicine: drug-resistant infections. Through the analysis of extensive datasets, encompassing genomic, clinical, and epidemiological data, machine learning models can discern patterns and forecast the potential evolution of resistance in bacteria, viruses, or other pathogens to current pharmaceuticals. This predictive ability facilitates the early identification of developing resistance, allowing for more effective interventions and customized treatment strategies aligned with the specific resistance characteristics of pathogens. Machine learning algorithms are employed in drug resistance management to enhance antibiotic stewardship programs by determining the most effective treatments from patient data, thereby mitigating the overuse and misuse of antibiotics that contribute to resistance. Moreover, machine learning is improving the identification of novel pharmaceuticals by examining molecular structures and modeling the interactions of various compounds with bacterial targets, thereby potentially expediting the advancement of next-generation antibiotics. Furthermore, machine learning can facilitate the monitoring of resistance trends across various regions, enhancing the global comprehension of resistance patterns and informing public health interventions. The incorporation of machine learning into drug resistance prediction and management is poised to enhance our capacity to address and mitigate drug-resistant infections, offering more accurate and prompt solutions to a developing global health crisis.

**Keywords:** Machine learning, drug resistance, prediction, control, antibiotic stewardship, drug discovery

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***DIST/2025/34***

# AI-Driven Formulation Design for Personalized Pharmaceuticals

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**Abstract:**

AI-driven formulation design is revolutionizing personalized pharmaceuticals by facilitating the creation of customized drug formulations that enhance efficacy, safety, and patient outcomes. Conventional drug development usually uses a uniform approach; however, artificial intelligence facilitates the incorporation of individual patient attributes, including genetics, metabolism, and disease profiles, in the formulation of medications. Employing sophisticated machine learning algorithms, AI may examine extensive patient data to identify patterns and forecast the performance of various formulations across heterogeneous populations. Artificial intelligence technologies, including deep learning and neural networks, are utilized to develop drug delivery systems capable of modulating release rates or targeting specific tissues according to an individual patient's requirements. AI can facilitate the creation of individualized dosing regimens that guarantee the accurate administration of medication at appropriate times, enhancing therapeutic efficacy and reducing adverse effects. Furthermore, AI can accelerate the formulation process by forecasting the stability, solubility, and bioavailability of pharmaceuticals prior to clinical trials, thereby minimizing both time and expenses. The incorporation of AI into pharmaceutical formulation represents a crucial advancement in precision medicine, facilitating treatments that are more tailored, efficacious, and attuned to the unique requirements of each patient, announcing a new age of personalized healthcare.

**Keywords:** AI-driven, formulation design, personalized pharmaceuticals, machine learning, precision medicine, drug delivery systems

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***DIST/2025/35***

# Bioinformatics in Pharmaceutical Microbiology: An Efficient Approach

Sabiha Kanwal Ansari*, Shivam Kumar

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**Abstract:**

Bioinformatics is assuming an increasingly critical role in pharmaceutical microbiology, providing effective and accurate methodologies to tackle issues in drug development, microbial resistance, and therapeutic efficacy. Bioinformatics enhances microbial research by integrating computational tools, thereby expediting the discovery of novel antibiotics, refining drug formulations, and deepening the comprehension of microbial behavior at the molecular level. Bioinformatics facilitates the identification of new drug targets and the clarification of microbial resistance mechanisms through genome sequencing, offering essential insights for the advancement of next-generation antibiotics. Moreover, metagenomics and proteomics analyses facilitate the characterization of intricate interactions within microbial communities, such as the human microbiome, which affect drug metabolism and therapeutic results. Bioinformatics tools facilitate drug design by analyzing extensive chemical databases and forecasting the bioactivity of prospective compounds. In pharmaceutical microbiology, these computational techniques facilitate more efficient screening of drug candidates, thereby decreasing the time and expenses linked to conventional methods. Moreover, AI-driven algorithms are improving the precision of predicting microbial resistance patterns, facilitating the creation of customized therapies. Notwithstanding its potential, obstacles such as data integration, standardization, and regulatory acceptance remain. Ongoing collaboration among bioinformaticians, microbiologists, and pharmaceutical scientists is crucial to effectively leverage bioinformatics for innovative and efficient solutions in pharmaceutical microbiology.

**Keywords:** Bioinformatics, pharmaceutical microbiology, genome sequencing, drug development, microbial resistance, metagenomics

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***DIST/2025/36***

# CRISPR Technology in Pharmaceutical and Microbial Engineering

Kashaf Rehman*, Shivam Kumar

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**Abstract:**

Pharmaceutical and microbial engineering have recently undergone a major revolution with the advent of CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats). Using the CRISPR-Cas system, scientists are capable of targeting and altering precise DNA sequences to create pioneering therapeutic tools against genetic disorders, infectious diseases, and cancer. In the pharmaceutical field, CRISPR is being used in functional genomic studies to discover drug targets and biomarkers in drug discovery. It also boosts biologics development through improved cell line engineering for monoclonal. CRISPR plays a vital role in designing microbial strains used to produce biopharmaceuticals (such as antibiotics, enzymes and bioactive compounds) in microbial engineering. Engineered micro-organisms are also used for environmental applications like bioremediation and renewable biofuel production. Although CRISPR technology has the potential to alter the way we think about medicine, it is not without its problems that could hinder translation into the clinic, including ethical concerns, regulatory pressure, and off-target effects. Developments in delivery methods, including lipid nanoparticles and viral vectors, are improving these barriers and enabling CRISPR-based therapies. This abstract summarizes the versatility of CRISPR which is making a paradigm shift in drug discovery and microbial engineering. Although it is new, CRISPR technology has the potential to revolutionize medicine and industrial microbiology to eliminate diseases at their genetic origin and harness microbial processes to support sustainable development.

**Keywords:** CRISPR, genome editing, microbial engineering, pharmaceuticals, biopharmaceuticals, gene therapy

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***DIST/2025/37***

# AI and Big Data: Optimizing Drug Trials for Infectious Diseases

David Sharma*, Shivam Kumar

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**Abstract:**

Artificial intelligence (AI) and big data are reengineering the design, conduct, and interpretation of clinical trials for infectious diseases. On top of that, these traditional drug trials tend to carry many costs and long timelines, making it challenging to recruit enough patients. AI algorithms and big data analytics solve this problem by analyzing massive datasets and predicting ideal participants for trials, the likelihood of drug efficacy, and real-time patient monitoring. Machine learning models can assist with biomarker identification, genomics, proteomics, clinical data analysis, and/or patient stratification to enable precision trial designs. Real time epidemiological surveillance enabled by big data platforms facilitates rapid identification of hotspots for trial site selection. AI adaptive trial designs can modify ongoing results to reduce failure or wastage of resources. AI also enables post-trial analytics by detecting patterns and relationships that might be lost on traditional methods, streamlining drug approvals. While the potential is huge, data privacy, regulatory issues, and the need for interdisciplinary work are a challenge. Attention must also be drawn to ethical issues associated with AIs in terms of patient selection and the possible biases of algorithms in the data. Fortunately, secure data-sharing protocols and explainable AI are making it easier to overcome barriers to trust and reliability in AI-driven trials. The transformative power of AI and big data is evident in the adaptability of the approaches adopted for drug trials on other infectious diseases, ensuring a rapid and effective response to a global health problem while providing a better outcome to patients around the world.

**Keywords:** AI, big data, drug trials, infectious diseases, machine learning, precision medicine

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*DIST/2025/38*

# Digital Microbiology: Smart Solutions for Pathogen Detection

Nakul Kumar*, Prakul Kumar

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**Abstract:**

Digital microbiology is changing the approach to pathogen detection, transforming the persistence, efficiency, and specificity of solutions to traditional microbiological analysis. Digital microbiology improves diagnostic sensitivity and specificity, accelerates time-to-detection, and decreases human error by incorporating advanced technologies, such as artificial intelligence (AI), machine learning (ML), biosensors, and digital imaging. Such innovations permit rapid and high-throughput detection of push bacterial, viral, and fungal pathogens that fill particular clinical, environmental, and food safety needs. Automated systems that are AI-based image recognition for colony morphology, and ML algorithms for interpreting genomic data—greatly enhance pathogen detection sensitivity and specificity. Digital tools enable rapid diagnostics through telemicrobiology platforms, which in turn increase access to microbial expertise in areas previously lacking it. Additionally, with big data analytics, IoT-enabled devices help real-time monitoring of outbreaks, improving epidemic preparedness and response. Recent advances in digital microbiology, particularly its translation into clinical diagnostics, AMR surveillance and environmental microbiology. This abstract investigates the intersection of digital technologies and laboratory workflows, discusses the barriers we face in implementation, and considers the promise of these approaches to transform microbiological practice. Future-directed digital microbiology will advance the rapid, accurate, and scalable detection of pathogens.

**Keywords:** Digital microbiology, pathogen detection, artificial intelligence, diagnostics, automation, antimicrobial resistance

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***DIST/2025/39***

# Blockchain in Pharmaceutical Intellectual Property Management

Jayveer Singh*, Prakul Kumar

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**Abstract:**

Blockchain is helping to change the way we manage IP in the pharmaceutical industry, providing secure, transparent, and efficient solutions to current core issues. Blockchain technology can offer immutable records of patent filings, clinical trial data, and licensing agreements, which decreases disputes and provides strong ownership protection of these assets. As a core functionality of blockchain, smart contracts automate the processes of licensing, payments, and collaboration agreements, which reduces administrative burden and increases trust between all involved parties. Blockchain helps in maintaining data integrity and traceability in an industry rife with counterfeiting and data security breaches. It allows secure transmission of sensitive data between investigators, regulators and manufacturers while abiding by international IP laws. Furthermore, platforms based on blockchain technology facilitate end-to-end tracking of the IP lifecycle, from initial filing to commercialization, giving pharmaceutical companies a competitive advantage in innovation management. While it does come with benefits, there are challenges as well like high cost of implementation, limits on scalability and more, and regulatory alignment. Nonetheless, further developments and test runs show the promise of blockchain for improving IP management in the pharmaceutical sector. This abstract will encapsulate the solutions that blockchain presents to some of the pertinent issues in managing drug and biological inventions and present a more cost-effective, transparent, and constructive ecosystem ensuring continued innovation and protection of IP.

**Keywords:** Blockchain, intellectual property, pharmaceuticals, smart contracts, data integrity, innovation management

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***DIST/2025/40***

# AI-Enhanced Drug Repurposing Strategies for Emerging Infections

Ajay Kumar*, Prakul Kumar

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**Abstract:**

Artificial Intelligence (AI) is revolutionizing the way we repurpose drugs into a faster, cheaper method never seen before in our fight against new, stronger infections. Drug discovery using conventional approaches is time-consuming and expensive, which is a major obstacle to efficient drug development during infectious disease outbreaks. AI-based platforms can process terabytes of chemical libraries, genomic profiles, and clinical data repositories using machine learning algorithms and natural language processing within the framework of network pharmacology. This would enable the safe and effective identification and administration of preexisting drugs for the treatment of new pathogens. AI enhances in silico predictive modeling of the drug (pathogen interaction, dosing regimen, adverse effect). Deep learning and computational docking techniques help in toxicity predictions which enhance the screening process, minimizing the time required to identify possible candidates. In addition, novel AI strategies on drug repositioning have successfully been used to repurpose antiviral and immunomodulatory candidates to tackle the global health crisis induced by COVID-19. However, challenges such as data standardization, model interpretability, and ethical considerations such as algorithmic bias are some barriers that need to be overcome. Crucially, further joint work between academic scientists, industry and regulatory bodies will be essential both to maximize the potential of AI models and translate them effectively to the clinic. The urgent need to develop efficient and scalable therapies for emerging infections can benefit from a repurposing approach, especially in a pandemic scenario.

**Keywords:** AI, drug repurposing, emerging infections, machine learning, predictive modeling, therapeutic discovery

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***DIST/2025/41***

# Virtual Screening and AI in Novel Antibiotic Development

Divyanshu Kumar*, Prakul Kumar

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**Abstract:**

Antibiotic resistance has become a worldwide problem that leads to worsening situations, which require new antibiotics to solve. AI-driven Virtual screening has been developed as a game-covering tool to speed up the time for target discovery of new antimicrobial agents. Using computational tools, virtual screening can evaluate vast collections of chemicals to identify those with antibiotic activity by predicting target-specific interactions. AI augments this process by using machine learning algorithms and deep neural networks to improve molecular docking simulations, optimize lead compounds and predict pharmacokinetic and toxicological properties. Also, through AI-driven data mining, it can identify patterns in microbial genomes both for new drug targets and mechanisms of action. Not only do such technologies save multiple years and millions of dollars on the path to lead development, but they also open up new chemical space for unique discoveries. Recent examples include the discovery of previously unknown antibiotic scaffolds through AI-based screening and drug development against multi-drug-resistant pathogens. While it holds promise, there are also challenges associated with algorithm validation, lack of high-quality data, and inability to integrate with experimental methods. Overcoming these hurdles via regulated multidisciplinary partnerships will be paramount to the realization of AI-guided antibiotic discovery. Finally, this overview describes how together virtual screening and AI add potential solutions to treating the increasing worldwide problem of antimicrobial resistance utilizing novel antibiotics.

**Keywords:** AI, virtual screening, antibiotics, antimicrobial resistance, drug discovery, machine learning

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***DIST/2025/42***

# Ensuring Pharma Supply Chain Resilience for Global Health Emergencies

Vivek Kumar*, Prakul Kumar

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**Abstract:**

The global pharmaceutical supply chain plays a critical role in responding to health emergencies, yet it faces significant vulnerabilities that hinder timely access to essential medicines and vaccines. Ensuring supply chain resilience during global health crises, such as pandemics, requires a comprehensive approach to address disruptions, mitigate risks, and maintain consistent production and distribution. This paper explores strategies to enhance the resilience of the pharma supply chain, focusing on diversification, real-time data tracking, digitalization, and strategic stockpiling. Key components of an agile and adaptive supply chain include strengthening communication channels, optimizing logistics networks, and fostering collaboration among stakeholders such as manufacturers, suppliers, and regulatory bodies. Furthermore, the integration of innovative technologies, including artificial intelligence, blockchain, and IoT, holds promise in streamlining operations, ensuring transparency, and improving decision-making processes during emergencies. By identifying challenges such as transportation delays, regulatory barriers, and raw material shortages, this study provides actionable insights into fortifying the pharmaceutical supply chain, ensuring that critical health products reach affected populations quickly and efficiently. The resilience of the pharma supply chain is essential not only for responding to present crises but also for preparing for future global health emergencies.

**Keywords:** Pharma supply chain, resilience, global health emergencies, digitalization, risk mitigation, AI.

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***DIST/2025/43***

# Role of 3D Printing in Decentralized Drug Manufacturing

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**Abstract:**

3D printing, also known as additive manufacturing, is revolutionizing the pharmaceutical industry by enabling decentralized drug manufacturing. This innovative technology allows for the production of customized, on-demand drug formulations, providing a solution to the challenges posed by traditional, centralized manufacturing models. By utilizing 3D printers, pharmaceutical companies can produce drugs closer to the point of care, reducing lead times and transportation costs while increasing supply chain flexibility. The technology facilitates the creation of complex dosage forms, personalized treatments, and precise dosages tailored to individual patient needs. Moreover, 3D printing enables efficient production of novel drug delivery systems, such as multi-drug combinations and controlled-release formulations, which can improve therapeutic outcomes. This paper explores the potential of 3D printing in decentralized drug manufacturing, highlighting its role in enhancing accessibility, reducing production costs, and addressing the challenges of global health disparities. Additionally, the integration of 3D printing with digital health technologies and regulatory frameworks will be discussed to ensure the safety, efficacy, and quality of printed pharmaceuticals. As the technology matures, 3D printing promises to reshape the landscape of drug manufacturing, making it more flexible, cost-effective, and patient-centric.

**Keywords:** 3D printing, decentralized manufacturing, drug delivery, personalized medicine, supply chain, healthcare innovation.

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***DIST/2025/44***

# Blockchain and IoT in Pharmaceutical Supply Chain Security

Shaurya Kumar*, Lalit Kumar

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**Abstract**:

The integration of Blockchain and the Internet of Things (IoT) presents a transformative opportunity for enhancing security and transparency in the pharmaceutical supply chain. The pharmaceutical industry is increasingly vulnerable to counterfeiting, theft, and regulatory non-compliance, which can compromise drug quality, safety, and patient health. Blockchain, with its immutable and decentralized nature, can provide a transparent, tamper-proof record of drug transactions from production to delivery, ensuring the integrity of the entire supply chain. IoT devices, such as sensors and RFID tags, can be used to track the real-time status of pharmaceuticals, including temperature, location, and condition, providing immediate alerts for any discrepancies or potential threats. By combining these two technologies, the pharmaceutical supply chain can be secured against fraud, theft, and product degradation, ensuring that drugs meet the required standards throughout their journey. This paper discusses how Blockchain and IoT together create a secure, transparent, and efficient pharmaceutical supply chain, improving traceability, enhancing regulatory compliance, and increasing consumer trust. Additionally, the potential challenges, such as data privacy and system integration, are explored, alongside the opportunities for future advancements in the field.

**Keywords:** Blockchain, IoT, pharmaceutical supply chain, security, traceability, counterfeiting.

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***DIST/2025/45***

# Strengthening Biopharmaceutical Logistics for Pandemic Preparedness

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**Abstract:**

Pandemic preparedness requires a robust and agile biopharmaceutical logistics infrastructure to ensure timely access to critical vaccines, treatments, and medical supplies. The biopharmaceutical supply chain is uniquely complex, with stringent requirements for storage, handling, and transportation of temperature-sensitive products. Strengthening logistics capabilities is essential to meet the demands of global health crises, such as pandemics, where the timely distribution of vaccines and therapeutics can significantly reduce morbidity and mortality. This paper explores key strategies to fortify biopharmaceutical logistics, including optimizing cold chain management, enhancing real-time monitoring with IoT and data analytics, and improving collaboration among global stakeholders. It also emphasizes the need for flexible logistics networks that can quickly scale up during emergencies, leveraging digital tools and AI to forecast demand and optimize supply chain routes. Furthermore, the integration of advanced technologies like blockchain can ensure the traceability and security of pharmaceutical products, reducing the risks of counterfeiting and spoilage. The paper highlights the importance of contingency planning, infrastructure investments, and regulatory preparedness to create a resilient logistics system capable of responding to future pandemics. Ultimately, strengthening biopharmaceutical logistics is key to safeguarding global health and ensuring equitable access to lifesaving treatments during public health emergencies.

**Keywords:** Biopharmaceutical logistics, pandemic preparedness, cold chain, real-time monitoring, supply chain optimization, blockchain.

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***DIST/2025/46***

# AI and Automation in Pharmaceutical Manufacturing: A Disruptive Force

Mohd Uzair*, Lalit Kumar

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**Abstract:**

AI and automation are rapidly transforming pharmaceutical manufacturing, positioning themselves as disruptive forces that promise to enhance efficiency, reduce costs, and improve product quality. The integration of artificial intelligence (AI) into manufacturing processes allows for the automation of complex tasks, such as process optimization, quality control, and predictive maintenance, thus minimizing human error and enhancing operational precision. AI-driven systems can analyze vast amounts of production data in real time, identifying patterns and optimizing processes to maximize throughput and minimize waste. Additionally, automation technologies like robotics and smart factories enable faster production cycles, ensuring that pharmaceutical products meet the increasing demand without compromising safety or efficacy. This paper explores the role of AI and automation in revolutionizing pharmaceutical manufacturing, with a focus on their potential to streamline supply chains, reduce production costs, and ensure compliance with stringent regulatory requirements. By enhancing the scalability and adaptability of manufacturing processes, these technologies can also enable the personalized production of medicines, providing tailored solutions for individual patients. However, challenges such as regulatory concerns, system integration, and workforce adaptation are also discussed. The paper concludes by highlighting how AI and automation can serve as a catalyst for innovation in the pharmaceutical industry, driving its evolution into a more efficient and responsive sector.

**Keywords:** AI, automation, pharmaceutical manufacturing, process optimization, robotics, smart factories.

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***DIST/2025/47***

# Smart Packaging for Pharmaceutical Traceability and Safety

Navneet Kumar*, Sharmistha Singh

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**Abstract:**

Smart packaging is emerging as a critical solution for enhancing pharmaceutical traceability and safety, offering an advanced method to ensure the integrity and authenticity of pharmaceutical products throughout the supply chain. With the increasing prevalence of counterfeit drugs and supply chain disruptions, smart packaging technologies, such as RFID tags, QR codes, and sensors, are providing real-time data on the location, temperature, and condition of pharmaceutical products. These technologies enable manufacturers, distributors, and consumers to track the journey of drugs from production to point-of-use, ensuring that products are stored and transported under the required conditions. Additionally, smart packaging can offer tamper-evident features, alerting stakeholders to any potential breaches in the packaging or handling process. This paper explores the role of smart packaging in improving pharmaceutical safety by enhancing visibility, reducing counterfeiting risks, and ensuring compliance with regulatory requirements. It also discusses the integration of blockchain with smart packaging systems to provide a secure, transparent record of the product's journey, fostering trust among consumers and healthcare providers. The paper concludes by evaluating the future potential of smart packaging in transforming the pharmaceutical industry, emphasizing its role in ensuring both product safety and patient well-being in an increasingly complex global market.

**Keywords:** Smart packaging, pharmaceutical traceability, safety, RFID, counterfeit drugs, blockchain.

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***DIST/2025/48***

# Counterfeit Drug Prevention: The Role of Technology and IP Protection

Mohd Zeeshan*, Sharmistha Singh

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**Abstract:**

Counterfeit drugs pose a significant threat to public health, safety, and the integrity of the pharmaceutical industry. The proliferation of counterfeit products, which often bypass regulatory scrutiny, can lead to ineffective treatments, adverse reactions, and loss of trust in the healthcare system. Technology and intellectual property (IP) protection play a vital role in combating this growing challenge. This paper explores the intersection of advanced technologies, such as blockchain, serialization, and anti-tampering packaging, in preventing counterfeit drugs from entering the supply chain. Blockchain offers an immutable, transparent ledger for tracking and verifying the authenticity of pharmaceutical products from production to distribution, ensuring full traceability and transparency. Serialization techniques, including unique product identifiers, enable manufacturers to track individual units and ensure that products have not been substituted or altered. Additionally, IP protection strategies, such as patents, trademarks, and digital rights management, help safeguard pharmaceutical innovations and prevent unauthorized replication. By combining these technological solutions with robust IP enforcement, the pharmaceutical industry can strengthen its defenses against counterfeit drugs, ensuring the delivery of safe, effective treatments to patients. This paper highlights the importance of a multi-layered approach in counterfeit prevention, focusing on the role of technology and IP protection in securing the global drug supply chain.

**Keywords:** Counterfeit drugs, technology, intellectual property, blockchain, serialization, anti-tampering packaging.

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***DIST/2025/49***

# Digital Twins in Pharma: Optimizing Manufacturing and Drug Safety

Vaishali*, Sharmistha Singh

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**Abstract:**

Digital twin technology is revolutionizing the pharmaceutical industry by offering a virtual replica of manufacturing systems, processes, and drug safety protocols. This innovative approach allows for the real-time simulation, monitoring, and optimization of pharmaceutical manufacturing, ensuring more efficient production and enhanced drug safety. A digital twin enables manufacturers to create a dynamic, data-driven model of the production process, allowing for predictive analytics to anticipate potential bottlenecks, equipment failures, or deviations from optimal conditions. This predictive capability enhances operational efficiency, reduces downtime, and ensures product consistency. Furthermore, digital twins can be used to simulate drug safety outcomes by modeling the behavior of pharmaceutical products under various conditions, from production to distribution. By analyzing real-time data and testing different scenarios in a virtual environment, potential risks and safety concerns can be identified and addressed before they impact patients. This paper explores how digital twins are transforming pharmaceutical manufacturing by improving process optimization, reducing costs, and ensuring compliance with stringent safety standards. Additionally, the potential for integrating digital twins with other technologies like IoT, AI, and machine learning to further enhance drug safety and operational effectiveness is discussed. The future of digital twin technology promises to drive greater innovation, resilience, and quality in pharmaceutical manufacturing.

**Keywords:** Digital twins, pharmaceutical manufacturing, optimization, drug safety, predictive analytics, IoT.

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***DIST/2025/50***

# Cold Chain Innovations for Global Vaccine Distribution

Mohd Sameer*, Sharmistha Singh

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**Abstract:**

Cold chain logistics play a crucial role in ensuring the safe and effective distribution of vaccines, particularly in global health initiatives aimed at combating infectious diseases. The integrity of the cold chain, which maintains vaccines at required low temperatures during storage and transportation, is essential to prevent degradation and ensure vaccine potency. Innovations in cold chain technologies are transforming the logistics of global vaccine distribution, offering more reliable and cost-effective solutions to address the challenges of temperature-sensitive products. This paper explores cutting-edge advancements in cold chain management, including smart temperature monitoring systems, advanced refrigeration technologies, and portable, energy-efficient cooling solutions. The integration of IoT-based sensors and blockchain provides real-time data tracking, ensuring continuous monitoring of vaccine storage conditions and enabling full traceability throughout the supply chain. These technologies enhance operational efficiency, reduce spoilage, and ensure timely delivery, even to remote or resource-limited regions. Additionally, the paper discusses the role of sustainable practices in cold chain logistics, such as solar-powered refrigeration and eco-friendly packaging, which contribute to reducing the carbon footprint of vaccine distribution. By leveraging these innovations, global health organizations can ensure more effective vaccine delivery, improving access to life-saving immunizations and strengthening preparedness for future pandemics.

**Keywords:** Cold chain, vaccine distribution, innovations, temperature monitoring, IoT, blockchain.

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***DIST/2025/51***

# Sustainable Drug Production: A Step Towards Green Pharmaceuticals

Nadeem*, Sharmistha Singh

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**Abstract:**

Sustainable drug production is emerging as a critical component of the pharmaceutical industry's efforts to minimize its environmental impact while ensuring the efficient delivery of essential medicines. The traditional methods of pharmaceutical manufacturing, which rely heavily on resource-intensive processes, chemical solvents, and high energy consumption, contribute significantly to environmental degradation. To address these challenges, the concept of green pharmaceuticals is gaining traction, promoting sustainable practices that reduce waste, energy consumption, and carbon footprints. This paper explores the advancements in sustainable drug production, highlighting eco-friendly manufacturing techniques, such as green chemistry, solvent-free synthesis, and the use of renewable resources. Additionally, innovations in biopharmaceuticals, such as biologic drugs and plant-based therapeutics, offer promising alternatives to conventional drug production methods. The integration of circular economy principles in drug manufacturing, which emphasize waste reduction, recycling, and resource efficiency, is also discussed. The paper also examines the role of regulatory frameworks and industry collaborations in promoting sustainability within the pharmaceutical sector. By adopting these green manufacturing approaches, the pharmaceutical industry can play a significant role in reducing environmental harm while ensuring the availability of safe, effective, and sustainable medicines for global populations. Ultimately, sustainable drug production is a step toward a more responsible and eco-conscious pharmaceutical landscape.

**Keywords:** Sustainable drug production, green pharmaceuticals, green chemistry, biopharmaceuticals, eco-friendly manufacturing, circular economy.

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***DIST/2025/52***

# Ethical Challenges in AI-Driven Drug Discovery

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**Abstract:**

AI-driven drug discovery is revolutionizing the pharmaceutical industry by accelerating the identification of potential therapeutic candidates and optimizing the drug development process. However, the integration of AI into drug discovery raises significant ethical challenges that must be addressed to ensure the responsible use of technology. One key concern is the potential for bias in AI models, which could lead to the development of drugs that are less effective or safe for certain populations, particularly marginalized groups. Additionally, the opacity of some AI algorithms raises questions about accountability and transparency in decision-making, especially when it comes to determining the safety and efficacy of new drugs. Data privacy is another critical issue, as AI systems rely on vast amounts of personal health data, raising concerns about the security and consent of patients. Furthermore, the speed at which AI can process data may outpace traditional regulatory frameworks, creating challenges in ensuring that AI-generated drugs meet established safety standards. This paper discusses these ethical challenges and proposes frameworks for mitigating risks, including guidelines for fairness, transparency, data protection, and regulatory alignment. By addressing these concerns, AI-driven drug discovery can advance in a manner that prioritizes patient safety, equity, and ethical responsibility.

**Keywords:** AI-driven drug discovery, ethical challenges, bias, transparency, data privacy, regulatory frameworks.

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***DIST/2025/53***

# Global Drug Regulation Harmonization: A Path to Faster Approvals

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**Abstract:** Global drug regulation harmonization is a critical step toward ensuring the swift and efficient approval of pharmaceutical products, especially in an increasingly interconnected world. Variations in regulatory standards across different regions often lead to delays in drug approvals, limiting access to life-saving therapies and increasing the cost of development. Harmonizing drug regulations can streamline the approval process, reduce duplication of efforts, and ensure that new medications meet high safety and efficacy standards. This paper explores the benefits and challenges of global regulatory harmonization, with a focus on initiatives such as the International Conference on Harmonisation (ICH), which seeks to align the regulatory requirements of major markets like the US, EU, and Japan. By addressing common regulatory practices, such as clinical trial designs, data sharing, and quality standards, harmonization can accelerate market access while maintaining rigorous safety protocols. The paper also examines the role of emerging technologies, such as digital platforms and artificial intelligence, in facilitating the harmonization process. Finally, it considers the potential impact of global harmonization on emerging markets and public health, particularly in the context of responding to pandemics and ensuring equitable access to treatments worldwide.

**Keywords:** Global drug regulation, harmonization, drug approval, clinical trials, regulatory standards, public health.

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***DIST/2025/54***

# Pharmacovigilance in the Age of AI and Digital Health

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**Abstract:**

Pharmacovigilance plays a crucial role in ensuring the safety and efficacy of pharmaceutical products after they have entered the market. As the pharmaceutical landscape evolves, AI and digital health technologies are reshaping pharmacovigilance by providing more efficient, accurate, and real-time monitoring of adverse drug reactions (ADRs) and drug safety. AI algorithms, machine learning, and natural language processing are increasingly being used to analyze vast amounts of health data, including electronic health records, social media, and patient-reported outcomes, to detect signals of potential safety issues that may have gone unnoticed in clinical trials. Digital health platforms, such as mobile health apps and wearable devices, offer valuable real-time data on patient health, providing a continuous stream of information that can help identify ADRs faster and more effectively. This paper explores the integration of AI and digital health in pharmacovigilance, highlighting their potential to enhance drug safety surveillance, improve risk management, and reduce the time required to detect and respond to safety concerns. It also discusses the ethical and regulatory challenges associated with these technologies, including data privacy and regulatory compliance. Ultimately, the paper argues that AI and digital health are transforming pharmacovigilance into a more proactive and dynamic field, improving patient outcomes and advancing public health.

**Keywords:** Pharmacovigilance, AI, digital health, adverse drug reactions, drug safety, machine learning.

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***DIST/2025/55***

# Ethical Dilemmas in Access to Experimental Drug Therapies

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**Abstract:**

Access to experimental drug therapies presents a range of ethical dilemmas, particularly in the context of clinical trials and compassionate use programs. While these therapies offer hope for patients with serious or life-threatening conditions, they are often not fully tested or approved, raising concerns about safety, efficacy, and informed consent. One significant ethical issue is the balance between providing access to potentially life-saving treatments and ensuring that patients are fully informed about the risks involved in using unapproved therapies. Additionally, the challenge of prioritizing limited resources—such as when experimental treatments are scarce or costly—can create disparities in access, favoring certain groups over others. This paper examines the ethical complexities of offering experimental drugs to patients outside of formal clinical trials, exploring the principles of autonomy, justice, and beneficence. It also delves into the regulatory frameworks governing compassionate use and expanded access programs, highlighting the tension between urgency and rigorous scientific evaluation. The paper further discusses the role of pharmaceutical companies, healthcare providers, and regulatory agencies in navigating these ethical challenges and ensuring that decisions are made in the best interest of patients. Ultimately, it advocates for a careful and transparent approach that balances patient rights, public health concerns, and the need for scientific integrity.

**Keywords:** Ethical dilemmas, experimental drug therapies, clinical trials, compassionate use, informed consent, access to healthcare.

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***DIST/2025/56***

# Transparency in Clinical Trials: The Need for Open Data Policies

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**Abstract:** Transparency in clinical trials is essential for maintaining the integrity of the drug development process and ensuring public trust in medical research. Open data policies that promote transparency have become increasingly important in addressing concerns related to selective reporting, data manipulation, and incomplete publication of trial results. This paper explores the need for open data policies in clinical trials, emphasizing how such policies can improve the quality and reliability of clinical research, facilitate independent verification of results, and enhance reproducibility. Open data policies also promote accountability by enabling researchers, clinicians, and the public to access detailed trial data, including raw data, statistical analyses, and adverse event reports. The paper discusses the ethical responsibility of researchers and pharmaceutical companies to share clinical trial data and highlights existing initiatives, such as the All-Trials campaign and the WHO's International Clinical Trials Registry Platform, that advocate for greater data transparency. Furthermore, the paper examines the potential challenges of implementing open data policies, including concerns over patient privacy, data security, and intellectual property rights. It concludes by proposing strategies to overcome these challenges, arguing that transparency is key to advancing medical knowledge, improving patient outcomes, and ensuring that clinical trials contribute meaningfully to evidence-based medicine.

**Keywords:** Transparency, clinical trials, open data policies, selective reporting, data integrity, ethical responsibility.

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***DIST/2025/57***

# Digital Health Policies and Their Role in Pharma Innovation

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**Abstract:**

Digital health policies are becoming increasingly vital in shaping the future of pharmaceutical innovation, as they govern the integration of digital technologies such as telemedicine, mobile health apps, wearable devices, and AI-driven healthcare solutions into the healthcare system. These policies play a pivotal role in ensuring that innovations are safe, effective, and equitable while maintaining regulatory standards and protecting patient privacy. This paper explores the intersection of digital health policies and pharmaceutical innovation, highlighting the role of regulatory frameworks in facilitating the development, approval, and adoption of digital health solutions in the pharmaceutical industry. By providing guidelines for the use of digital tools in clinical trials, drug development, and patient monitoring, these policies enable pharmaceutical companies to leverage new technologies to enhance drug efficacy, reduce time to market, and improve patient outcomes. The paper also addresses the challenges and opportunities posed by digital health policies, including issues related to data privacy, interoperability, and reimbursement structures. Furthermore, it examines how policies can foster collaboration between the pharmaceutical, technology, and healthcare sectors, driving innovation and improving healthcare delivery. Ultimately, digital health policies are essential for ensuring that digital technologies are effectively integrated into pharmaceutical innovation, contributing to more personalized, efficient, and accessible healthcare solutions.

**Keywords:** Digital health policies, pharmaceutical innovation, regulatory frameworks, patient monitoring, data privacy, healthcare delivery.

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***DIST/2025/58***

# Patient-Centered Drug Development: Integrating Public Health Needs

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**Abstract:**

Patient-centered drug development is an approach that places the needs, preferences, and experiences of patients at the forefront of the drug discovery and development process. This model emphasizes the importance of aligning pharmaceutical innovation with public health priorities, ensuring that new treatments address the most pressing health concerns of diverse patient populations. By incorporating patient feedback early and throughout the development process, pharmaceutical companies can improve clinical trial design, identify more relevant endpoints, and ensure that treatments are both effective and accessible. This paper explores the integration of public health needs into patient-centered drug development, focusing on strategies for enhancing patient involvement in clinical trials, the role of patient advocacy groups, and the inclusion of underrepresented populations. It also examines how patient-centered approaches can lead to the development of drugs that better meet the needs of the public, particularly in the context of chronic diseases, rare conditions, and emerging health threats. The paper discusses the challenges in achieving patient-centered drug development, such as balancing scientific rigor with patient preferences, and the regulatory frameworks that support these efforts. Ultimately, patient-centered drug development has the potential to accelerate innovation while ensuring that new therapies are truly beneficial to patients and contribute to broader public health goals.

**Keywords:** Patient-centered drug development, public health, clinical trials, patient involvement, drug accessibility, patient advocacy.

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***DIST/2025/59***

# The Role of Regulatory Sandboxes in Pharma Innovation Acceleration

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**Abstract:**

Regulatory sandboxes have emerged as a powerful tool to foster innovation in the pharmaceutical industry, allowing companies to test new technologies, drugs, or business models within a controlled regulatory environment. These flexible frameworks enable companies to experiment with innovative approaches, such as AI-driven drug development, digital health solutions, or novel manufacturing techniques, while ensuring that safety standards and regulatory requirements are met. This paper examines the role of regulatory sandboxes in accelerating pharma innovation, particularly in the context of emerging technologies and disruptive business models. By providing a structured yet adaptable space for experimentation, regulatory sandboxes can reduce the time and cost associated with bringing new products and services to market. The paper explores how sandboxes encourage collaboration between regulatory authorities, pharmaceutical companies, and technology innovators, fostering an environment of learning, transparency, and rapid iteration. It also highlights the benefits of sandboxes for reducing regulatory uncertainty, promoting patient safety, and encouraging investment in novel therapies. Furthermore, the paper discusses the challenges of implementing regulatory sandboxes, such as ensuring appropriate oversight, balancing innovation with public health concerns, and aligning policies across jurisdictions. Ultimately, regulatory sandboxes are positioned as a crucial enabler of pharmaceutical innovation, helping the industry stay ahead in a rapidly evolving healthcare landscape.

**Keywords:** Regulatory sandboxes, pharmaceutical innovation, emerging technologies, AI in drug development, regulatory flexibility, innovation acceleration.

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***DIST/2025/60***

# Policy Frameworks for Emerging Biopharmaceutical Technologies

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**Abstract:**

The rapid evolution of biopharmaceutical technologies has created both tremendous opportunities and significant challenges in ensuring that innovations are developed, regulated, and implemented safely and effectively. Policy frameworks for emerging biopharmaceutical technologies play a crucial role in fostering innovation while maintaining rigorous safety, efficacy, and ethical standards. This paper examines the need for robust policy frameworks to guide the development of advanced biopharmaceutical technologies, including gene therapies, cell-based therapies, and bioprinting. By establishing clear regulatory guidelines, these frameworks can facilitate timely market access, ensure patient safety, and address issues related to intellectual property, data privacy, and affordability. The paper discusses the role of regulatory bodies, such as the FDA and EMA, in adapting existing policies to accommodate the unique challenges posed by emerging technologies, and the importance of international harmonization in setting consistent standards. Furthermore, the paper explores the ethical and societal implications of biopharmaceutical innovations, particularly with equity, access, and long-term health impacts. It also highlights the need for dynamic policy approaches that can evolve in response to rapid technological advancements. Ultimately, the development of effective policy frameworks is essential for unlocking the full potential of emerging biopharmaceutical technologies and ensuring they contribute positively to public health outcomes.

**Keywords:** Policy frameworks, biopharmaceutical technologies, gene therapy, cell-based therapies, regulatory guidelines, public health.

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***DIST/2025/61***

# Ethical Considerations in Genetic-Based Pharmaceutical Interventions

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**Abstract:** Genetic-based pharmaceutical interventions, including gene therapies and personalized medicine, offer groundbreaking potential for treating a variety of genetic disorders and tailoring treatments to individual patients' genetic profiles. However, these innovations raise significant ethical considerations that must be carefully addressed to ensure their responsible development and application. This paper explores the ethical challenges surrounding genetic-based pharmaceutical interventions, focusing on issues such as informed consent, privacy, and equity. The ability to modify or target an individual's genome raises questions about the long-term implications of genetic alterations, particularly in germline editing, where changes could be inherited by future generations. The paper examines the ethical dilemmas of accessing and utilizing genetic data, balancing the need for personalized treatments with the risks of genetic discrimination and privacy violations. Additionally, it considers concerns about the affordability and accessibility of these advanced therapies, particularly in resource-limited settings, and the potential for widening healthcare disparities. The paper also discusses the ethical role of pharmaceutical companies, healthcare providers, and regulatory bodies in ensuring that genetic-based interventions are developed in alignment with ethical principles such as beneficence, non-maleficence, and justice. Ultimately, addressing these ethical considerations is essential for ensuring that genetic-based pharmaceutical interventions are used in a way that benefits all patients while minimizing harm.

**Keywords:** Genetic-based interventions, gene therapy, ethical considerations, personalized medicine, informed consent, genetic privacy.

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***DIST/2025/62***

# The Rise of Edible Vaccines: Opportunities and Challenges

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**Abstract:**

Edible vaccines, a novel approach to immunization, have gained attention due to their potential to provide an easy, cost-effective, and scalable alternative to traditional injectable vaccines. These vaccines are engineered to be consumed in the form of genetically modified plants, such as fruits or vegetables, which contain the active antigen needed to trigger an immune response. This paper explores the opportunities and challenges associated with the rise of edible vaccines, focusing on their potential to revolutionize global immunization efforts, particularly in resource-limited settings where access to healthcare infrastructure is limited. Edible vaccines could simplify vaccination programs by eliminating the need for refrigeration, syringes, and trained healthcare professionals, making them more accessible and reducing costs. However, several challenges must be overcome, including regulatory hurdles, public acceptance, and ensuring consistent and safe antigen expression in plants. Additionally, there are concerns about the long-term stability and effectiveness of edible vaccines, as well as ethical considerations regarding the genetic modification of crops. The paper also discusses the ongoing research and development efforts in this field and the potential for edible vaccines to target diseases such as hepatitis, cholera, and malaria. Ultimately, while edible vaccines offer significant promise, addressing these challenges will be crucial to their widespread adoption and success in global health strategies.

**Keywords:** Edible vaccines, genetic modification, immunization, global health, plant-based vaccines, vaccine accessibility.

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***DIST/2025/63***

# Phytopharmaceuticals: Unlocking the Potential of Natural Medicine

Mohit Kumar*, Amit Kumar Rishi[2]

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**Abstract:**

Phytopharmaceuticals, or plant-derived pharmaceuticals, are gaining recognition for their potential to offer effective, natural treatments for a variety of health conditions. These products, derived from medicinal plants, contain bioactive compounds that can provide therapeutic benefits, ranging from anti-inflammatory and antimicrobial properties to anticancer and antiviral effects. This paper explores the growing interest in phytopharmaceuticals, emphasizing their potential to complement or even replace synthetic drugs in the treatment of various diseases. The paper examines the process of discovering and developing phytopharmaceuticals, from plant selection and extraction techniques to clinical trials and regulatory approval. It also highlights the role of traditional medicine in the development of phytopharmaceuticals, noting the importance of integrating indigenous knowledge with modern scientific research. Additionally, the paper addresses the challenges in the commercialization of phytopharmaceuticals, including standardization, quality control, and the need for rigorous clinical evidence to support their efficacy and safety. Despite these challenges, phytopharmaceuticals represent a promising frontier in medicine, offering the possibility of more sustainable, less toxic treatments. The paper concludes by discussing the future of phytopharmaceuticals in the global healthcare landscape, considering their role in personalized medicine, public health, and the growing trend toward natural and holistic healthcare approaches.

**Keywords:** Phytopharmaceuticals, natural medicine, plant-derived pharmaceuticals, bioactive compounds, traditional medicine, therapeutic benefits.

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***DIST/2025/64***

# Marine Microbiomes as a Treasure Trove for New Drug Discovery

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**Abstract:**

Marine microbiomes are an underexplored yet promising source of novel bioactive compounds for drug discovery. The vast and diverse microbial communities present in marine environments, including oceans, deep-sea vents, and coastal ecosystems, are rich in unique metabolites with potential therapeutic applications. This paper explores the potential of marine microbiomes as a treasure trove for new drug discovery, particularly in the development of antimicrobial, anticancer, anti-inflammatory, and neuroprotective agents. The paper reviews current research on the isolation and characterization of bioactive compounds from marine microorganisms, such as bacteria, fungi, and algae, and their subsequent application in drug development. It also examines the advantages of marine-derived drugs, which often possess distinct mechanisms of action due to their unique ecological environments. However, the paper also addresses the challenges in utilizing marine microbiomes, such as the difficulty in cultivating marine microbes in laboratory settings, the need for sustainable harvesting practices, and regulatory hurdles in bringing marine-based drugs to market. The paper concludes by emphasizing the importance of continued research into marine microbiomes and the need for interdisciplinary collaboration between marine biologists, chemists, and pharmacologists to unlock their full potential for drug discovery.

**Keywords:** Marine microbiomes, drug discovery, bioactive compounds, antimicrobial agents, anticancer drugs, marine microorganisms.

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***DIST/2025/65***

# From Traditional Medicine to Biopharma: Bridging the Gap

Muskan Thoriya*, Anuj Agarwal

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**Abstract:**

Marine microbiomes are an underexplored yet promising source of novel bioactive compounds for drug discovery. The vast and diverse microbial communities present in marine environments, including oceans, deep-sea vents, and coastal ecosystems, are rich in unique metabolites with potential therapeutic applications. This paper explores the potential of marine microbiomes as a treasure trove for new drug discovery, particularly in the development of antimicrobial, anticancer, anti-inflammatory, and neuroprotective agents. The paper reviews current research on the isolation and characterization of bioactive compounds from marine microorganisms, such as bacteria, fungi, and algae, and their subsequent application in drug development. It also examines the advantages of marine-derived drugs, which often possess distinct mechanisms of action due to their unique ecological environments. However, the paper also addresses the challenges in utilizing marine microbiomes, such as the difficulty in cultivating marine microbes in laboratory settings, the need for sustainable harvesting practices, and regulatory hurdles in bringing marine-based drugs to market. The paper concludes by emphasizing the importance of continued research into marine microbiomes and the need for interdisciplinary collaboration between marine biologists, chemists, and pharmacologists to unlock their full potential for drug discovery.

**Keywords:** Marine microbiomes, drug discovery, bioactive compounds, antimicrobial agents, anticancer drugs, marine microorganisms.

ISBN: 978-93-6135-396-3

***DIST/2025/66***

# Microbial Factories: Engineering Bacteria for Drug Synthesis

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**Abstract:**

Microbial factories, particularly bacteria, have become a central focus in the biopharmaceutical industry for their ability to produce complex molecules used in drug synthesis. By harnessing the natural metabolic pathways of microorganisms, scientists can engineer bacteria to produce a wide variety of bioactive compounds, from antibiotics to anticancer agents. This paper explores the potential of engineered bacteria as microbial factories for drug synthesis, highlighting recent advancements in genetic engineering, synthetic biology, and metabolic pathway optimization. The paper discusses the process of designing and constructing microbial systems capable of producing pharmaceutical-grade compounds, focusing on tools such as CRISPR-Cas9, synthetic promoters, and biosynthetic gene clusters. It also addresses the benefits of using microbial factories, including cost-effectiveness, scalability, and the ability to produce compounds that are difficult or impossible to synthesize chemically. However, the paper also explores the challenges involved, such as regulatory issues, strain stability, and the need for sustainable production practices. Finally, the paper looks at the future of microbial factories in drug synthesis, including their potential to revolutionize the production of biologics, rare natural products, and personalized medicines. Engineering bacteria as microbial factories offer a promising approach to meet the growing demand for novel and affordable therapeutics in the global healthcare landscape.

**Keywords:** Microbial factories, drug synthesis, engineered bacteria, genetic engineering, biosynthetic pathways, pharmaceutical production.

ISBN: 978-93-6135-396-3

***DIST/2025/67***

# The Promise of RNA Therapeutics in Next-Gen Drug Development

Hammad Siddiqui*, Anuj Agarwal

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**Abstract:**

RNA therapeutics represent a revolutionary approach to drug development, harnessing the power of RNA molecules to target and treat a range of diseases at the genetic level. This paper explores the promise of RNA-based therapies, including messenger RNA (mRNA), small interfering RNA (siRNA), and antisense oligonucleotides, as next-generation treatments for conditions such as cancer, genetic disorders, and viral infections. The paper discusses the mechanisms by which RNA therapeutics can modulate gene expression, repair faulty genes, and block pathogenic proteins, offering targeted and highly specific interventions. It also highlights the success of mRNA vaccines in combating diseases like COVID-19 as a groundbreaking milestone for RNA therapeutics, demonstrating their potential for rapid development and adaptability. Furthermore, the paper addresses the challenges in RNA therapy, such as delivery methods, stability, immunogenicity, and manufacturing scalability. It also examines the regulatory and ethical considerations involved in the development and approval of RNA therapeutics. The paper concludes by examining the future of RNA therapeutics, with an emphasis on expanding their application to a wider range of diseases, improving delivery technologies, and overcoming current limitations. RNA therapeutics have the potential to redefine drug development by providing innovative and personalized treatments for patients worldwide.

**Keywords:** RNA therapeutics, mRNA, gene expression, drug development, RNA vaccines, targeted therapies.

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***DIST/2025/68***

# Biosensors in Pharma: Real-Time Monitoring of Drug Efficacy

Suhail Ahmad Saifi*, Anuj Agarwal

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**Abstract:**

Biosensors have emerged as powerful tools in the pharmaceutical industry, offering real-time monitoring of drug efficacy and enabling personalized medicine approaches. These devices, which can detect biological markers or physiological changes in response to drug administration, provide valuable insights into how drugs perform in the body, helping optimize therapeutic regimens. This paper explores the role of biosensors in pharmaceutical research and clinical settings, focusing on their ability to assess drug efficacy in real time. It discusses the various types of biosensors, including enzymatic, immunological, and electrochemical sensors, and how they can be integrated into drug development processes for continuous monitoring of treatment outcomes. The paper also examines the use of biosensors in clinical trials to provide dynamic feedback on patient responses, allowing for the early detection of adverse effects or the need for dose adjustments. Furthermore, the paper highlights the potential of biosensors in advancing precision medicine by tailoring treatments based on real-time data from individual patients. Despite their promise, challenges such as sensor accuracy, data interpretation, and regulatory hurdles remain. The paper concludes by discussing the future of biosensor technology in pharma, with a focus on innovations in sensor design, integration with wearable devices, and their role in improving drug development and patient care.

**Keywords:** Biosensors, drug efficacy, real-time monitoring, personalized medicine, clinical trials, pharmaceutical research.

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***DIST/2025/69***

# Smart Pills and Digital Medicine: Transforming Patient Adherence

Ravikant*, Anuj Agarwal

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**Abstract:**

Smart pills and digital medicine have emerged as powerful tools in improving patient adherence, offering innovative solutions to monitor and manage medication intake in real-time. Integrating sensors and tracking technologies with digital interfaces, these systems allow healthcare providers to monitor whether their patients are taking their medications as prescribed remotely, improving outcomes and reducing the risk of medication errors. Smart pills also could determine whether a drug was ingested and give real-time data to patients and providers. With the help of digital medicine patients are changing the manner in which they interface with their treatment allowing them to overcome issues related to forgetfulness, side effects, or other problematic drug regimens. Such an approach improves the personalization of care and helps healthcare providers to make data-driven decisions and monitor the treatment effectiveness with higher precision. Despite the promising advancements, there are concerns related to privacy, data security and regulatory frameworks. As digital health technologies continue to evolve, they hold the potential to significantly enhance medication adherence, reduce healthcare costs and improve patient outcomes.

**Keywords**: Smart pills, digital medicine, patient adherence, medication monitoring, healthcare technology, medication errors, personalized care

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***DIST/2025/70***

# AI-Powered Drug Delivery Systems: The Future of Precision Medicine

Jatin Kumar*, Shavej Husain

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**Abstract:**

Drug delivery system is one of the enduring areas of research that is subjected to rapid advancement by artificial intelligence (AI) in the field of precision medicine. The therapeutic outcome can be further enhanced by the design of more effective and targeted drug delivery methods using AI-powered technologies that help deliver drugs at a specific site of the body with higher precision. These systems optimize drug release profiles based on patient-specific factors such as genetic makeup, disease state and environmental influences. Using artificial intelligence (AI) algorithms, optimal drug formulations can be predicted, while treatment responses can be monitored and drug delivery mechanisms modified in real time. This approach allows to increases efficacy and safety of treatments, reducing side effects, and improving outcomes. In addition, these systems can also help cut costs through the efficiencies of a more streamlined drug development process and can improve the accuracy of treatments. The advancement of research in AI and nanotechnology will allow the use of AI-powered drug delivery systems to transition into precision medicine, paving the way for the future treatment of complex diseases like cancer, autoimmune disorders and genetic conditions.

**Keywords**: AI-powered drug delivery, precision medicine, targeted drug delivery, drug formulations, patient-specific treatment, personalized therapy, nanotechnology, healthcare innovation.

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***DIST/2025/71***

# Plant-Based Biologics: The Next Wave in Pharmaceutical Innovation

Shivam Kumar*, Shavej Husain

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**Abstract:**

Plant-based biologics have opened a new window in pharma innovation as a sustainable and cost-effective alternative to conventional biologics. The utilization of plant-based systems for the production of therapeutic proteins, vaccines and antibodies enables researcher to tackle many challenges of traditional biologic manufacturing, including high production and long development times. These biologics, produced in genetically engineered plants, can generate massive amounts of proteins with little potential for contamination, making them suitable for worldwide health care need. Moreover, plant-based biologics can be designed for specific diseases for example cancer, autoimmune disorders and infectious diseases, open evaluation a new paradigm based therapeutics. Plant-based systems can potentially mitigate global healthcare challenges, given their scalability and minimal environmental footprint. Plant-based biologics are starting to grab our attention and may drive great changes in our biotechnology industry by bringing significant economic and clinical advantages.

**Keywords**: Plant-based biologics, pharmaceutical innovation, therapeutic proteins, vaccines, antibodies, biologic manufacturing, sustainable healthcare, plant-derived therapeutics, biotechnology.

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***DIST/2025/72***

# mRNA Vaccines Beyond COVID-19: Expanding Applications

Lavish Kumar*, Shavej Husain

Disha Institute of Pharmacy, Dhampur

**Abstract:**

The concept of mRNA vaccines, which was popularised in the fight against Covid-19, is currently being investigated for a whole variety of other infectious diseases and health conditions. With mRNA platform's ability for quick development and manufacturing of vaccines, it can combat diseases that have previously resisted conventional tools such as malaria, HIV and cancer. Unlike live viruses, mRNA vaccines do not contain a portion of the disease-causing virus itself, but instead, they use RNA instructions that teach cells how to produce a protein that the immune system responds to. Consequently, mRNA vaccines are safer and easier to adapt to different pathogens. The emergence of innovative vaccine technologies could revolutionise the field of vaccinology itself giving us faster responses to new infectious disease and also novel treatment options for chronic disease. If translated into clinical practice, advances in mRNA vaccine research could revolutionize global health and immunisation programs and provide a renewed approach to addressing some of the most profound health challenges of our time.

**Keywords**: mRNA vaccines, COVID-19, infectious diseases, cancer immunotherapy, HIV, malaria, vaccine development, precision vaccines, immunization.

ISBN: 978-93-6135-396-3

***DIST/2025/73***

# Vaccine Development in the Post-Pandemic Era: Lessons Learned

Mohd Farman*, Shavej Husain

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**Abstract:**

The COVID-19 pandemic has greatly condensed timelines in the development of vaccines and the lessons that will be learnt following its aftermath will help build effective frameworks for future innovations and preparedness for vaccines. The rapid pace of vaccine development, driven by advances in technology such as mRNA platforms, has demonstrated the potential for faster and more effective vaccine production. However, the pandemic also highlighted challenges in global vaccine distribution, public trust and addressing vaccine hesitancy. The post-pandemic era offers an opening to strengthen vaccine infrastructure, enhance global access and promote synergy among governments, the private sector and international organisations. It also provides an opportunity to contemplate the value of investment in early vaccine research, vaccine platforms and communications strategies. These experiences will inform and improve vaccine development for the future and will ensure that the world is better equipped to deal with the next pandemic and disease outbreak.

**Keywords**: Vaccine development, COVID-19, post-pandemic, vaccine innovation, global access, vaccine hesitancy, public health preparedness, mRNA platforms.

ISBN: 978-93-6135-396-3

***DIST/2025/74***

# The Role of Nanotechnology in Next-Generation Vaccines

Tarun Sharma*, Preeti Vishnoi

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**Abstract:**

The development of next-generation vaccines is increasingly dependent on nanotechnology, which provides creative ways to enhance vaccine administration, stability, and efficacy. By more precisely delivering antigens, minimising the need for repeated doses, and boosting long-term immunity, nanoparticles can be employed as carriers to improve the immune response. Additionally, these nano systems make it possible to create adjuvants that increase the efficacy of vaccines, especially against difficult-to-fight diseases like bacteria and viruses. Furthermore, vaccinations that may be delivered via different channels, such as nasal or transdermal which can be designed by nanotechnology, which enhances patient accessibility and compliance. The development of more durable and transportable vaccinations is made possible by the accuracy and adaptability of nanomaterials, which also helps to solve logistical issues in the worldwide distribution of vaccines. Nanotechnology has the potential to completely transform vaccine design as research advances, providing safer, more efficient, and more widely available vaccines.

**Keywords**: Nanotechnology, next-generation vaccines, nanoparticle delivery, vaccine adjuvants, immune response, vaccine stability, targeted delivery, vaccine innovation.

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***DIST/2025/75***

# Universal Flu Vaccines: Are We Ready for the Future?

Tanishka*, Preeti Vishnoi

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**Abstract:**

A long-term objective in the field of vaccination is the creation of a universal flu vaccine, which would offer widespread defence against both seasonal flu and new strains with just one dosage. A universal flu vaccine would target more stable parts of the influenza virus, potentially providing lifetime immunity and lowering the need for repeated immunisations, in contrast to present flu vaccines that need to be altered every year to account for viral alterations. Though there are still obstacles in identifying universal antigens that may elicit a strong and enduring immune response, developments in molecular biology, genetics, and immunology are moving us closer to achieving this objective. Making universal flu vaccines a reality would also require overcoming obstacles pertaining to safety, effectiveness, and production scalability. If effective, these vaccinations have the potential to transform flu prevention and drastically lower the worldwide burden of influenza-related illness and mortality.

**Keywords**: Universal flu vaccine, influenza prevention, seasonal flu, viral mutations, vaccine development, immunology, vaccine efficacy, molecular biology.

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***DIST/2025/76***

# Vaccine Hesitancy: Overcoming Barriers with Science and Policy

Khusbu Chauhan*, Preeti Vishnoi

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**Abstract:**

A major obstacle to attaining universal immunisation and safeguarding public health is vaccine reluctance. Reluctance to receive vaccines is caused by a number of factors, including cultural beliefs, disinformation, mistrust of healthcare systems, and perceived safety concerns. A multimodal strategy that incorporates scientific education, open communication, and policy actions is needed to address vaccine reluctance. Together with cooperation between governments, healthcare providers, and communities, evidence-based public health campaigns can help debunk myths and promote wise decision-making. By reducing logistical obstacles, providing incentives, and guaranteeing that all populations have access to vaccines, policymakers can also foster settings that are conducive to immunisation. Controlling infectious diseases and averting future pandemics require overcoming vaccine hesitancy.

**Keywords**: Vaccine hesitancy, public health, vaccine confidence, misinformation, vaccine safety, communication strategies, policy interventions, healthcare access.

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***DIST/2025/77***

# Personalized Vaccinology: Tailoring Immunization Strategies

Saniya Parveen*, Preeti Vishnoi

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**Abstract:**

Personalised vaccinology focusses on customising immunisation approaches based on specific characteristics of individual patients, including age, gender, genetic factors, and health conditions. Utilising genomic data alongside sophisticated analytics allows for the refinement of vaccination strategies, enhancing immune responses, minimising adverse effects, and boosting vaccine efficacy tailored to particular populations. This approach holds significant importance for at-risk populations, including older adults, individuals with weakened immune systems, and those suffering from chronic illnesses, as it facilitates tailored vaccine guidance rooted in specific risk assessments. The advancement of personalised vaccinology facilitates the creation of vaccines tailored to various genetic backgrounds, thereby enhancing overall protection. With the ongoing advancements in genomics and data science, personalised vaccinology holds the promise of transforming immunisation practices and enhancing global health equity.

**Keywords**: Personalized vaccinology, immunization strategies, genomic data, vaccine efficacy, targeted vaccines, vaccine safety, personalized medicine, population health.

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***DIST/2025/78***

# Biomanufacturing 4.0: The Next Revolution in Vaccine Production

Vanshika Rani*, Preeti Vishnoi

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**Abstract:**

Biomanufacturing 4.0 signifies a transformative phase in vaccine production, incorporating cutting-edge technologies like automation, artificial intelligence, big data, and the Internet of Things (IoT) to enhance the efficiency of vaccine development and manufacturing processes. The advancements hold the potential to enhance production processes, boost efficiency, and lower expenses, thereby contributing to the greater accessibility and affordability of vaccines. Through the analysis of real-time data, AI algorithms are capable of forecasting ideal production conditions, overseeing quality control, and improving batch consistency, thereby guaranteeing the production of high-quality vaccines. Moreover, automation and intelligent manufacturing systems facilitate adaptable and adaptable production, enhancing the ability to address emerging health crises effectively. Biomanufacturing 4.0 presents an opportunity to enhance the speed of vaccine availability, optimise global distribution, and strengthen readiness for future pandemics.

**Keywords**: Biomanufacturing 4.0, vaccine production, automation, artificial intelligence, big data, IoT, smart manufacturing, vaccine development, global health.

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***DIST/2025/79***

# Climate Change and Infectious Disease: The Role of Pharma in Preparedness

Diksha Rani*, Preeti Vishnoi

Disha Institute of Science & Technology, Dhampur

**Abstract:**

The increasing impact of climate change has led to a rise in both the frequency and distribution of infectious diseases, creating a considerable challenge for public health. Rising temperatures, changes in precipitation patterns, and disruptions to habitats have led to a higher occurrence of vector-borne diseases like malaria, dengue, and Zika. Furthermore, alterations in ecosystems play a significant role in the emergence of zoonotic diseases, posing a risk to global health security. The pharmaceutical sector is pivotal in tackling this crisis by advancing innovations in diagnostics, vaccines, and therapeutics. Investing strategically in studies related to climate-sensitive diseases, enhancing resilient supply chains, and fostering global collaboration are crucial elements. By utilising predictive modelling and extensive data analysis, the pharmaceutical industry can foresee outbreaks and improve readiness. Moreover, implementing eco-friendly manufacturing methods integrates environmental sustainability with health initiatives. This work examines the relationship between climate change and infectious diseases, highlighting the pharmaceutical industry's contributions to mitigation and response strategies. Improving industry preparedness, fostering collaborations between public and private sectors, and ensuring policy coherence are crucial for reducing health impacts and strengthening global resilience.

**Keywords:** Climate change, infectious diseases, pharmaceuticals, preparedness, vector-borne diseases, sustainability

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***DIST/2025/80***

# Vaccine Equity: Addressing Global Disparities in Immunization Access

Aashu Kumar*, Preeti Vishnoi

Disha Institute of Science & Technology, Dhampur

**Abstract:**

Global disparities in vaccine access continue to pose a significant obstacle to attaining fair health outcomes. Countries with lower and middle income encounter obstacles like inadequate funding, supply chain constraints, and political instability, which impede their immunisation initiatives. The COVID-19 pandemic highlighted these disparities, as postponed vaccine distributions in resource-constrained environments intensified illness and death rates. Ensuring equitable access to vaccines is crucial for alleviating the worldwide impact of infectious diseases and mitigating the risk of future pandemics. Collaboration among pharmaceutical companies, non-governmental organisations, and governments is essential for the development of vaccine solutions that are affordable, adaptable, and accessible. Strategies like technology transfer, tiered pricing, and local vaccine production can effectively address disparities in access. The aim of this abstract to examines worldwide disparities in vaccine access, focussing on creative approaches and policy suggestions for equitable immunisation initiatives. Enhancing international frameworks and improving funding mechanisms are essential for attaining universal vaccine coverage and promoting health equity on a global scale.

**Keywords:** Vaccine equity, global health, immunization, access disparities, COVID-19, health equity

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***DIST/2025/81***

# DNA Vaccines: The Future of Pandemic Preparedness

Rahat Izhar*, Jolly Chauhan

Disha Institute of Science & Technology, Dhampur

**Abstract:**

DNA vaccines signify a remarkable development in the field of immunology, providing a swift and adaptable approach to address emerging infectious diseases. These vaccines function by introducing a synthetic DNA sequence that encodes an antigen, thereby provoking strong and specific immune responses. The swift advancement in their development timeline, coupled with their thermal stability and straightforward production process, positions them as a prime candidate for addressing pandemic preparedness. DNA vaccines have shown effectiveness in both preclinical and clinical trials for diseases including Zika, COVID-19, and HPV, setting the stage for wider applications. This abstract is about to examines the foundational technology, benefits, and obstacles associated with DNA vaccines, focussing on delivery methods and regulatory factors. The potential of DNA vaccines to transform global health is highlighted, particularly in their ability to facilitate rapid responses to emerging pathogens. Progress in manufacturing and partnerships between public and private sectors are essential for realising the complete capabilities of this technology in addressing future pandemics.

**Keywords:** DNA vaccines, pandemic preparedness, immunology, vaccine technology, global health

ISBN: 978-93-6135-396-3

***DIST/2025/82***

# Green Chemistry in Pharmaceutical Manufacturing: A Sustainable Future

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Dnyan Ganga college of Pharmacy, Thane

**Abstract:**

Sustainable practices in pharmaceutical manufacturing are being revolutionised through green chemistry, which aims to reduce environmental impact and improve resource efficiency. Through the development of eco-conscious synthetic methods and the minimisation of hazardous waste, this approach harmonises industrial objectives with worldwide sustainability initiatives. Innovations like biocatalysis, flow chemistry, and solvent recovery systems have greatly reduced the environmental impact of drug production. This work explores the principles of green chemistry within the pharmaceutical sector, highlighting its significance in meeting regulatory and societal expectations for sustainability. Furthermore, examination of case studies of effective implementation, highlighting cost efficiency and minimised environmental impact. Partnerships among educational institutions, businesses, and regulatory bodies are essential for speeding up the implementation of sustainable manufacturing practices. Through the incorporation of green chemistry, the pharmaceutical sector can foster environmental responsibility while sustaining innovation and financial success.

**Keywords:** Green chemistry, pharmaceutical manufacturing, sustainability, biocatalysis, environmental impact

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***DIST/2025/83***

# Tackling Antibiotic Pollution: Pharma's Role in Environmental Safety

Azmi*, Jolly Chauhan

Disha Institute of Science & Technology, Dhampur

**Abstract:**

Antibiotic pollution represents a growing environmental challenge, playing a significant role in the rise of antimicrobial resistance (AMR) and the disruption of ecosystems. Effluents from pharmaceutical production, the improper disposal of antibiotics, and agricultural runoff represent major sources of contamination. To tackle this issue, it is essential for pharmaceutical companies to implement rigorous waste management strategies and invest in environmentally friendly production technologies. Innovative treatment techniques like bioremediation and effluent monitoring have the potential to significantly reduce the environmental discharge of antibiotics. Furthermore, global frameworks and policies should enforce adherence to discharge standards and encourage sustainable production practices. This abstract will explores the origins and effects of antibiotic pollution, highlighting the role of the pharmaceutical sector in addressing its repercussions. Joint initiatives among industry stakeholders, regulators, and experts are crucial for ensuring environmental safety and addressing AMR.

**Keywords:** Antibiotic pollution, environmental safety, antimicrobial resistance, pharmaceutical industry, waste management, sustainability

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***DIST/2025/84***

# Biodegradable Drug Packaging: Innovations for a Sustainable Future

Juveriya*, Jolly Chauhan

Disha Institute of Science & Technology, Dhampur

**Abstract:**

The growing environmental consequences of traditional pharmaceutical packaging have necessitated the exploration of sustainable alternatives. Biodegradable drug packaging signifies a groundbreaking advancement focused on minimising plastic waste without compromising product safety and effectiveness. This abstract is about to investigates recent developments in biodegradable materials, such as biopolymers, plant-based plastics, and nanocomposites, emphasising their potential uses in pharmaceutical applications. Important factors including the biodegradability of materials, their compatibility with active pharmaceutical ingredients (APIs), and adherence to regulatory standards are examined. The focus is placed on the incorporation of sustainable technologies and comprehensive evaluations throughout the lifecycle in the creation of environmentally friendly packaging. This transition towards sustainability not only corresponds with environmental objectives but also enhances consumer confidence in pharmaceutical brands. Future directions involve investigating renewable feedstocks and pioneering designs to improve biodegradation rates and functionality.

**Keywords**: Biodegradable packaging, pharmaceutical sustainability, biopolymers, eco-friendly materials, green technology

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***DIST/2025/85***

# Microbial Bioremediation of Pharmaceutical Waste: A Novel Approach

Khushi Rajput*, Jolly Chauhan

Disha Institute of Science & Technology, Dhampur

**Abstract:**

Pharmaceutical waste presents considerable dangers to ecosystems, highlighting the need for creative approaches to ensure its proper management. Microbial bioremediation has surfaced as a compelling strategy, utilising the metabolic functions of microorganisms to break down intricate pharmaceutical compounds. This abstract provides the processes utilised by bacteria, fungi, and algae in the degradation of active pharmaceutical ingredients (APIs), particularly emphasising persistent pollutants such as antibiotics and hormones. The exploration of genetically engineered microbes and microbial consortia in improving degradation efficiency is conducted. Case studies demonstrate effective remediation strategies in industrial wastewater and hospital effluents. Challenges such as the adaptability of microbes to diverse environments and the potential risks associated with secondary metabolites are examined. Future directions emphasise the need to combine bioremediation with cutting-edge wastewater treatment technologies for adaptable applications. This environmentally conscious strategy is in harmony with the principles of a circular economy, promoting the sustainable management of pharmaceutical waste.

**Keywords**: Microbial bioremediation, pharmaceutical waste, environmental sustainability, wastewater treatment, microbial consortia

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***DIST/2025/86***

# Circular Economy in Pharma: Reducing Waste and Enhancing Sustainability

Niketa Chauhan*, Jolly Chauhan

Disha Institute of Science & Technology, Dhampur

**Abstract:**

The pharmaceutical sector is under increasing scrutiny to implement sustainable practices and minimise its environmental impact. The circular economy model presents a practical framework that highlights the importance of reducing waste, enhancing resource efficiency, and optimising product lifecycles. This paper examines approaches for integrating circular economy principles into the pharmaceutical industry, focussing on the design of recyclable drug packaging, the reuse of production by-products, and the implementation of reverse logistics. Innovations including biodegradable materials, green chemistry, and digital tools for enhancing supply chain transparency are examined. The incorporation of these strategies improves resource recovery and diminishes reliance on non-renewable inputs. Incentives from regulatory bodies and partnerships across different sectors play a vital role in facilitating adoption and addressing obstacles like substantial upfront expenses and technological hurdles. Transitioning to a circular economy allows the pharmaceutical industry to meet sustainability objectives while ensuring profitability and adherence to regulations.

**Keywords**: Circular economy, pharmaceutical sustainability, waste reduction, resource efficiency, green chemistry

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***DIST/2025/87***

# Water Purification Strategies for Eliminating Pharmaceutical Contaminants

Mehvish*, Jolly Chauhan

Disha Institute of Science & Technology, Dhampur

**Abstract:**

The widespread occurrence of pharmaceutical pollutants in aquatic environments raises significant ecological and public health issues. Implementing effective purification strategies is crucial for reducing these impacts and guaranteeing water safety. This abstract analyses the cutting-edge techniques for the removal of pharmaceutical contaminants, encompassing advanced oxidation processes (AOPs), membrane filtration, adsorption methods, and biological treatments. Innovative technologies, including nanomaterials and photocatalysis, are emphasised for their effectiveness in breaking down persistent compounds. The discussion encompasses the challenges related to scalability, energy consumption, and by-product management, alongside comparative analyses of cost-effectiveness and environmental impact. Further it examines the case studies which illustrate effective implementations in both municipal and industrial water treatment. Future directions focus on the integration of these methods into comprehensive water management systems aimed at achieving sustainable and efficient purification. This study highlights the significance of teamwork in tackling pharmaceutical pollution in aquatic environments.

**Keywords**: Water purification, pharmaceutical contaminants, advanced oxidation processes, nanomaterials, sustainable water management

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***DIST/2025/88***

# Sustainable Pharma Supply Chains: Minimizing Carbon Footprint

Deepanshi*, Jolly Chauhan

Disha Institute of Science & Technology, Dhampur

**Abstract:**

The supply chain of the pharmaceutical industry plays a crucial role in greenhouse gas emissions, highlighting the need for immediate measures to improve sustainability. It explores the approaches to reduce the carbon footprint of pharmaceutical supply chains, emphasising energy-efficient manufacturing, sustainable logistics, and waste minimisation. The significance of digitalisation, including blockchain and IoT, in enhancing transparency and optimising resource utilisation is emphasised. The adoption of renewable energy and the principles of a circular economy are highlighted as crucial for attaining carbon neutrality. Case studies demonstrate effective strategies for minimising emissions throughout the production, distribution, and disposal stages. Addressing challenges such as cost implications and regulatory hurdles, along with providing recommendations for policy support and fostering industry-wide collaborations, is essential. Implementing these sustainable practices allows the pharmaceutical sector to make a meaningful impact on global climate objectives, all while ensuring operational efficiency is upheld.

**Keywords**: Sustainable supply chains, carbon footprint reduction, green logistics, renewable energy, pharmaceutical sustainability

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***DIST/2025/89***

# Nanotechnology in Drug Waste Management: Transforming Pharma Sustainability

Aysha Bano*, Mansi

Disha Institute of Science & Technology, Dhampur

**Abstract:**

Pharmaceutical waste presents considerable dangers to both the environment and public health, necessitating creative approaches to attain sustainability. Nanotechnology has surfaced as a groundbreaking method to tackle these issues, providing enhanced abilities for identifying, capturing, and breaking down pharmaceutical contaminants. Nanomaterials, including nanostructured catalysts and adsorbents, demonstrate exceptional effectiveness in eliminating persistent pharmaceutical compounds from wastewater. Moreover, nano sensors allow for the immediate observation of drug impurities, supporting forward-thinking waste management approaches. The incorporation of nanotechnology in drug waste management is consistent with the tenets of green chemistry, minimising the environmental impact of the pharmaceutical sector. It examines the use of nanotechnology in addressing pharmaceutical waste, focussing on recent advancements, existing challenges, and potential future opportunities. The examination of policy and public-private partnerships in advancing sustainability through nanotechnology is also undertaken. Through the promotion of interdisciplinary collaboration, nanotechnology has the potential to greatly improve the sustainability of practices related to pharmaceutical waste management.

**Keywords:** Nanotechnology, drug waste management, pharmaceutical pollutants, sustainability, green chemistry

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***DIST/2025/90***

# The Impact of Pharmaceuticals on Aquatic Ecosystems: A Call for Action

Mantasha Parveen*, Mansi

Disha Institute of Science & Technology, Dhampur

**Abstract:**

The improper disposal of pharmaceuticals in aquatic ecosystems has resulted in concerning outcomes, such as the disruption of aquatic life and the contamination of water resources. Pharmaceutical residues, including antibiotics, analgesics, and hormones, are being increasingly found in aquatic environments such as rivers, lakes, and oceans, which poses significant risks to biodiversity and the balance of ecosystems. The presence of these contaminants affects reproductive health, behaviour, and population dynamics of aquatic organisms, in addition to playing a role in antimicrobial resistance. Existing wastewater treatment facilities frequently fall short in completely eliminating pharmaceutical substances, highlighting the need for novel strategies. It highlights the critical necessity for intervention, examining the origins, routes, and ecological impacts of pharmaceutical contamination in aquatic environments. Strategies for mitigation are explored, encompassing advanced treatment technologies, public awareness campaigns, and the implementation of stricter regulatory frameworks. Joint initiatives among policymakers, industry stakeholders, and experts are essential for protecting aquatic ecosystems for the benefit of future generations.

**Keywords:** Pharmaceuticals, aquatic ecosystems, environmental impact, antimicrobial resistance, wastewater treatment

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***DIST/2025/91***

# Eco-Friendly Drug Development: Strategies for Minimizing Toxicity

Abid*, Mansi

Disha Institute of Science & Technology, Dhampur

**Abstract:**

The development of eco-friendly drugs is crucial for minimising the environmental impact of the pharmaceutical sector. This method focusses on creating sustainable molecules, employing environmentally friendly synthesis techniques, and developing biodegradable drug formulations that reduce toxicity to ecosystems. Approaches involve utilising computational modelling to forecast environmental risks, applying green chemistry principles to refine synthesis processes, and incorporating biocompatible excipients to improve drug degradability. Innovations like continuous flow manufacturing and bio-catalysis significantly minimise resource consumption and waste generation. It analyses the advancements and obstacles in implementing environmentally conscious approaches in pharmaceutical development, emphasising the importance of collaborative research in attaining sustainable results. Furthermore, the discussion includes the incorporation of life cycle assessments and regulatory incentives to promote the broad implementation of sustainable practices. The development of eco-friendly pharmaceuticals aligns with environmental objectives while also meeting societal demands for sustainability within the healthcare sector.

**Keywords:** Eco-friendly drugs, green chemistry, biodegradable formulations, sustainable drug development, life cycle assessment

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***DIST/2025/92***

# The Future of Pharma 4.0: Integrating IoT, AI and Robotics

Usma*, Mansi

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**Abstract:**

The integration of IoT, AI, and robotics in the pharmaceutical sector is transforming drug discovery, manufacturing, and distribution, marking a significant advancement in the field. This significant transformation allows for immediate data analysis, anticipatory upkeep, and improved visibility within the supply chain. IoT sensors enable ongoing observation of manufacturing processes, guaranteeing quality and adherence to standards. Algorithms powered by artificial intelligence enhance the process of drug discovery through the analysis of extensive datasets and the identification of new compounds. Robotics streamline repetitive tasks, enhancing accuracy and minimising human error. Collectively, these technologies improve efficiency, elevate product standards, and lower expenses. It examines the significant influence of Pharma 4.0, highlighting its applications, challenges, and future trends. Considerations regarding ethics, cybersecurity, and the enhancement of workforce skills are also examined to facilitate smooth integration. The advancements in Pharma 4.0 hold the promise to transform the pharmaceutical sector, providing solutions that prioritise patient needs with remarkable efficiency.

**Keywords:** Pharma 4.0, IoT, artificial intelligence, robotics, pharmaceutical manufacturing

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***DIST/2025/93***

# Digital Pharmacies: Revolutionizing Drug Accessibility

Harshita Kholi*, Mansi

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**Abstract:**

Digital pharmacies are transforming the healthcare landscape through the provision of convenient, efficient, and patient-centered drug delivery solutions. Utilising e-commerce platforms, mobile applications, and telemedicine integration, digital pharmacies improve access to vital medications, especially in remote and underserved areas. Capabilities like online prescription management, automated refills, and medication reminders enable individuals to actively manage their health. Moreover, digital pharmacies leverage artificial intelligence to provide tailored recommendations, enhance adherence, and reduce the risk of drug interactions. This analysis explores the development, advantages, and obstacles of digital pharmacies, focussing on aspects such as data security, regulatory adherence, and equitable access. The expansion of digital health necessitates a vital partnership among healthcare providers, policymakers, and technology developers to guarantee broad acceptance and cost-effectiveness. Digital pharmacies possess significant potential to revolutionise medication accessibility, thereby enhancing health outcomes on a global scale.

**Keywords:** Digital pharmacies, drug accessibility, e-commerce, telemedicine, medication adherence

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***DIST/2025/94***

# Predicting Future Pandemics: The Role of AI and Microbiology

Mantasha*, Mansi

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**Abstract:**

The rising occurrence of pandemics demands creative strategies for forecasting and averting their impact. Artificial intelligence (AI) and microbiology have become essential instruments in detecting potential outbreaks prior to their development into worldwide emergencies. Artificial intelligence utilises extensive datasets, such as genomic information, epidemiological records, and environmental factors, to forecast disease trends and track the evolution of pathogens. Microbiology enhances our understanding by providing insights into pathogen behaviour, resistance mechanisms, and interactions with hosts. This collaborative approach improves early warning systems, facilitating the swift creation of specific interventions, such as vaccines and therapeutics. Machine learning models are capable of analysing real-time data to identify anomalies, and recent advancements in microbiome studies are uncovering new pathways for the prevention of zoonotic transmissions. While the potential is significant, the integration of AI and microbiology encounters obstacles, including data privacy issues, ethical dilemmas, and the necessity for strong international collaboration. This work examines the capabilities of AI and microbiology in predicting pandemics and emphasises approaches to address current challenges. By adopting these technologies, healthcare systems can shift from a reactive approach to a proactive strategy in managing pandemics, thereby decreasing morbidity and mortality rates.

**Keywords**: Artificial intelligence, microbiology, pandemic prediction, machine learning, zoonotic diseases, outbreak detection

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***DIST/2025/95***

# Quantum Computing in Drug Discovery: A New Frontier

Chandni*, Mansi

Disha Institute of Science & Technology, Dhampur

**Abstract:**

Quantum computing is set to transform drug discovery by providing exceptional computational capabilities to tackle intricate molecular challenges. Conventional approaches to drug development frequently require extensive time and resources, facing considerable challenges in accurately simulating molecular interactions and forecasting pharmacological characteristics. Quantum computers utilise quantum bits (qubits) and superposition to model quantum mechanics in molecular systems with remarkable accuracy. Applications encompass protein-ligand docking, modelling drug-target interactions, and optimising lead compounds to enhance efficacy and safety. By significantly shortening computational times from years to just days, quantum computing enhances the drug discovery process, providing economical solutions to address diseases. This developing technology is still in the early stages, facing challenges like error correction, hardware scalability, and accessibility. Partnerships between quantum computing firms and pharmaceutical pioneers are essential for addressing these challenges. This abstract investigates the significant impact of quantum computing on drug discovery, highlighting its importance in meeting unmet medical needs and promoting personalised medicine.

**Keywords**: Quantum computing, drug discovery, molecular simulation, personalized medicine, pharmaceutical innovation, quantum mechanics

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***DIST/2025/96***

# 3D Bioprinting of Human Tissues for Pharmaceutical Testing

Zoya Iqrar*, Reshu

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**Abstract:**

3D bioprinting signifies a significant advancement in pharmaceutical testing, providing realistic human tissue models that overcome the shortcomings of traditional preclinical approaches. This technology facilitates the development of biomimetic tissues through the use of bioinks that consist of cells, growth factors, and biomaterials. In contrast to animal models, bioprinted tissues closely mimic human physiology, enhancing the predictability of drug efficacy and safety profiles. Important applications encompass toxicity screening, disease modelling, and personalised medicine, utilising patient-specific tissues to inform therapeutic decisions. Innovations in 3D bioprinting technologies, including multi-material printing and organ-on-chip integration, significantly improve its applicability. While notable advancements have been made, obstacles persist in realising vascularization, scalability, and obtaining regulatory approval for bio printed tissues. It emphasises the recent advancements and prospective opportunities of 3D bioprinting in transforming pharmaceutical testing. Replacing or reducing animal testing aligns with ethical considerations in drug development.

**Keywords**: 3D bioprinting, pharmaceutical testing, biomimetic tissues, toxicity screening, personalized medicine, organ-on-chip

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***DIST/2025/97***

# The Microbiome Revolution: Unlocking New Avenues in Healthcare

Madiha*, Reshu

Disha Institute of Science & Technology, Dhampur

**Abstract:**

The human microbiome, an intricate ecosystem of microorganisms that inhabit the body, has become a significant factor in both health and disease. Recent developments in the study of microbiomes have uncovered their significant impact on immunity, metabolism, and even mental well-being. This revolution has catalysed the advancement of therapeutics rooted in the microbiome, encompassing probiotics, prebiotics, and microbiota transplants, aimed at addressing conditions like inflammatory bowel disease, obesity, and depression. Advanced methodologies such as metagenomics and metabolomics facilitate thorough microbiome analysis, revealing new biomarkers for predicting diseases and tailoring treatments. Nonetheless, obstacles remain, such as differences between individuals, regulatory challenges, and the necessity for uniform methodologies. This abstract examines the transformative potential of microbiome studies, highlighting its significance in revealing innovative healthcare solutions. Integrating microbiome science into clinical practice paves the way for personalised and preventive medicine.

**Keywords**: Microbiome, metagenomics, probiotics, personalized medicine, healthcare innovation, disease biomarkers

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***DIST/2025/98***

# The Rise of Biologics and Their Impact on Global Healthcare

Pallavi*, Reshu

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**Abstract:**

Biologics, intricate macromolecules sourced from living organisms, have revolutionised contemporary medicine by providing targeted treatments for chronic and life-threatening conditions. Biologics, ranging from monoclonal antibodies to gene therapies, offer exceptional specificity, minimising off-target effects and enhancing patient outcomes. The applications encompass oncology, autoimmune disorders, and rare genetic diseases. Nonetheless, the elevated production expenses and intricate manufacturing procedures pose considerable obstacles to worldwide accessibility. The rise of biosimilars presents a financially viable option, encouraging competition and enhancing patient accessibility. This review explores the emergence of biologics, their effects on clinical practice, and the economic and ethical dilemmas they present. By tackling manufacturing bottlenecks and promoting global collaboration, biologics have the potential to serve as a fundamental element of equitable healthcare systems across the globe.

**Keywords**: Biologics, monoclonal antibodies, gene therapy, biosimilars, global healthcare, targeted therapies

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***DIST/2025/99***

# Decentralized Clinical Trials: The Future of Pharma Research

Suhani Sharma*, Reshu

Disha Institute of Science & Technology, Dhampur

**Abstract:**

Decentralised clinical trials (DCTs) signify a transformative change in the field of pharmaceutical investigation, facilitating remote and patient-focused study methodologies. Utilising digital tools, wearable devices, and telemedicine, decentralised clinical trials minimise geographical and logistical obstacles, fostering enhanced inclusivity and diversity in participant recruitment. This method improves patient convenience, decreases dropouts, and speeds up trial timelines by optimising data collection and lessening reliance on in-person site visits. DCTs provide real-time monitoring features that guarantee reliable and precise data collection, all while adhering to regulatory standards. While these benefits are evident, obstacles like data privacy issues, inconsistent regulations, and technology accessibility remain, necessitating collaborative initiatives from all parties involved to enhance implementation. It examines the fundamental innovations in decentralised clinical trials, their influence on pharmaceutical research, and approaches to address current challenges, highlighting their significant potential to enhance drug development.

**Keywords**: Decentralized clinical trials, patient-centric design, telemedicine, real-time monitoring, pharmaceutical research

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***DIST/2025/100***

# The Impact of Space Research on Pharmaceutical Innovations

Kanika Singh*, Reshu

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**Abstract:**

The exploration of space has significantly impacted advancements in pharmaceuticals, revealing distinct biological insights in microgravity environments. Experiments conducted on the International Space Station (ISS) have yielded essential insights into protein crystallisation, cellular growth, and drug stability, facilitating advancements in drug development for diseases like osteoporosis and cancer. The results obtained have opened new avenues for the development of sophisticated drug formulations and innovative delivery mechanisms. Furthermore, research conducted in space fosters advancements in biomanufacturing and tissue engineering, utilising microgravity to produce high-purity compounds and 3D-printed tissues. As we gear up for extended missions beyond our planet, the need for efficient solutions to health issues arising from space travel, including radiation-related conditions and muscle atrophy, propels ongoing innovations. This work explores the interconnected dynamics between space exploration and advancements in pharmaceuticals, highlighting the possibilities for groundbreaking healthcare solutions both on our planet and in outer space.

**Keywords**: Space research, pharmaceutical innovation, microgravity, drug development, biomanufacturing

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***DIST/2025/101***

# AI-Powered Drug Testing: Accelerating Safe and Effective Treatments

Disha Kumari*, Reshu

Disha Institute of Science & Technology, Dhampur

**Abstract:**

Artificial Intelligence (AI) is transforming drug testing by speeding up the process of identifying safe and effective treatments. Utilising sophisticated algorithms and machine learning techniques, artificial intelligence examines intricate datasets to forecast the effectiveness and safety of drugs, thereby reducing dependence on conventional trial-and-error approaches. Platforms powered by artificial intelligence enhance the process of virtual drug screening, pinpoint biomarkers, and refine clinical trial designs, leading to notable reductions in both development timelines and costs. These technologies significantly improve the monitoring of drug safety by identifying adverse reactions at an early stage, thereby safeguarding patient well-being. Despite its potential, challenges like algorithm transparency, data bias, and regulatory hurdles remain, highlighting the need for ethical considerations and thorough validation. This examines the significant impact of AI on drug testing, emphasising successful implementations, emerging trends, and future possibilities in providing innovative healthcare solutions.

**Keywords**: Artificial intelligence, drug testing, machine learning, virtual screening, pharmacovigilance

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***DIST/2025/102***

# Artificial Intelligence in Health Care

Pallavi*

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**Abstract:**

Artificial Intelligence (AI) is transforming healthcare by enhancing diagnostics, treatment planning, and patient management. AI-driven algorithms, particularly machine learning and deep learning models, enable early disease detection, predictive analytics, and personalized medicine, improving patient outcomes. In medical imaging, AI facilitates automated analysis of radiological scans, aiding in accurate and rapid diagnoses. Natural language processing (NLP) supports clinical documentation and decision-making, reducing administrative burdens. Moreover, AI-powered chatbots and virtual assistants improve patient engagement and accessibility. The integration of AI in drug discovery accelerates research by identifying potential compounds and optimizing clinical trials. However, challenges such as data privacy, algorithmic bias, and regulatory compliance must be addressed to ensure ethical AI deployment. This presentation will explore AI's current applications in healthcare, the benefits of AI-driven innovations, and the challenges hindering widespread adoption. By leveraging AI responsibly, the healthcare industry can enhance efficiency, reduce costs, and provide equitable care. Future advancements, including explainable AI and federated learning, will further refine AI's role in healthcare. Understanding these developments is crucial for researchers, clinicians, and policymakers to harness AI's potential for improved patient care and system efficiency.

**Keywords**: Artificial intelligence, healthcare, machine learning, predictive analytics, medical imaging, data privacy

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***DIST/2025/103***

# COVID-19: Spread and Prevention

Navneet Kaur*

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## Abstract

The COVID-19 pandemic, caused by the SARS-CoV-2 virus, has posed unprecedented challenges to global health systems, economies, and societies. This presentation provides an overview of the virus's transmission dynamics, including airborne and contact-based spread, and highlights key preventive measures to mitigate its impact. Factors such as asymptomatic carriers, viral mutations, and high transmission rates contributed to the rapid spread of COVID-19 worldwide. Preventive strategies such as social distancing, mask-wearing, hand hygiene, and vaccination have played crucial roles in controlling outbreaks. Additionally, advancements in diagnostic techniques, public health policies, and digital health interventions, including contact tracing and telemedicine, have improved disease management. Despite significant progress, challenges such as vaccine hesitancy, misinformation, and emerging variants continue to threaten global containment efforts. The presentation will discuss evidence-based approaches to strengthening pandemic preparedness and response, emphasizing the importance of community engagement, scientific innovation, and global cooperation. Understanding the lessons learned from COVID-19 is essential for developing more resilient public health infrastructures to combat future pandemics.

**Keywords:** COVID-19, transmission, prevention, vaccination, public health, pandemic response, digital health, infection control

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***DIST/2025/104***

# Antibiotic Resistance

Saiba*

Disha Institute of Science & Technology, Dhampur

**Abstract:**

Antibiotic resistance (AR) is a critical global health threat, undermining the efficacy of existing antibiotics and leading to prolonged illnesses, increased mortality, and healthcare costs. The rapid evolution of resistant bacteria is driven by various factors, including overuse and misuse of antibiotics, inadequate infection control measures, and the lack of novel antibiotic development. Inappropriate prescriptions, agricultural use of antibiotics, and poor hygiene practices further contribute to the spread of resistance. AR affects not only humans but also animals, the environment, and the food supply chain, making it a multifaceted issue that demands a coordinated global response. This presentation explores the mechanisms underlying antibiotic resistance, such as genetic mutations, horizontal gene transfer, and biofilm formation. It also examines the consequences of AR on public health, including its impact on the treatment of infections and medical procedures. Strategies for combating AR, including antibiotic stewardship programs, development of alternative therapies, and improved diagnostics, are discussed. The need for international collaboration in surveillance, policy-making, and public awareness campaigns is emphasized to mitigate the spread of resistant pathogens. Addressing AR is critical to safeguarding the future of medicine and preventing a post-antibiotic era.

**Keywords**: Antibiotic resistance, antimicrobial stewardship, bacterial infections, genetic mutations, horizontal gene transfer, public health, global health

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***DIST/2025/105***

# Bisphenol A (BPA) and Human Health: Risks, Mechanisms, and Implications

Suhani Sharma*

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**Abstract:**

Bisphenol A (BPA) is a widely used industrial chemical found in plastics, epoxy resins, and thermal paper. Despite its extensive applications, BPA has raised significant health concerns due to its endocrine-disrupting properties. Exposure occurs primarily through food packaging, water bottles, and environmental contamination, leading to bioaccumulation in the human body. BPA mimics estrogen and interferes with hormonal balance, contributing to adverse health effects such as metabolic disorders, neurodevelopmental impairments, reproductive toxicity, and increased risk of cardiovascular diseases. Recent studies also suggest potential links between BPA exposure and immune dysregulation, cancer progression, and epigenetic modifications. While regulatory bodies have imposed restrictions on BPA usage, its substitutes, such as BPS and BPF, may pose similar health risks. This presentation explores the latest research on BPA's impact on human health, its molecular mechanisms of action, and regulatory measures aimed at mitigating exposure. Understanding BPA toxicity is crucial for public health policies and the development of safer alternatives.

**Keywords**: Bisphenol A, endocrine disruptors, metabolic disorders, reproductive toxicity, neurodevelopment, epigenetics, public health.

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***DIST/2025/106***

# Microorganisms in Health and Drug Industries

Alina Sofiya*

Disha Institute of Science & Technology, Dhampur

## Abstract

Microorganisms play a pivotal role in both healthcare and the pharmaceutical industry, serving as essential tools for drug development, disease treatment, and biotechnological advancements. Beneficial microbes contribute to the production of antibiotics, vaccines, and probiotics, while also aiding in bioremediation and gut microbiome modulation. Their applications in recombinant DNA technology have revolutionized the synthesis of insulin, monoclonal antibodies, and enzyme-based therapeutics. Additionally, microbial fermentation processes are integral to the production of bioactive compounds, such as statins and immunosuppressants. Advances in metagenomics and synthetic biology have expanded the scope of microbial applications, leading to the discovery of novel antimicrobial agents and precision probiotics. However, the rise of antibiotic resistance and pathogenic microbes poses significant challenges, necessitating innovative strategies in microbial engineering and drug discovery. This presentation highlights the critical role of microorganisms in health and the drug industry, emphasizing recent advancements and future prospects in microbial therapeutics, biopharmaceuticals, and personalized medicine.

**Keywords**: Microorganisms, Drug Discovery, Biotechnology, Antibiotics, Probiotics, Synthetic Biology, Biopharmaceuticals, Antimicrobial Resistance, Precision Medicine

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***DIST/2025/107***

# Clinical Microbiology

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**Abstract:**

Clinical microbiology plays a pivotal role in diagnosing, preventing, and managing infectious diseases by identifying pathogens and understanding antimicrobial resistance. Recent advancements in molecular diagnostics, next-generation sequencing, and artificial intelligence have revolutionized pathogen detection, allowing for rapid and precise identification. The emergence of multidrug-resistant organisms presents significant challenges, necessitating novel antimicrobial strategies and stewardship programs. Furthermore, the integration of microbiome research in clinical practice offers insights into host-pathogen interactions, contributing to personalized treatment approaches. This presentation will discuss the latest developments in clinical microbiology, including rapid diagnostic techniques, resistance surveillance, and innovative therapeutic strategies. The role of automation and artificial intelligence in improving laboratory workflows and enhancing diagnostic accuracy will also be explored. Additionally, the impact of clinical microbiology on public health, infection control, and outbreak management will be highlighted. By leveraging cutting-edge technologies and interdisciplinary collaborations, clinical microbiologists can significantly enhance patient outcomes and mitigate the global burden of infectious diseases.

**Keywords:** Clinical microbiology, infectious diseases, antimicrobial resistance, molecular diagnostics, microbiome, artificial intelligence, pathogen detection, public health

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***DIST/2025/108***

# Waste Water Treatment for Protection of Human Health & Environment

Sara Sumbul*

Disha Institute of Science & Technology, Dhampur

**Abstract:**

Water pollution poses significant threats to human health and ecosystems, necessitating advanced wastewater treatment strategies. Effective wastewater management minimizes environmental contamination, prevents waterborne diseases, and ensures sustainable water resources. This presentation explores modern wastewater treatment technologies, including biological, chemical, and physical processes, along with emerging innovations such as membrane filtration, advanced oxidation processes, and bio-remediation. Special emphasis is placed on sustainable and cost-effective approaches that enhance pollutant removal while reducing energy consumption. Additionally, the role of regulatory policies and community engagement in ensuring safe water disposal is discussed. Case studies highlight the successful implementation of wastewater treatment plants, demonstrating their impact on reducing microbial, chemical, and pharmaceutical contaminants. The presentation underscores the need for continuous advancements in wastewater treatment to combat climate change, urbanization, and industrialization challenges. Strengthening interdisciplinary research and public-private partnerships can drive innovative, scalable solutions for achieving cleaner water, safeguarding public health, and preserving biodiversity.

**Keywords:** Wastewater treatment, environmental protection, human health, water pollution, sustainability, bio-remediation, advanced oxidation, membrane filtration

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***DIST/2025/109***

# Tuberculosis

Niketa*

Disha Institute of Science & Technology, Dhampur

**Abstract:**

Tuberculosis (TB), caused by *Mycobacterium tuberculosis*, remains one of the leading global health threats, with millions of cases and deaths each year. Despite significant advances in diagnostic methods and treatment regimens, TB continues to challenge healthcare systems due to factors such as drug resistance, delayed diagnosis, and co-infections like HIV. This presentation provides an overview of the current state of TB, emphasizing the global burden, pathogenesis, and the evolution of diagnostic strategies. We will explore traditional diagnostic techniques, such as sputum smear microscopy and culture, alongside newer, molecular approaches like GeneXpert and whole-genome sequencing, which offer enhanced sensitivity and speed. Furthermore, we will discuss the ongoing challenge of multidrug-resistant TB (MDR-TB) and extensively drug-resistant TB (XDR-TB), highlighting the urgent need for novel therapeutics and vaccines. The presentation also examines public health initiatives and strategies for TB control, with a focus on improving diagnosis, treatment adherence, and prevention. With a collaborative global response, there is hope for a future where TB can be effectively controlled and eventually eradicated.

**Keywords**: Tuberculosis, drug resistance, diagnostics, multidrug-resistant TB, molecular techniques, public health, global health.

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*DIST/2025/110*

# Artificial Intelligence in Pharma Sector

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**Abstract:**

Artificial Intelligence (AI) is transforming the pharmaceutical sector by enhancing drug discovery, development, and manufacturing processes. Through data-driven insights, AI algorithms optimize drug design, predict molecular interactions, and identify potential therapeutic candidates faster than traditional methods. Machine learning models are employed to analyze vast datasets, accelerating the identification of biomarkers, improving patient stratification, and supporting personalized medicine. AI-driven automation in drug production also streamlines manufacturing processes, ensuring higher quality control, cost efficiency, and scalability. Furthermore, AI is revolutionizing clinical trials by predicting patient responses, optimizing trial designs, and monitoring real-time data, leading to reduced costs and faster time-to-market. The integration of AI technologies not only enhances the precision and efficacy of drugs but also fosters innovation in healthcare solutions. As AI continues to evolve, its potential to reshape pharmaceutical processes holds promise for significant advancements in public health, offering novel therapeutic avenues and optimizing existing treatments.

**Keywords**: Artificial intelligence, pharmaceutical industry, drug discovery, machine learning, drug development, personalized medicine, clinical trials

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***DIST/2025/111***

# Strategic Management in the Intersection of Pharmaceuticals, Microbiology, and Intellectual Property for Global Health Solutions

Sameer Ahmed*

Disha Group of Institutions, Dhampur

**Abstract:**

The convergence of pharmaceuticals, microbiology, and intellectual property (IP) presents both challenges and opportunities for businesses in the global health landscape. This paper explores how management strategies within these sectors can drive innovation, navigate complex regulatory environments, and ensure equitable access to essential medicines. By examining the roles of pharmaceutical companies in drug development, microbiology's contributions to disease management, and the influence of IP on innovation, the paper highlights the importance of strategic management in creating sustainable business models. This approach balances profitability with social responsibility, offering valuable insights for MBA professionals seeking to lead in industries at the intersection of science, technology, and global health challenges. By fostering cross-sector collaboration, businesses can address health disparities while maintaining competitive advantage in a rapidly evolving marketplace.

**Keywords:** Strategic management, pharmaceuticals, microbiology, intellectual property (ip), global health, innovation, drug development

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***DIST/2025/112***

# Phytochemical Screening and In-Vitro Anti-Urolithiatic Activity of *Impereta cylindrica* Leaves

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**Abstract:**

Urolithiasis is a polygenic disorder with a multifaceted etiology and significant treatment challenges. *Imperata cylindrica*, a widely cultivated plant, is traditionally claimed to have potential anti urolithiatic properties. This study aimed to extract, screen, and evaluate the in vitro anti-urolithiatic activity of *Impereta cylindrica* leaves (ICL) using agregation assays and titrimetry. Dried ICL powder was subjected to decoction with aqueous solvent. Preliminary phytochemical screening revealed the presence of phytosterols, diterpenes, triterpenes, flavonoids, phenolic compounds, and saponins across the extract. The anti-urolithiatic potential was assessed by evaluating the effects of the extracts on calcium oxalate crystallization. Results indicated significant inhibition of crystal formation by the aqueous extract showing the highest inhibition ($p<0.001$) at 1000 µg/mL compared to the standard Ghokshura ghokru. Microscopic analysis confirmed a reduction in crystal size and number. In titrimetry, the aqueous extract of ICL demonstrated significant dissolution of calcium oxalate crystals ($p<0.01$) compared to Ghokshura ghokru. In conclusion, ICL extract, particularly the aqueous extract, exhibited significant anti- urolithiatic activity, likely due to their diverse phytochemical profiles, suggesting their potential as a therapeutic alternative for managing urolithiasis.

**Keywords:** Urolithiasis, *Imperata cylindrica*, aggregation, titrimetry, ghokshura ghokru

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***DIST/2025/113***

# Evaluation of Effect of *Pongamia Pinnata* on Oral Pathogens-An *In-Silico* Study

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**Abstract:**

**Objectives:** The present study is aimed to carry out In-*silico* network pharmacology of *Pongamia pinnata* on oral pathogens.

**Introduction**: Plant based medicines have played a critical role in treatment of various ailments due to their ability to bind and modulate cellular targets involved in disease. Medicinal plants contain a variety of bioactive compounds for the treatment of multiple disorders. The less adverse effects, affordability, and easy accessibility highlight their potential in traditional remedies. Before preclinical research it is always good to identify pharmacological targets from active ingredients of medicinal plants. The present study is planned to see the different targets of *Pongamia pinnata* on oral pathogens by Network Pharmacology.

**Method:** *In-silico* network pharmacology study was carried out. The phytoconstituent of Pongamia *pinnata are identified,*target gene involved in the pathology of Periodontitis were retrieved to construct a network.

**Results:** The *In-silico* study predicted the interaction of phytoconstituents of *Pongamia pinnata* with several pathological targets of periodontitis. The protein sequence of these targets was predicted in *Fusobacterium nucleatum (Fn), Porphyromonas gingivalis (Pg), Prevotella intermedia (Pi).*

**Keywords:** *Pongamia pinnata, in-silico,*oral pathogens, antimicrobial activity

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***DIST/2025/114***

# Liposomal Delivery of *Mucuna pruriens, Bacopa monnieri, Curcuma longa* Extacts as Natural Polyherbal and Prophylactic Remedy to Beat Symptoms of Parkinson's Disease

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**Abstract:**

Parkinson's disease is a progressive neurological disorder that affects nigrostriatal dopaminergic pathway of basal ganglia responsible for movements and leads to symptoms (tremors, rigidity, bradykinesia, and balance problem). It occurs due to the loss of dopamine producing brain cell. The present study explores the synergistic potential of polyherbal liposomes in mitigating MPTP-induced Parkinson's disease in Wistar rats. The synergistic neuroprotective efficacy of the polyherbal (Velvet Bean of *Mucuna pruriens***,** whole herb of *Bacopa monnieri* and roots *Curcuma longa*) extract will be assessed in MPTP-treated Wistar rats by evaluating behavioural outcomes (motor co-ordination), oxidative stress, inflammatory (cytokines: TNF-alpha, IL-6) biomarkers and histopathological analysis to ensure dopaminergic neuronal survival in managing Parkinson's disease. The polyherbal formulation, known for its broad-spectrum therapeutic effects, will be encapsulated in liposomes to improve their bioavailability, stability and targeted delivery to the brain. Liposomal delivery of the polyherbal drugs extract may offer a novel, effective, and natural traditional herbal-based approach to beat symptoms of Parkinson's disease.

**Keywords:** Liposomes, MPTP, neuroprotection, natural, dopaminergic neurons, oxidative stress, cytokines, wistar rats, polyherbal therapy, parkinson's disease

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***DIST/2025/115***

# Exploration of Quinazoline-1,2,3-triazole Inhibitors as Potential EGFR-Targeting Agents in Lung Cancer

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[2]Department of Pharmaceutical Chemistry, School of Pharmaceutical Sciences, Shoolini University, Solan-173229, Himachal Pradesh, India.

**Abstract:**

The epidermal growth factor receptor (EGFR) drives lung cancer progression by utilizing specialized signal transduction pathways, as secreted growth factors cannot penetrate the cell membrane. This study aims to identify a novel anticancer agent capable of inhibiting EGFR and lowering the risk of lung cancer. Using Chemdraw software, a series of triazole-substituted quinazoline hybrid compounds were designed and docked against five different crystallographic EGFR tyrosine kinase domains (TKD). PyRx, Autodock Vina, and Discovery Studio Visualizer were employed for docking and visualization. Among the tested compounds, Molecule-14, Molecule-16, Molecule-19, Molecule-20, and Molecule-38 demonstrated significant binding affinities, with Molecule-19 exhibiting the highest binding affinity (-12.4 kcal/mol) to the crystallographic EGFR tyrosine kinase. The superimposition of the co-crystallized ligand with the hit compound revealed a similar conformation at the EGFR active site (PDB ID: 4HJO), indicating strong coupling and pharmaceutical potential. Additionally, the hit compound demonstrated a favorable bioavailability score of 0.55, with no evidence of carcinogenic, mutagenic, or reproductive toxicity properties. Molecular dynamics (MD) simulation and MMGBSA analysis confirmed the good stability and favorable binding free energy of Molecule-19, suggesting its potential as a lead compound. Additionally, Molecule-19 exhibited excellent ADME properties, high bioavailability scores, and synthetic accessibility, with minimal indications of toxicity. Molecule-19 was identified as a novel and promising inhibitor of EGFR, showing fewer side effects compared to the reference molecule. Molecular dynamics simulations confirmed the stability of the protein-ligand interaction and highlighted the key amino acid residues involved in binding. This study successfully identified potential EGFR inhibitors with favorable pharmacokinetic properties. We believe the findings from this research can contribute to the development of more potent, drug-like compounds to combat human lung cancer.

**Keywords:** EGFR-TKD, lung cancer, quinazoline-1,2,3-triazole hybrids, virtual screening, ADME

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***DIST/2025/116***

# Recent Advances in Herbal Approaches for the Treatment of Mouth Ulcers- A Comprehensive Review

Rupal Choudhary*, Ankit Kumar, Aditi Singhal

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**Abstract:**

Mouth ulcers affect a significant portion of the population. A mouth ulcer is an uncomfortable condition that affects the oral mucosa. Due to the severity of these ulcers, an efficient herbal cure is frequently required. They are not lethal, but they can make it difficult to do daily activities like eating and talking. Herbal medicines are gaining popularity because they are safer and more accessible, even though traditional medications are still effective. Given the potential side effects of synthetic drugs, effective natural alternatives are crucial. While the exact pathogenesis is yet unknown, stress, hunger, and microbial diseases are commonly associated. Herbal alternatives offer a viable treatment with minimal side effects. Recent studies have demonstrated the antiulcer effects of specific herbal formulations through mechanisms such enhancing mucosal healing, immune system regulation, and providing anti-inflammatory and antibacterial properties. By looking at the research on herbal treatments for mouth ulcers, this study highlights the effectiveness of plant-based therapies as natural alternatives to synthetic drugs. It emphasizes their antioxidant action, anti-inflammatory and antibacterial properties, minimal side effects, and capacity to support mucosal healing. As interest in natural therapies grows, herbal drugs provide an enticing approach to treating oral ulcers, with a focus on efficacy, patient safety, and ease of use.

**Keywords:** Mouth ulcers, herbal treatment, antioxidant effect, anti-inflammatory activity, antimicrobial activity

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***DIST/2025/117***

# Preliminary Anticancer Bioassay: Challenges and Opportunity for the Detection of Anticancer Principle from Herbs

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**Abstract:**

Cancer is one of the leading causes of mortality worldwide. Many of the cucurbitaceae plants possess antitumor activity on the traditional use. The present study was carried out to evaluate the preliminary anticancer of activity of extracts Lagenaria siceraria Stand. Fruit. Lagenaria siceraria Stand. fruit. has the various pharmacological activity like antioxidant activity anti hypertensive and other so many activities so the plant may have anticancer activity. The present research had carried out on laboratory level assays to avoid the use of different animal models. Preliminary phytochemical tests of successive extraction of Lagenaria siceraria Stand. Fruit powder had performed to find out the different chemical moieties. Preliminary anticancer screening by exposure of different extracts on Brine shrimp models, Phytotoxic bioassay, Potato disk assay Onion Root assay and CAM assay were carried out to find out the lead extract which shows the promising cell growth inhibitory activity and cyto toxicity. The preliminary bioassay were selected because easy to done and give fastest promising results. n-Butanol extract of Lagenaria siceraria Stand. Fruit powder shows the promising preliminary anticancer activity that' so it is selected as a lead extract. Further isolation of chemical moieties of same extract will be possible.

**Keywords:** Anticancer, on Brine shrimp models, Phytotoxic bioassay, Potato disk assay Onion Root assay and CAM assay

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***DIST/2025/118***

# Artificial Intelligence in Pharma Sector

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**Abstract:**

Artificial intelligence is a machine operating system which is used widely in Pharma sector for several purposes. There are three types of AI systems which includes Machine learning, Machine intelligence and machine consciousness. It's used in the Pharma industry for data management and organization. The AI reduces human error and reduces the repetitive works with digital assistance. Artificial intelligence is for several purposes like Drug discovery, formulation design and testing of several dosage forms. It's also used for the analyze of biological data, predict pharmacokinetics and pharmacodynamics and solve the complex challenges in the Pharma sector. The AI has efficient in reducing the drug development cost, increase the treatment outcomes and analyze world patient records. AI is an effective tool for the prediction of synergism and antagonism also. It also decreases the health hazards in preclinical studies. The Artificial intelligence speed up the drug research and health care system. The AI is a powerful tool which assists in experimental designs, PK/PD studies and optimizes R&D Process.

**Keywords:** Artificial intelligence, health care, research and development, disease diagnosis

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***DIST/2025/119***

# Pharmacognostic and Phytochemical Evaluation of *Cucumis melo* L

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**Abstract:**

Standardization usually involves confirming its identity as well as determining its quality and purity. Current study was undertaken with the goal of developing standards for the fruits of *Cucumis melo* L belonging to Cucurbitaceae family. To develop standards, selected fruit sample of *Cucumis melo* L was subjected to morphological, microscopical, and physiochemical evaluation. The colour of external surface of fruit was found to be silver. Shape of fruit was round and average size was found to be 10 X 10 cm. Apex of fruit was blunt type, taste was sweet and characteristic odour observed during organoleptic evaluation. Microscopically fruit showed the presence of spherical parenchymatous cells, xylem vessels which were annular and spiral type. Prism type calcium oxalate crystals were also observed in powder drug. Phytochemically presence of phenols, flavonoids, resins, carbohydrates confirmed in the alcoholic extract of the sample. Foreign organic matter, ash value, extractive value, fluorescence analysis, and chromatography were all performed, providing data that could be useful in the future for standardization purpose.

**Keywords:** *Cucumis melo* L, cucurbitaceae, standardization, pharmacognostic, phytochemicals

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***DIST/2025/120***

# Green Synthesis of Silver and Copper Nanoparticles: A Sustainable Approach

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JJTU, Rajasthan

**Abstract:**

The synthesis of nanoparticles has gained immense importance due to their remarkable physicochemical properties and wide-ranging applications in medicine, electronics, and environmental remediation. Among various nanoparticles, silver (Ag) and copper (Cu) nanoparticles have drawn significant attention for their antimicrobial, catalytic, and therapeutic properties. However, conventional synthesis methods often involve toxic chemicals and hazardous byproducts, raising environmental and health concerns. Green synthesis provides an eco-friendly and sustainable alternative by utilizing plant extracts, microorganisms, and natural biomolecules as reducing and stabilizing agents. This presentation will explore the mechanisms of green synthesis for Ag and Cu nanoparticles, emphasizing the role of phytochemicals, enzymes, and microbial agents in nanoparticle formation. Various characterization techniques, such as UV-Vis spectroscopy, XRD, and TEM, used to analyze their size, morphology, and stability will be discussed. Additionally, the potential applications of green-synthesized Ag and Cu nanoparticles in antimicrobial coatings, drug delivery, wastewater treatment, and catalysis will be highlighted. By adopting green synthesis, we can achieve cost-effective, scalable, and environmentally sustainable nanomaterials, paving the way for safer innovations in nanotechnology.

**Keywords:** Green synthesis, Cu/Ag nanoparticles, reducing agents, phytochemicals, biomolecules

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***DIST/2025/121***

# Assessment & Phytochemical Screening of Anti-Lithiatic Activity in *Pedalium murex* L as a Binding Agent in Magnesium Trisilicate and Calcium Oxalate Tablet

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Department of Pharmaceutical Analysis, Kamarajar College of Pharmacy, Chidambaram, Tamil Nadu, India

**Abstract:**

*Pedalium murex* L commonly known as Bada gokhru belongs to family pedaliaceae is one of the most useful traditional medicinal plants in India. The leaves of plant contain the gum resin "galbanum". The galbanum gum reported for its anti-lithiatic activity. This study concluded that gum resin was used as a binding agent in magnesium trisilicate and calcium oxalate tablet formulation to overcome the lithiatic effect. The leaves extracts of *Pedalium murex* was also confirmed the presence of flavonoids, alkaloids, glycosides, phenols, saponins, terpenoid, cardiac glycosides and tannins and extract was prepared by using petroleum ether chloroform, aqueous and ethanol. The extraction was efficient when ethanol was used. Confirmative test for mucilage is Ruthenium red test. Bada gokhru gum resin was extracted to dry powder. Hence the result concluded that, mechanical property indicated that galbanum gum act as a binding agent and also have anti-lithiatic effect so, useful to formulate Magnesium Trisilicate and calcium oxalate tablets with desired mechanical characteristics for specific purpose, and also used as an alternative substitute binder in pharmaceutical formulation.

**Keywords:** Pedaliaceae, bada gokhru, galbanum, wet granulation, resin, phytochemical screening

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***DIST/2025/122***

# Telmisartan Cocrystals: Formation and Characterization Using Different Coformers to Increase Telmisartan Solubility

Chelsi Bishnoi*, Simran Arora, Sharda Sambhakar

Banasthali Vidyapith

**Abstract:**

Telmisartan, a BCS class II drug characterized by low solubility and high permeability, is widely prescribed for the treatment of hypertension, as well as for reducing the risk of stroke, heart attack, and cardiovascular-related mortality. However, its clinical efficacy is hampered by its poor solubility, resulting in limited bioavailability A promising strategy to overcome this limitation involves the formation of pharmaceutical cocrystals. By co-crystallizing Telmisartan with various coformers, including cinnamic acid, benzoic acid, succinic acid, tartaric acid, and urea, the solubility, stability, and bioavailability of the drug can be significantly enhanced without altering its pharmacological activity. In this study, Telmisartan cocrystals were synthesized in a molar ratio using solution crystallization method. Their formation was confirmed by using methods such as FTIR, XRD, NMR, and SEM and the solubility of telmisartan co-crystals was determined by shake flask method. The results indicated that the pure drug exhibited very poor solubility in 0.1 N HCl, phosphate buffer, and water. Notably, the cocrystal containing cinnamic acid demonstrated a substantial improvement in solubility, showing an increase of approximately 16-fold in 0.1 N HCl, a 5-fold increase in phosphate buffer, and a 13-fold increase in water compared to the pure Telmisartan. These findings underscore the potential of cocrystals in addressing solubility and bioavailability issues associated with BCS class II drugs and highlight the importance of selecting appropriate coformers for optimal results.

**Keywords:** Telmisartan, hypertension, cocrystals, bioavailability, cinnamic acid

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***DIST/2025/123***

# Fluoxetine-Loaded Proniosomes: Formation and Evaluation for Effective Transdermal Delivery

Aashi Sharma*, Mamta, Sharda Sambhakar

Banasthali Vidyapith

**Abstract:**

Fluoxetine (FX), a selective serotonin reuptake inhibitor (SSRI), is commonly used to treat depression but has limited oral bioavailability (72%) due to first-pass metabolism and often causes gastrointestinal side effects, leading to patient non-compliance. Although advanced formulations such as nanocarriers and intranasal systems aim to address these challenges, they often come with high costs or lack sufficient bioavailability data. As an alternative, transdermal proniosomes have been developed as a promising drug delivery system. These proniosomes bypass the first-pass metabolism and minimize side effects associated with oral administration. This study successfully developed fluoxetine proniosomal gel formulations using the coacervation phase separation method, incorporating lecithin, cholesterol, and surfactants (Span and Tween). The formulations were evaluated for key parameters including entrapment efficiency, vesicle size, polydispersity index (PDI), zeta potential, and morphology using scanning electron microscopy (SEM). Among the formulations, Span 60 demonstrated the highest entrapment efficiency. The results were within acceptable ranges, with Span 60 being identified as the most suitable surfactant for proniosome preparation. In vitro release and permeation studies confirmed that the fluoxetine-loaded proniosomal gel provided effective controlled release, demonstrating good drug permeation and prolonged release profiles. Stability tests showed that the formulation remained stable at room temperature. These findings suggest that fluoxetine proniosomal gels could potentially serve as an effective and stable transdermal treatment for depression, offering an improved alternative to oral administration with fewer side effects and enhanced bioavailability.

**Keywords:** Fluoxetine, transdermal proniosomes, entrapment efficiency, controlled release, bioavailability

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***DIST/2025/124***

# Isolation and Structure Elucidation of Phytoconstituent from *Moringa concanensis* Leaf Extract

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**Abstract:**

*Moringa concanensis* Nimmo. (Moringaceae) is a wild plant found in India. Tribes have long used this plant as an antibacterial, antifertility, anti-inflammatory, antipyretic, antioxidant, anticancer, and anticonvulsant. In the present study, the leaves of *Moringa concanensis* were subjected to successive solvent extraction with five different solvents of increasing polarity, i.e., petroleum ether, chloroform, ethyl acetate, methanol, and water, followed by a phytochemical screening of each extract. The phytochemical study indicated the presence of terpenoids, steroids, cardiac glycosides, flavonoids, alkaloids, carbohydrates, proteins, tannins, and phenolics. The chloroform extract showed the presence of cardiac glycosides (cardenolides); therefore, an RP-HPLC method was developed to identify the phytoconstituents in the extract. The extract was recrystallized to isolate the single component and to gain the desired purity for further spectral analysis. Different spectral data from UV-visible, Infrared, Mass, and Nuclear Magnetic Resonance spectroscopy were analyzed and the isolated chemical constituent was identified. Based on spectral analysis (UV, IR, HNMR, 13C NMR, and mass spectroscopy), it is concluded that digoxin is present in the recrystallised fraction of the chloroform extract of *Moringa concanensis* leaf.s

**Keywords:** *Moringa concanensis,* RP-HPLC, Structure Elucidation, cardiac glycosides

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***DIST/2025/125***

# Method Development and Validation of Simultaneous Estimation of Phytomarkers in Ayurvedic Formulation by High-Performance Thin Layer Chromatography

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**Abstract:**

The goal of the current research was to develop and validate a fast, accurate HPTLC technique for concurrently estimating Lupeol, Diosgenin, Oleanolic acid, and Caffeic acid in an Ayurvedic formulation. The HPTLC method employed a silica gel G 60 $F_{254}$ coated plate and a mobile phase of n-Hexane: Ethyl acetate: Methanol: Formic acid in 7.2:2:1:0.1, v/v/v/v. Diosgenin (449 nm), Lupeol (604 nm), and Oleanolic acid (540 nm) was detected after derivatization with vanillin-sulphuric acid reagent while caffeic acid (322 nm). The method was validated through ICH Q2 (R2) guidelines. Linearity for Lupeol, Diosgenin, Oleanolic acid, and Caffeic acid linearity ranged from 1000-5000 ng/band, with correlation coefficients ($r^2$) of 0.99. LOD and LOQ were determined for Lupeol (95.26 and 288.68 ng/band), Diosgenin (95.27 and 288.67 ng/band), OA (91.66 and 277.77 ng/band), and CA (82.50 and 250 ng/band). Accuracy was evaluated using recovery methods, demonstrating satisfactory outcomes for all the phytomarkers in the range of 99 – 101 %. Precision study % RSD values were < 2%. The $R_f$ values for Lupeol, Diosgenin, Oleanolic acid, and Caffeic acid were found to be 0.702, 0.525, 0.453, and 0.186, respectively. The proposed HPTLC techniques were discovered to be precise, accurate, and reproducible for regular assessment of marketed formulations without prior separation.

**Keywords:** Lupeol, Diosgenin, Oleanolic acid, Caffeic acid, HPTLC, DoE

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***DIST/2025/126***

# Formulation and Evaluation of *Calotropis gigantea* Latex Based Transdermal Patches

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**Abstract:**

A transdermal patch is a medicated adhesive pad which is meant to adhere to the skin and to deliver the active ingredient slowly over a few hours to days. Transdermal medication patches have been found to be a good way of using medicines. As reported, the transdermal drug delivery system (TDDS) is a better administration technique and enhances patient compliance. In the present work we attempted to formulate and evaluate a transdermal patch containing Calotropis gigantea latex. It is a well-known medicinal herb, commonly known as milkweed. It has been used in Unani, Ayurvedic, and Siddha systems of medicine for several years. The pharmacological studies have revealed that *Calotropis gigantea* has numerous potent pharmacological effects such as wound healing, antioxidant, anti-inflammatory, hepatoprotective and analgesic activity. The latex was collected, characterized and incorporated into a transdermal patch using polymers by a solvent casting method. The formulated patches were evaluated for their physical, medical and pharmaceutical properties. Characterization studies include GC-MS analysis. This combinational therapy, combining the best of traditional and modern medicine, is set to be a promising strategy for controlled drug delivery and to avoid pain and liver first pass metabolism. Keywords: Calotropis gigantea, transdermal patch, antiviral, anti-inflammatory.

**Keywords:** *Calotropis gigantea*, transdermal patch, antiviral, anti-inflammatory

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***DIST/2025/127***

# Development and Validation of UV- Spectrophotometric and Method for the Estimation of Cerebroprotein Hydrolysate in Bulk and Pharmaceutical Dosage Form

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**Abstract:**

A Simple, Precise, Accurate and Economical UV spectrophotometric method was developed and validated for estimation of Cerebroprotien Hydrolysate in bulk and pharmaceutical dosage form. The drug was highly soluble in distilled water and Phosphate saline buffer. so it was selected as the solvent system. The detection wavelength of Cerebroprotien Hydrolysate was found to be 208 nm for Distilled water and 280 nm for Phosphate saline buffer. Because 208nm presents the strong peptides bond at D.Water and 280 nm presented for Aromatic amino acids at Phosphate saline buffer. The linearity of Cerebroprotien Hydrolysate was found to be in range of Cerebroprotien Hydrolysate pure in Distilled water 0.5-1.0 mg/ml with correlation coefficient value 0.998 and Phosphate saline buffer 0.1 – 0.5 mg/ml with correlation coefficient value 0.997. Cerebroprotien Hydrolysate in dosage form in D.Water 0.5 – 1.0 mg/ml with correlation coefficient value 0.997. and Phosphate saline buffer 0.1 – 0.5 mg/ml with correlation coefficient value 0.998. The linear regression equation obtained by least square regression method, were y = 0.005x-0.0056, y=0.005x-0.0032, y=0.051x-0.0057, y = 0.0026x-0.7235. The absorbance was found to increases linearly with increasing concentration of Cerebroprotien Hydrolysate. The LOD were found to be Pure D.Water and Phosphate saline buffer at 0.36µg/ml and 1.12µg/ml, 0.21µg/ml and 0.64µg/ml and Dosage forms at 0.36µg/ml and 1.11µg/ml respectively. Mean recovery of Cerebroprotien Hydrolysate was found to be in the range of 98.69% to 100.77% signifies the accuracy of method. This method was validated as per ICH Q2 (R1) guidelines. The proposed methods were found to be accurate, specific and reproducible which can be effectively applied to pharmaceutical dosage form. Robustness obtained % RSD was found to be pure 0.827, 0.356 and Dosage form 0.567, 0.678 and % Purity obtained by assay was 98.60 and 99.67. Stability indicating results find out in Phosphate saline buffer at 12 hrs, 24 hrs and 48 hrs of %RSD in fresh stock at 5.241 µg/ml and old stock solution at 3.030 µg/ml.

**Keywords:** Distilled water, cerebroprotien hydrolysate, uv-vis spectroscopy, ich q2 (r1) guidelines.

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# The Potential of Herbal Treatments for Folliculitis

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**Abstract:**

A dermatological disorder called folliculitis is typified by inflammation of the hair follicles and is frequently brought on by bacterial pathogens like Staphylococcus aureus as well as fungal or viral agents. Additionally, follicular blockage or mechanical irritation may be the cause. Erythematous pustules, papules, itching, and localized discomfort are common symptoms. Even while folliculitis is usually a benign and self-limiting infection, severe or recurrent cases can cause psychological distress, scarring, and discoloration, particularly in places that ue visible. Some populations are more susceptible to the illness, but it affects a wide range of people. These comprise those with weakened immune systems, those with long-term illnesses like diabetes, and those who participate in activities that frequently result in follicular damage, perspiration, or skin friction. Herbal treatments for folliculitis are becoming more popular because of their extensive antibacterial, anti-inflammatory, and skin-repairing capabilities. The herbal remedies are prized for being accessible, biocompatible, and having few adverse effects especially in environments with low resources. Using herbal medications to treat folliculitis is a promising approach to comprehensive and long- lasting care. To confirm their effectiveness, improve formulations, and standardize dosage, more clinical research is necessary, opening the door for their wider use in dermatological treatment.

**Keywords:** Folliculitis, polyherbal, inflammation, antimicrobial, anti-inflammatory

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# The Evolution of Antifungal Infection Management: Bridging Gaps in Research and Practice

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**Abstract:**

Antifungal infections pose a significant global health burden, particularly in immunocompromised populations. Despite advances in antifungal therapies, the rising incidence of drug-resistant fungal pathogens and limitations in diagnostics underscore the need for improved management strategies. This review highlights the evolution of antifungal infection management, focusing on advancements in diagnostics, therapeutic options, and emerging research. Innovations in molecular diagnostics have revolutionized early pathogen identification, enabling more precise and timely interventions. However, challenges remain in their accessibility and cost-effectiveness, particularly in resource-limited settings. The development of novel antifungal agents, including next-generation azoles, echinocandins, and combination therapies, has expanded the therapeutic arsenal. Yet, issues such as toxicity, drug interactions, and resistance persist, necessitating continued exploration of alternative treatment strategies. This abstract also emphasizes the importance of global surveillance systems and interdisciplinary collaboration in addressing antifungal resistance and improving patient outcomes. Bridging the gaps between research and clinical practice requires concerted efforts to develop cost-effective diagnostics, novel therapeutics, and evidence-based guidelines tailored to diverse healthcare settings. By integrating advances in science with practical solutions, the future of antifungal infection management holds promise for more effective and equitable care.

**Keywords:** Immunocompromised, antifungal therapies, pathogens, diagnostics, interdisciplinary

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***DIST/2025/130***

# Pharmacological Neuroprotective Evaluation of Herbal Drug in Experimental Zebra Fish Model of Alzheimer's Disease

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**Abstract:**

The signature features of Alzheimer disease include damaged neurons coupled with diminished cholinergic signaling mechanisms found in both hippocampus and cerebral cortex tissues that aid cognitive processes and help maintain memories. An experimental zebrafish model of AD serves to study and evaluate new pharmaceutical treatments developed from herbal formulations against Alzheimer's disease. This work established an original adult zebrafish model through extensive scopolamine dosage experiments while creating conditions that duplicated Alzheimer-like biological processes. Tests for stress, anxiety and spatial memory were used to assess cognitive functioning in zebrafish following their administration of various herbal medicine solutions after receiving neurotoxicity treatment. Independent biochemical tests examined markers of oxidative stress while measuring inflammatory cytokines and neuronal damage. When administered at specified dosage levels this compound returned scopolamine-induced learning and memory impairment deficits alongside displaying its activity as antioxidant and Acetylcholinestrase agent. The research results indicate that herbal drugs could potentially become valuable therapeutic agents for handling Alzheimer's disease symptoms. Further research needs to investigate both the molecular basis of these herbs and how well they work in real clinical practice. The results of this research establish a foundation which may guide upcoming Alzheimer's disease therapeutic developments.

**Keywords:** Alzheimer's disease, neuroprotection, herbal drug, zebrafish model, oxidative stress

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# A Comprehensive Review on Bilosomal Gel for Topical Drug Delivery

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**Abstract:**

Topical drug delivery refers to the administration of drugs through the skin as well as via vaginal, ophthalmic and rectal routes. These drugs can be intended for either localized or systemic effects. Topical formulations can exist in solid, semisolid or liquid forms. In this system, a bilosome-based formulation is prepared and incorporating it into a nanogel for enhanced delivery. Bilosomes are closed vesicles containing non-ionic surfactants and bile salts, ranging in size from 5 to 200 nm. They are composed of phospholipids and bile salts, forming a bilayer structure similar to biological membranes. These vesicles are designed to enhance the penetration of drugs through the skin, making them useful for transdermal drug delivery. Bilosomes are effective in delivering hydrophobic or poorly soluble drugs, and they can protect encapsulated drugs from degradation. The development of bilosome-based transdermal formulations has shown promise in improving drug delivery efficiency and therapeutic outcomes. By leveraging the unique properties of bilosomes, researchers aim to optimize the delivery of various medications, including anti-inflammatory agents, analgesics, antibiotics, and other therapeutic compounds. The patient adherence to topical formulations is significant in relation to chronic skin diseases, like fungal infections, acne, psoriasis. Further research and development in this area may lead to the commercialization of bilosome-based transdermal products with enhanced efficacy and patient convenience. This formulation offers several advantages that make it more effective than others. Increases water solubility with low water-soluble drugs, improves drug permeability, bioavailability of drug from bilosome is greater than liposome and micronized form of drug.

**Keywords:** Bilosomes, topical drug delivery, skin diseases, nano gel

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# Effects of Combined Ethanolic Extracts of *Citrullus colocynthis* (L) and *Plumbago zeylanica* in Human Breast Cancer Cell Lines

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**Abstract:**

Cancer is a malignant disease that is characterized by rapid and uncontrolled formation of abnormal cells. medicinal plants due to some benefits and used to treat cancer in all centuries. Therefore, the aim of the study was the phytochemical screening, identification of phtocomponents in GC-MS analysis, computational biological works and tablet punching and anticancer evaluation of *Citrullus Colocynthisi* and *Plumbago Zeylanica* Linn. The result is indicates that ethanolic extract *of Citrullus colocynthis* and *Plumbago zeylanica* Linn. and two of its fraction is prepared with ethanol possess significant the decrease proliferation and growth potential along with cell cycle arrest of treated cells compared to control untreated cells. Expression regulation of genes furtered conformed the cellcycle arrest significant up granulation block the Estrogen receptor. It is concluded that *Citrullus colocynthis* and *Plumbago zeylanica* arrest cell cycle in human breast cancer cells. Through expression regulation of ER+inhibitors and with further research can be proposed for therapeutic interventions and also reduced the elevated levels of lipid peroxidation due to higher content of *Plumbago Zeylanica* is contain the active ingredients Plumbagin and the *Citrullus Colocynthis* is contains the active ingredients of Cucurbitacin. Could have therapeutic application against cancer.

**Keywords:** Breast cancer, cytotoxicity lipid peroxidation, MIT, MTT, apoptosis, cucurbitacin, plumbagin, antioxidant, antimicrobial, wound healing, flavonoids and terpenoids, medicinal plants

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***DIST/2025/133***

# Flavonol-based Nanotherapeutics in Management of Allergic Dermatitis

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**Abstract:**

Allergic dermatitis is a chronic inflammatory skin condition characterized by pruritus, erythema, and immune dysregulation. Current treatments such as corticosteroids and antihistamines often provide symptomatic relief but are associated with side effects including skin atrophy and systemic immunosuppression. Flavonols, a subclass of flavonoids, have emerged as promising bioactive compounds due to their potent anti-inflammatory, antioxidant, and immunomodulatory properties. These polyphenolic compounds modulate inflammatory pathways by inhibiting pro-inflammatory cytokines (e.g., TNF-α, IL-4, IL-13), reducing oxidative stress, and stabilizing mast cells to prevent histamine release. Additionally, flavonols enhance skin barrier function by promoting ceramide synthesis and reducing trans-epidermal water loss, making them ideal candidates for dermatological applications. Despite their therapeutic potential, the clinical application of flavonols is limited by their poor water solubility, rapid metabolism, and low skin penetration. To address these challenges, novel formulation strategies such as nano-emulsions, liposomes, hydrogels, and solid lipid nanoparticles are being developed to enhance its bioavailability and targeted delivery. These advanced drug delivery systems improve skin retention, controlled release, and overall therapeutic efficacy while minimizing systemic side effects. The outcomes of study conferred that novel approaches may help to formulate safer, more effective, and patient-friendly alternatives to conventional treatments, addressing an unmet need in dermatological care.

**Keywords:** Flavonols, allergic dermatitis, anti-inflammatory, novel formulations, drug delivery

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***DIST/2025/134***

# A Novel Therapeutic Approach for Neuroprotection utilizing Nose-to-Brain Delivery

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**Abstract:**

The neuroprotective properties of flavonoids have drawn a lot of attention of researchers and pharmaceutical scientists. Their anti-inflammatory, antioxidant, and mitochondrial-protective properties support neuronal survival and cognitive function.These qualities make them intriguing candidates for treating neurodegenerative diseases like Parkinson's and Alzheimer's. However, flavonoids' low permeability across the blood-brain barrier (BBB), fast metabolism, and poor aqueous solubility limits their therapeutic use by limiting their bioavailability in the central nervous system (CNS). Alternative delivery methods are required because traditional oral and intravenous administration routes frequently fall short of achieving sufficient brain concentrations. Bypassing the blood-brain barrier through the olfactory and trigeminal pathways, nose-to-brain delivery has become a non-invasive and effective method of direct brain targeting. Niosomes, nanoparticles, nanoemulsions, and liposomes are examples of nanoformulation-based techniques that provide a workable solution by increasing solubility, boosting stability, and enabling controlled drug release. These nanocarriers prolong the half-life of flavonoids, shield them from enzyme destruction, and facilitate effective drug delivery to the central nervous system. Nano-based intranasal delivery offers targeted neuroprotection with minimal systemic side effect. However, further studies need to be performed to concentrate on refining the characteristics of nanoformulations and assessing their effectiveness in preclinical and clinical models.

**Keywords:** Nose-to-brain delivery, neuroprotection, flavonoids, nanoformulations, blood-brain barrier (BBB), targeted drug delivery

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***DIST/2025/135***

# Synthesis, Anti-Inflammatory Activity, and COX-1/2 Inhibition Profile of Some Novel Non-Acidic Polysubstituted Pyrazoles

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**Abstract:**

The synthesis and evaluation of the anti-inflammatory activity of some structure hybrids comprising basically the 5-hydroxy-3-methyl-1-phenyl-4-substituted-1H-pyrazole scaffold directly linked to a variety of heterocycles and functionalities, or annulated as pyrano[2,3-c]pyrazoles, is described. According to the in vivo results and a comprehensive structure-activity relationship study, five analogs (5, 10, 17, 19, and 27) displayed remarkable anti-inflammatory profiles showing distinctive % protection and $ED_{50}$ values were nearly equiactive to celecoxib ($ED_{50}$ 32.1 μmol/kg). Compounds 10, 17, and 27 exhibited distinctive COX-2 inhibition with a noticeable COX-2 selectivity close to that of celecoxib. Additionally, 5, 10, 17, 19, and 27 proved to be gastrointestinal tract safe (0-20% ulceration). Collectively, the in vivo $ED_{50}$ values for the most potent five derivatives agree with their in vitro COX-2 selectivity indices, suggesting their usefulness as selective anti-inflammatory COX-2 inhibitors.

**Keywords:** Anti-inflammatory activity; COX-1; COX-2; pyrazole; selective COX-2 inhibitors

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***DIST/2025/136***

# Application of Liquisolid Technique in Enhancing Solubility of BCS Class II Drug from Orodispersible Tablets

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**Abstract:**

The issue of low solubility and dissolution rate poses a major problem the bioavailability of Promethazine theoclate, BCS Class II drug. The main objective of the research work was to enhance the solubility and dissolution rate of Promethazine theoclate from orodispersible tablets by using liquisolid technique and orodispersible system which offer immediate release, increased bioavailability and better patient compliance. In this research, orodispersible tablets of Promethazine theoclate were prepared by liquisolid technique using PEG 400 (non-volatile solvent), microcrystalline cellulose and aerosil as carrier and coating material. The amounts of carrier (MCC) and coating (Aerosil 200) materials were optimized using a $3^2$ full factorial design. Precompression and post compression evaluations were performed. Precompression evaluations showed formulation F4 with optimal flow (angle of repose: 26.19°) and compressibility (Carr's index: 11.29). Post-compression tests revealed F4 showing the shortest disintegration time (28 seconds), fastest dispersion (32.18 seconds), and highest water absorption (72%). *In vitro* dissolution studies identified F4 as the best formulation, achieving 98.8% drug release in 30 minutes. Stability testing under accelerated conditions confirmed robustness of optimized formulation F4.

**Keywords:** BCS Class II drug, Promethazine theoclate, Liquisolid technique, Orodispersible tablets, Stability studies.

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***DIST/2025/137***

# Biorefinery Potential of Waste Peel and Seed of *Persea americana*

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**Abstract:**

Avocado (*Persea americana*) is a nutrient-rich fruit, abundant in healthy fats, vitamins, minerals, proteins, and fibre. However, its industrial processing yields substantial amounts of waste, including peels and seeds that are loaded with valuable phytochemicals. This study reported processing of peel and seed from avocado to extract and identify bioactive phytochemicals. The dried peel and seed were subjected to soxhlet extraction followed by identification of compounds like citric acid, syringic acid, protocatechuic acid, quercetin and Kaempferol. Total phenolic content, total flavonoid content and in vitro antioxidant activity of different extracts were further determined. The physico chemical properties of avocado seed oil through acid value, iodine value, and peroxide value were further analysed. The presence of polyunsaturated fatty acid in seed oil was confirmed using NMR studies. Finally, the antibacterial activity of the extracts were determined using the zone of inhibition assay using two gram negative and two gram positive bacteria. The extracts were found to be potential natural antibacterial agents. The avocado waste-based phytochemicals may have future applications in pharmaceuticals, cosmetics, and food industries.

**Keywords:** Avocado, fats, vitamins, minerals, proteins, fibre, waste peel, biorefinery

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***DIST/2025/138***

# Formulation Development and Characterization of Sustained Release Microspheres of Aceclofenac and Omeprazole

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**Abstract:**

Aceclofenac is an oxyacetic and non-steroidal anti-inflammatory dmg which has a half-life of 4h. Aceclofenac is used to reduce fever, inflammation of rheumatoid arthritis, traumatic pain etc. Development of aceclofenac microsphere is carried out to achieve sustained release of the dmg after administration. The objective of this research was to develop and formulate combination of two drug aceclofenac and omeprazole in the form of sustained release microspheres having pH sensitivity property and microspheres were prepared by solvent evaporation method. Microspheres were formed using different drug polymer ratios (1:1 to 1 :3), stirring speeds (400-900rpm). The prepared microspheres were characterized by percentage yield, particle size, entrapment efficiency, micrometrics properties, FTIR, in-vitro release behavior, etc. The in-vitro release studies was performed by buffer change method to mimic gastro intestine tract (GIT) environment in pH 1.2, carbonate buffer (acidic) and pH 7.2, phosphate buffer (Alkaline). The infrared spectra showed stable character of aceclofenac omeprazole in the drug loaded microspheres and show the absence of dmg polymer interactions. The drug loaded microspheres show high entrapment efficiency (74%) and release was extended up to 6 to 8 hrs. releasing 86% of the total drug from the microspheres.

**Keywords:** Aceclofenac, omeprazole, microspheres, formulation, preformulation, sustained release drug delivery

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***DIST/2025/139***

# Design, Creation, and Evaluation of Silver Nanoparticles for Possible Topical Uses Using Plant Leaf Extract

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**Abstract:**

Growing in popularity, plant-mediated production of nanoparticles is more cost-effective and environmentally friendly. In this work, silver (Ag) nanoparticles are created using an aqueous extract of fresh Eucalyptus globulus leaves as a bio-reducing agent. Transmission electron microscopy (TEM) and ultraviolet-visible spectrophotometry (UV-Vis) were used to verify the nanoparticle production. UV-Vis spectra and ocular inspection revealed that fresh leaf extracts turned greyish-brown after being treated with Ag precursors. Inductively coupled plasma spectroscopy (ICP) and UV-Vis spectroscopy were employed to optimize the concentration and duration required for the transformation of silver ions into AgNPs. The biosynthesised AgNPs showed a clear UV-visible absorption peak between 413 and 420 nm. Microscopic imaging verified that the produced nanoparticles were spherical in shape, with an average diameter of less than 90 nm. X-ray diffraction (XRD) studies were used to confirm the size and semicrystalline structure of AgNPs. AgNPs and phytochemicals interacted, as shown by an analysis of the Eucalyptus globulus leaf extract using Fourier Transform Infrared Spectroscopy (FTIR).AgNPs showed isothermal behavior in ambient air between 20 and 500 °C, according to analysis utilizing Differential Scanning Calorimetry (DSC).

**Keywords:** Silver nanoparticles, eucalyptus globus plant, green synthesis, characterization

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# Approaches for Controlled Delivery of Plant Derived Natural Products

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**Abstract**:
Natural plants have long been a source of bioactive compounds with therapeutic properties, offering a sustainable alternative to synthetic chemicals. Recent advancements in controlled release (CR) technology have enabled the development of systems that can precisely regulate the release of these plant-derived substances, enhancing their efficacy and minimizing side effects. Controlled release mechanisms can be integrated with plant-based formulations to optimize the bioavailability, stability, and targeted delivery of active ingredients. This approach has broad applications in fields such as medicine, agriculture, and cosmetics. The integration of controlled release with plant-based therapies holds promise for more effective, eco-friendly, and patient-friendly solutions in various industries.

**Keywords:** Controlled release, bioactive compounds, synthetic chemicals, bioavailability, stability, targeted delivery

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***DIST/2025/141***

# Improved Solubility of Ivacaftor by Preparing Liquisolid Ivacaftor Tablet Using the Box-Behnken Design

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**Abstract:**

Ivacaftor a drug falling under BCS class II due to its low solubility, with a bioavailability of around 20%. The primary objective was to increase the efficiency of the drug, particularly in lower doses. In this study, the novel liquisolid technique is used to enhance the dissolution and ultimately improve the solubility. The formulation containing 25mg liquisolid ivacaftor tablet was prepared through a multi-step process. Initially, assessed the drug saturation solubility in various non-volatile solvents, whereas utilized transcutol shows higher solubility for Ivacaftor (i.e. 82.1 mg/ml). The angle of slide was determined by using neusilin US2 as the carrier and syloid FP 244 as the coating agent. The neusilin US2 and syloid FP244 materials were chosen for their high surface area (300 $m^2/g$), facilitating absorption and adsorption, respectively. The liquid loading factor, excipient ratio (R), disintegrating agent in the liquisolid technique plays a crucial role in determining the effectiveness of drug dissolution and bioavailability enhancement. Employing a design of experiment (DOE) approach, including box-behnken model the optimized batch was formulated to achieve enhanced dissolution and bioavailability, thus maximizing the therapeutic efficiency. The results demonstrated a 100% dissolution for the Ivacaftor liquisolid tablet compared to the lactose-based conventional tablet, indicating superior drug release.

**Keywords:** Ivacaftor, liquisolid, tablet, box-behnken design

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***DIST/2025/142***

# Analytical Method Development and Validation of a New HPTLC Method for the Simultaneous Estimation of Phytoconstituents in an Ayurvedic Formulation

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**Abstract:**

Objective: This study aimed to develop and validate a HPTLC method for the simultaneous estimation of embelin, gallic acid, and piperine in an ayurvedic formulation.

Method: The HPTLC method utilized a pre-coated silica gel G 60 $F_{254}$ plate and a mobile phase composed of Toluene: Ethyl acetate: Petroleum ether: Formic acid in 7:1:1:1.5 (v/v/v/v). A HPTLC scanner was used to analyze the spectra of all standards to identify the appropriate wavelengths for embelin, gallic acid and piperine respectively 284 nm,278nm & 333 nm. The method was validated according to ICH Q2 (R1) guidelines.

Results: The linearity of embelin, gallic acid, and piperine ranged from 1000 to 5000 ng/band, with correlation coefficients ($r^2$) of 0.9982, 0.9984, and 0.9986. The LOD and LOQ were established for embelin (104.54 and 316.81 ng/band), gallic acid (110 and 333.33 ng/band), and piperine (109.91 and 333.08 ng/band). The Accuracy, as assessed through recovery methods, was found to be satisfactory; 99.90−100.02% for embelin, 100.03−101.02% for gallic acid, and 99.98−100.12% for piperine. The recision study also assessed by % RSD, was found to be less than 2%.

Conclusion: The proposed HPTLC techniques were determined to be precise, accurate, and reproducible.

**Keywords:** Embelin, gallic acid, piperine, HPTLC, ayurvedic

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*DIST/2025/143*

# Benefits and Challenges of Using Artificial Intelligence for Pharmaceutical Drug Discovery and Development

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**Abstract:**

**Aim and objectives**: The research work based on study of benefits and challenges of using artificial intelligence for pharmaceutical drug discovery and development.

**Introduction;** Artificial intelligence (AI) is one branch of Computer Science, which accelerate all the areas of science and technology, Pharmaceutical R&D consists of the discovery and testing of medicines or vaccines with the aim of obtaining regulatory approval for their clinical use. It is also used the identification of potential drug candidates and optimizes molecular design. By analyzing biological data, AI helps in predicting drug efficacy and safety profiles, shortening the time from laboratory to market.

**Methodology:** Some popular AI models used for drug discovery are Deep Chem ,RDKit, Chem BERTa, Graph Conv, Auto Dock Vina, SMILES Transformer, Schrödinger Suite, IBM RXN for Chemistry, scape-DB ,GENTRL (Generative Tensorial Reinforcement Learning), Generative Adversarial Networks (GANs), Recurrent neural Networks (RNNs) Convolutional Neural Networks (CNNs), Long Short-Term Memory Networks (LSTMs), Transformer Models, Reinforcement Learning (RL), Bayesian Models, Deep Q-Networks (DQNs), Autoencoders, Graph Neural Networks (GNNs).

**Uses:** These methods are applied to develop some of the popular AI model tools used for drug discovery; data science algorithms, machine learning algorithms, deep learning.

**Challenges:** However, it also poses challenges that bring along significant hurdles and limitations, such as: Lack of transparency, Lack of data availability, Biases in data, Data Inability, a limited ability to account for variability, Interpretation of the results, Consideration of ethics, biological systems with complexity, A lack of clinical expertise, Inactive molecules.

**Methods of converting challenges to opportunity**: Therefore, AI-based models should be used in combination with traditional experimental methods to ensure the safety and efficacy of drugs. As data availability, deep learning algorithms, integration with other modeling approaches, and computational power have improved As a mitigation measure, we should adopt FAIR data principles (Findable, Accessible, Interoperable, Reusable), which align with ALCOA principles (Attributable, Legible, Contemporaneous, Original, and Accurate). By adhering to these principles, data quality can be improved

**Conclusion:** Artificial intelligence brings both challenges and opportunities to the pharmaceutical industry. In one sense, AI accelerates drug discovery, improves clinical trials, and optimizes supply chains, resulting in greater efficiency and innovation.

**Keyword:** Artificial intelligence, LSTMs, ALCOA, DQNs, IBM, RXN

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*DIST/2025/144*

# Microsponges-Based Topical Herbal Gel for the treatment of Cellulitis: A Novel Approach for Enhanced Drug delivery

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**Abstract**

Cellulitis is a common illness of the deep layers of the skin, often caused by bacteria like streptococcus and staphylococcus aureus. Although the epidermis activity as a barrier to protect the skin, it can let bacteria into the deeper layers and result in illness. In India, cellulitis affects 6.7% to 21%of the population. According to a research, 7.4%of hospitalised patient in southern India developed cellulitis. Cellulitis is typically managed with antibiotic. Synthetic medicine are successful, but they also have some drawback such as resistance development, adverse effect and environmental issues. Herbal extract–loaded topical gels based on microsponges present a possible substitute to increase treatment effectiveness and reduce systemic side effects. Porous polymeric carriers known as microsponges offer better penetration, extended skin retention, and controlled medication release. In order to treat Cellulitis,herbal medication with strong antibacterial, anti-inflammatory and wound healing qualities,such as Curcuma longa,and Azadirachta Indica are perfect. This study investigates the creation, properties and effectiveness of a herbal gel based on microsponges for the treatment of Cellulitis. The modified formulation showed notable antibacterial effectiveness against the main Cellulitis-causing bacteria, Streptococcus and Staphylococcus aureus, as well as improved skin permeability and prolonged drug release. Studies conducted both in vitro and in vivo verified it's therapeutic potential and safety. This novel strategy may lower the danger of antibiotic resistance while providing a safe, efficient, and patient – friendly substitute for treating Cellulitis.

**Keywords:** Cellulitis, microsponges, topical gel, herbal treatment, controlled drug release, anti-bacterial

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*DIST/2025/145*

# A Comprehensive Review of Nanotechnology Based Nanoemulsion Delivery Systems for Targeted Drug Delivery and Enhanced Therapeutic Efficacy

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**Abstract:**

Herbal medicine is one of the most well established health care practices for thousands of years, providing various therapeutic benefits through plant-derived bioactive compounds. Still, the problems associated with poor bioavailability, instability of active ingredients, and non-targeted delivery reduce the clinical effectiveness of herbal drugs. Nanotechnology has appeared as a breakthrough strategy for overcoming these limitations, primarily through the development of nanoemulsion-based drug delivery systems. Nanoemulsions, fabricated at the nanoscale (1–100 nm), improve solubility, stability, bioavailability, and targeted delivery of plant-derived bioactives. The manuscript reviews the recent advances in nanoemulsion technology for herbal medicine, highlighting nanoencapsulation, controlled drug release, targeted delivery, and co-delivery of multiple therapeutic agents. Some of these herbal constituents, specifically curcumin, oleanolic acid, and flavonoids, encapsulated within nanocarriers, showed significantly enhanced pharmacokinetic profiles, better therapeutic efficacies, and reduced side effects. The applications in the areas of cancer treatment, neurological disorders, and cardiovascular diseases are discussed, in view of the potential revolution to be brought about in the area of precision herbal medicine through nanotechnology. With customized properties, nanoemulsions offer personalized therapies customized for the needs of patients to achieve accurate dosing with site-specific delivery. Despite these promising advancements, challenges such as scalability, long-term safety, and pharmacodynamic characterization must be addressed for clinical translation. The nanoemulsion-based delivery systems represent a paradigm shift in botanical medicine, overcoming traditional formulation limitations and unlocking the full therapeutic potential of plant-based remedies. Continued research and development in this area could significantly enhance patient outcomes and pave the way for next-generation precision herbal therapeutics.

**Keywords:** Revolutionizing herbal medicine, nano drug delivery systems, nanotechnology, nanocarriers, liposomes, targeted delivery

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***DIST/2025/146***

# Prevalence of Vulvovaginal Candidiasis in the 18 to 55 Years Age in a Semi Urban Area in North India

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**Abstract:**

**Objective**: Based on severity and prevalence of vulvovaginal candidiasis (VVC) present study was intended to ascertain the prevalence, distribution, and risk factors associated with VVC in reproductive age of females ranging from 18-55 years.

**Methods:** This cross-sectional study was done for one month and included patients with complaints of vaginal discharge and itching in 18–55 years age. Characteristics included age, parity, risk factors, use of oral contraceptive pills and intrauterine contraceptive device. High vaginal swabs were collected and sent for microscopic examination and culturing. Candida positive cases were noted, and results were analysed.

**Results:** more than 380 high vaginal swabs (HVS) samples exhibited high prevalence of VVC in 36-45 years age group and multiparous women. Frequency of *C. albicans* was found to be more than 75% and non-albicans candida was more than 20%.

**Conclusions:** Present study concludes that VVC is highly prevalent in reproductive age group females, therefore routine HVS culture must be performed in every woman presented with vaginal discharge and itching for early diagnosis.

**Keywords:** High vaginal swab, intrauterine contraceptive device, oral contraceptive pills, vulvovaginal candidiasis

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*DIST/2025/147*

# Detection and Estimation of Quercetin and Gallic Acid in Marketed Poly Herbal Formulation by HPTLC Method

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**Abstract:**

A High Performance Thin Layer chromatographic (HPTLC) method was developed for the qualitative and quantitative estimation of Quercetin and Gallic acid in the marketed formulation BGR-34 tablets. The method was developed using pre-coated HPTLC silica gel 60 F254 as stationary phase and Toluene: ethyl acetate: formic acid: methanol (3:6:1.6:0.4v/v/v/v) as mobile phase. Detection and quantification were performed at 254nm. The Rf values of Quercetin and Gallic acid was found to be 0.85 and 0.75 respectively. Linearity was observed in the concentration range of 0.5 to 2.5µg/spot. The accuracy of the method was confirmed by conducting recovery studies. The average recoveries of both the standards were close to 100% which indicates the accurateness of the method. Quantification of Quercetin and Gallic acid was found to be achieved by HPTLC fingerprinting.

**Keywords:** HPTLC, BGR-34, quercetin, gallic acid

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***DIST/2025/148***

# Antimicrobial Activity of Silver Nanoparticles Synthesised by Biological Method

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**Abstract:**

Silver is naturally having inhibitory action. Hence, silver can be effectively used as an antimicrobial agent. Compared to bulk silver nanoparticles have maximum inhibitory effect because of its high specific surface area. So, silver nanoparticles have been synthesized by biological method using *Agaricus bisporus* and the nanoparticles are screened for its antimicrobial activity against ciprofloxacin and flucinolone after its characterization. The silver nanoparticles can be obtained from cell pellet as well as from the supernatant of the culture. The cell pellet was observed to show maximum inhibition against *S.aureus* whilethe supernatant shows maximum activity against *Escherichia coli*.The cell pellet, supernatant and crude samples showed maximum activity against *Aspergillus parasites.* In future, it's going to be much important to understand biochemical and molecular mechanism of the synthesis of silver nanoparticles and to achieve desired better control over size and polydispersity of the nanoparticles.

**Keywords:** Silver nano particles, *Agaricus bisporus*, disc diffusion

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*DIST/2025/149*

# Investigating the Potential of Chitosan as a Carrier for Antifungal Dry Powder Inhalation Formulation

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**Abstract:**

Pulmonary fungal infections pose a significant threat to individuals with compromised immune systems, necessitating effective and targeted therapeutic interventions. This study investigates the potential of chitosan as a carrier for antifungal dry powder inhalation (DPI) formulations. Chitosan-based DPI formulations were prepared using a spray-drying technique and evaluated for their physicochemical properties, in vitro drug release, and aerosolization performance. The antifungal efficacy and cytotoxicity of the optimized formulations were assessed using in vitro assays. Results showed that chitosan-based DPI formulations demonstrated improved antifungal efficacy, reduced cytotoxicity, and enhanced aerosolization performance. These findings suggest that chitosan is a promising carrier for antifungal DPI formulations, offering a potential therapeutic approach for the treatment of pulmonary fungal infections.

**Keywords:** Chitosan, antifungal, dry powder inhalation, pulmonary fungal infections, targeted drug delivery

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***DIST/2025/150***

# SLN Loaded Hydrogel on Wound Healing

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**Abstract:**

The biological process of wound healing is intricate and requires coordinated action from cells, signaling molecules, and the extracellular matrix. Solid lipid nanoparticles (SLNs) have shown great promise as drug delivery vehicles because of their controlled release characteristics, biocompatibility, and capacity to improve therapeutic efficacy. The benefits of SLNs and the hydrophilic properties of hydrogels are combined in SLN-loaded hydrogels, which create the perfect environment for wound healing. With an emphasis on their formulation, modes of action, and therapeutic advantages, this review investigates the potential of SLN-loaded hydrogels in wound. Care. Drug stability, penetration, and retention at the wound site are improved when bioactive substances like growth factors, antibiotics, and anti-inflammatory drugs are encapsulated within SLNs. The hydrogel matrix speeds up wound healing by promoting collagen synthesis, cell division, and tissue hydration. These systems also lessen oxidative stress and have antibacterial qualities, both of which are essential for avoiding infections and encouraging tissue regeneration. Recent research has shown that SLN-loaded hydrogels are preferable to traditional wound dressings because they increase medication absorption and reduce systemic side effects. To maximize their mechanical qualities and biodegradability, a variety of polymers, including synthetic and natural hydrogels, have been investigated. Research is still being done on issues like scalability in clinical applications, burst drug release, and nanoparticle agglomeration. In summary, SLN-loaded hydrogels combine the advantages of hydrogel matrices and nanocarriers to provide a new and efficient wound healing approach. For them to be widely used in regenerative medicine and advanced wound care, more clinical research is required to determine their long term.

**Keywords:** Medication delivery, hydrogels, solid lipid nanoparticles, wound healing

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***DIST/2025/151***

# Formulation and Evaluation of Gastroretentive Tablets of Acyclovir

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**Abstract:**

The aim of the present study was to formulate and evaluate gastroretentive tablets of acyclovir, an antiviral drug with an oral bioavailability of 30 % (due to its poor absorption from lower gastrointestinal tract) have been designed and optimized. PVPK 90 and carbopol 934 were used as the polymers and sodium bicarbonate as gas generating agent to reduce floating lag time. The tablet formulations were prepared by direct compression method. Estimation of acyclovir in the prepared tablet formulations were carried out with 0.1N HCl and measuring the absorbance at 254 nm. The prepared formulations were further evaluated for hardness, friability, weight variation, drug content, drug excipient interactions, floating lag time, total floating time, *in vitro* drug release studies and drug release kinetic studies. Cumulative percent drug released from optimized formulation F3 was found to be 98.3 % at 9 h. All the five formulations remained buoyant more than 12 h. the kinetic release studies confirmed that Higuchi plot analysis favours F3 formulation. As the slope obtained form Korsmeyers- peppas plot is more than 0.5 and less than 0.89 indicated that the drug release which follows non-fickian diffusion. Tablets containing PVPK 90 and carbopol 934 at a ratio of 1:3 experienced promising floating lag time, total floating time and sustained acyclovir floating tablet release rates indicating an *in-situ* complexation between the two polymers.

**Keywords:** Acyclovir, carbopol, polyvinylpyrrolidone, gastroretentive tablets, direct compression method

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*DIST/2025/152*

# Novel Analytical Method Development and Validation for Simultaneous Estimation of Antidepressant Drugs

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**Abstract:**

The applicability of a quality by design (QbD) approach for the development of sensitive and selective stability-indicating chromatographic methods for simultaneous estimation of Bupropion and Dextromethorphan in synthetic mixture was investigated. DOE was used for method development. Fractional Factorial Design was used to optimize the chromatographic conditions for HPLC method for Bupropion and Dextromethorphan Combination in its synthetic mixture. Stability of the combination was assessed in various degradation conditions like hydrolysis (acid- alkali), oxidation, thermal and photolytic conditions. The optimized methods (HPLC) for the combinations produced shall) peaks with good resolution (>2). The calibration plot of developed method was linear over the selected concentration range with a correlation coefficient value nearer to 0.999. % assay values and % recoveries of drug of combined synthetic mixture was obtained within the limit specified in ICH guidelines i.e. 98-1020 0. Results of stability studies in different conditions for combination indicated that the drugs were susceptible to hydrolysis (acidic and alkaline) whereas comparatively stable. Hence, the proposed method was found to be simple, sensitive, economical, precise and robust and can be applicable to the routine analysis of the selected combination.

**Keywords:** Quality by design, bupropion, dextromethorphan, HPLC

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*DIST/2025/153*

# Role of Inflammatory Pathway in the Pathogenesis of Type 2 Diabetes

Anant Kumar[1*], Arvind Kumar[2], Vaishali[2], Bhuwanendra Signh[3], Himja Pundir[3], Supriya Garg[3], Pratiksha Tyagi[3], Harshit Jain, Km Nargis[1]

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**Abstract:**

A significant healer to type 2 diabetes, nutritional excess enhance insulin secretion while decreasing its metabolic interventions in the liver, skeletal muscle, and adipose tissue. The timing of these processes during the development of obesity and diabetes is unclear, and this is a significant knowledge gap in metabolic illness, as evidenced by inconsistent data. Type 2 diabetes/glucose intolerance, obesity, dyslipidemia, and hypertension are among the clinical manifestations that exhibit insulin resistance and are collectively referred to as the metabolic syndrome. Consuming plant-based foods is crucial for promoting health, particularly in relation to managing and preventing chronic illnesses. In addition to modulating signaling pathways linked to glucose uptake and insulin sensitivity that are implicated in the pathophysiology of diabetes and its associated complications, phytoconstituents found in plant-based foods also control biomarkers of glycemic control, lipid profiles, renal function, hepatic enzymes, and antioxidant enzymes. This article examines recent research with an emphasis on inflammatory processes that trigger the pathophysiology of type 2 diabetes, Furthermore, a new avenue for improved type 2 diabetes treatment may be opened by an understanding of the inflammatory responses in the disease.

**Keywords:** Diabetes, insulin resistance, glucose, phytoconstituents

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***DIST/2025/154***

# Diabetes and Herbal Remedies

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**Abstract:**

Diabetes mellitus is, a group of illnesses which is characterized by elevated glucose levels and glucose intolerance. These conditions might be caused due to insulin insufficiency, decreased insulin activity, or a combination of these. Diabetes must be understood in the context of the regular physiological processes, that take place before, during, and after meals. Nutrients, such as proteins, fats, and carbohydrates, are absorbed into the bloodstream during the digestion process of food. A carbohydrate called sugar instructs the endocrine pancreas to release the hormone insulin. Type I diabetes refers to a condition in which the pancreas destroys beta cels, resulting in diabetes mellitus, and in which "insulin is required for survival" to inhibit the onset of ketoacidosis, coma, and death. Insulin resistance is associated with Type-Il diabetes in which the body does not respond to insulin as it should. The oldest known medical practice to treat patients is herbal therapy. Throughout history, all civilizations have employed herbs. There are many herbal plants and their parts which are having antidiabetic activity. Some of which are Beta Vulgaris, Musa sapient, hibiscus rosa-sinesis, Eugenia uniflora, vinca rosea, Punica granatum, Momordica charantia and many others. Using herbal medicines for type-2 diabetes can be useful as they have less to no effect and they are comparatively cheaper. There are already many formulated herbal drugs in the market which are a better alternative.

**Keywords:** Insulin, nutrients, civilizations, intolerance, herbal

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*DIST/2025/155*

# Different Models for Studying Wound Healing and their Respective Evaluation Parameters

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**Abstract:**

Wound healing is a complex process crucial for restoring damaged tissues. Various models, including In Silico, In Vitro, Ex Vivo, and In Vivo models, are utilized to understand and develop effective treatments. In Silico Models use computational simulations to predict outcomes and test interventions, focusing on accuracy, parameter sensitivity, and efficiency. They provide a cost-effective method for initial screening. In Vitro Models involve cell cultures to replicate cellular and molecular mechanisms in a controlled environment. Evaluation parameters include cell viability, proliferation, migration, and protein expression. Ex Vivo Models use tissue samples to study healing in a realistic tissue context

while maintaining controlled conditions. Parameters such as tissue integrity, inflammatory response, angiogenesis, and collagen deposition are essential. In Vivo Models involve animal studies to understand wound healing in a biologically active environment. Key parameters include wound size reduction, tissue color changes, suppuration, swelling, haemostasis, and protease activity. These models collectively advance our understanding of wound healing, guide research, and aid in developing effective treatments, ultimately improving patient outcomes. Leveraging the strengths of each model creates a synergistic approach to wound healing research**.**

**Keywords**: Wound healing, in silico, in vitro, ex vivo, in vivo

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***DIST/2025/156***

# Formulation and Evaluation of a Polyherbal Gel for Anti-Arthritic Relief

Supriya Garg[1*], Vaishali[2], Arvind Kumar[2], Bhuwanendra Singh[1], Anant Kumar[3]

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**Abstract:**

This study explores the development of a polyherbal gel using *Boswellia serrata*, *Zingiber officinalis*, *Withania somnifera*, and *Curcuma longa*, plants known for their significant anti-inflammatory, analgesic, and anti-arthritic properties. Each plant has been traditionally used to alleviate symptoms of arthritis, with *Boswellia serrata* and *Curcuma longa* showing potent anti-inflammatory effects, *Zingiber officinalis* providing pain relief, and *Withania somnifera* offering joint protection and muscle relaxation. The gel was formulated by extracting the bioactive compounds from these plants, including boswellic acids, curcumin, gingerols, and withanolides, and incorporating them into a gel base. Phytochemical screening revealed the presence of alkaloids, flavonoids, terpenoids, and phenolic compounds, which contribute to the therapeutic properties. In vitro evaluations of the gel's anti-arthritic activity confirmed its potential to reduce inflammation and pain, with a synergistic effect from the combined extracts. Additionally, the gel demonstrated excellent skin compatibility, with minimal irritation and good absorption. This polyherbal gel offers a promising natural alternative for the management of arthritis and related inflammatory conditions. Further clinical trials are recommended to assess its full therapeutic potential and safety.

**Keywords:** Anti-arthritic, polyherbal gel, joint protection, anti- inflammatory

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*DIST/2025/157*

# Unravelling the Molecular Mechanisms and Pharmacological Properties of Carvarol and Thymol in Diabetes Mellitus: Current Challenges and Future Prospects

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**Abstract:**
A major worldwide health concern is diabetes mellitus, a chronic metabolic disease marked by increased levels of glucose in the blood brought on by impaired insulin synthesis or action. Recent studies demonstrate the potential of natural substances, especially phenolic monoterpenoids like carvacrol and thymol, which are present in oregano and thyme essential oils, in the treatment of diabetes. These substances demonstrate a variety of anti-hyperglycemic effects via various molecular routes, such as oxidative stress adjustment, insulin sensitivity augmentation, and control of important glucose metabolic pathways. Their strong antioxidant qualities protect insulin secretion and beta-cell integrity by scavenging reactive oxygen species and lowering lipid peroxidation, which mitigates oxidative stress, a major cause of pancreatic beta-cell failure. Furthermore, through the PI3K/AKT and AMPK signaling pathways, carvacrol and thymol increase insulin sensitivity, which aids in better glucose absorption and metabolic control. By addressing chronic inflammation, a key contributor to insulin resistance and diabetic complications, anti-inflammatory actions further enhance their curative abilities. Pharmacological studies show that thymol has a poor bioavailability and carvacrol has a moderate bioavailability; nevertheless, nanotechnology techniques show promise for improving these bioavailabilities. Their safety profile shows little toxicity at therapeutic dosages, and when used in combination with other antidiabetic medications, especially metformin, they show increased effectiveness. There are still issues with dose uniformity, drug purity fluctuation, and long-term safety, despite promising preclinical data from in vitro and animal research. To close the translational gap between lab results and clinical practice, future research should focus on the creation of precision medicine methodologies, enhanced pharmaceutical formulations, and combinatorial medicines. Carvacrol and thymol are natural substances that provide a great deal of promise for novel, a plant-based therapeutic approaches when included into traditional diabetic care.

**Keywords:** Diabetes mellitus, carvacrol, thymol, anti-hyperglycaemic, oxidative stress, insulin sensitivity.

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***DIST/2025/158***

# Comparative Analysis of Genotypic and Phenotypic Techniques for Rapid Identification of MRSA in Clinical Specimens

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**Abstract:**

Methicillin Resistant Staphylococcus aureus (MRSA) is a significant nosocomial pathogen that has been a leading cause of nosocomial and community-acquired infections over the last three decades. For rapid choices on successful antimicrobial treatment, MRSA in clinical specimens must be accurately and quickly identified. The purpose of this study was to compare two traditional genotypic and phenotypic techniques: the polymerase chain reaction (PCR) for the mecA gene (as the gold standard) and the oxacillin disk diffusion (ODD) method. The current study outlines a quick and precise PCR method for identifying Staphylococcus aureus antibiotic resistance genes that are clinically significant. In addition to reviewing MRSA evaluation and management, this activity emphasizes the importance of the interprofessional team in identifying and treating this illness.

**Keywords:** Methicillin-resistant staphylococcus aureus, PCR, oxacillin disk diffusion test, nosocomial infection

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***DIST/2025/159***

# Phytochemical Screening and Evaluations of *In-vitro* Antioxidant Activities of Ethanolic Extracts of *Cocos nucifera* (l.) Leaves

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**Abstract:**

The *Cocos nucifera* (L.) (Arecaceae) is commonly called the ‘‘coconut tree’’ and is the most naturally widespread fruit plant on Earth. Throughout history, humans have used medicinal plants therapeutically, and minerals, plants, and animals have traditionally been the main sources of drugs. The objective in the present study was to screen the phytochemical profile and antioxidant activities of Pet Ether, Aqueous and ethanolic extract of coconut leaves. The phytochemical analysis of ethanolic extract of coconut leaves showed that they contained significant presence of flavonoids, phenols, saponins, terpenoids and triterpenes. Alkaloids, glycosides and tannins are also present. Quantitative evaluations show significant presence of phenols which was more than tannin content. The objective in the present study was to screen the phytochemical profile and Antioxidant activities of ethanolic extract of coconut leaves.

***Methods:*** To investigate phytochemical screening and in-vitro antioxidant activities DPPH scavenging assay Hydroxyl Radical Scavenging Activity, Superoxide radical scavenging activity methods were performed for antioxidant activities respectively.

***Results:*** The Phytochemical studies revealed that the plant extracts may have significant antioxidant effect which is probably mediated by inhibition of DPPH free radical. The IC50 values by DPPH scavenging assay observed for standard and leaves were 240.29 µg/ml and 470 µg/ml. This plant extracts have significant antioxidant effect. Superoxide radical scavenging activity IC50 value of 280 µg/ml and 70 µg/ml. Hydroxyl Radical Scavenging Activity IC50 value of 305 µg/ml and 410 µg/ml respectively.

**Keywords:** Antioxidant, anti-inflammatory, *Cocos nucifera*, IC50 values, phenols, tannin content, DPPH, hydroxyl radical scavenging activity, superoxide radical scavenging activity

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***DIST/2025/160***

# Pharmacy Practice in the Multidisciplinary Healthcare Team: Collaboration and Patient Outcomes

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**Abstract:**

Multidisciplinary Healthcare Teams (MHTs) refer to teams composed of various healthcare professionals (e.g., physicians, nurses, pharmacists, dietitians, social workers) who collaborate to provide patient-centered care. The growing complexity of healthcare has underscored the importance of these teams in addressing patients' multifaceted needs. Pharmacists contributes to the team by ensuring safe, effective, and optimal use of medications. Their expertise in pharmacotherapy, drug interactions, and patient education is essential. Hospital and acute care settings (paediatrics), medication therapy management (speciality) and medication safety, patient education and adherence, chronic disease management. Communication barriers, role confusion and time and resource constraints. Implementing regular interdisciplinary education programs can promote a better understanding of each profession's role and enhance communication. Role clarification and defined responsibilities role delineation helps ensure that each healthcare provider's strengths are fully utilized. The integration of clinical pharmacists into multidisciplinary healthcare teams significantly improves patient outcomes by enhancing medication safety, optimizing pharmacotherapy, and contributing to better disease management. While challenges to effective collaboration exist, strategies such as clear role definition, better communication, and technology integration can address these barriers and enhance the impact of pharmacists on patient care.

**Keywords:** Pharmacy practice, healthcare, multidisciplinary healthcare teams, pharmacotherapy, drug interactions

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***DIST/2025/161***

# Stress Management

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**Abstract:**
Stress management refers to the strategies and techniques used to control and reduce stress for improved mental and physical well-being. Chronic stress can lead to serious health issues, including anxiety, depression, and cardiovascular diseases. Effective stress management involves a combination of psychological, behavioral, and lifestyle approaches. Techniques such as mindfulness, meditation, exercise, time management, and social support play a crucial role in reducing stress levels. Additionally, healthy habits like balanced nutrition and proper sleep contribute to resilience against stress. By understanding stress triggers and applying effective coping mechanisms, individuals can enhance their overall quality of life and productivity.

**Keywords:** Stress, mental, anxiety, depression, cardiovascular diseases, quality of life

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***DIST/2025/162***

# Pharmacological, and Phytochemical Profile of *Tectona grandis* Linn (Verbenaceae) – A Comprehensive Review

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**Abstract:**

*Tectona grandis*, commonly known as teak, holds a prestigious status among timber plants globally and is a member of the Verbenaceae family. Teak wood is highly valued for its exceptional qualities, including durability, stability, and aesthetic appeal, making it a preferred choice for various applications such as furniture, flooring, shipbuilding, and construction valued for its remarkable hardness and resistance to deterioration even in the absence of paint or preservatives. Although this plant is locally referred to as Sagon, Sagwan, it is popularly called teak. Furthermore, teak is regarded as a key component in a large number of traditional remedies. It is known that teak has a significant role in numerous traditional remedies, underlining its historical importance in traditional healing practices. In addition, teak is regarded as a key ingredient in some traditional remedies. *Tectona grandis* Linn. Commonly known as teak, possesses a plethora of pharmacological properties, making it a valuable resource in traditional and modern medicine. Research indicates that teak exhibits antipyretic, analgesic, antibacterial, antioxidant, antifungal, anti-inflammatory, and anti-diuretic hypoglycaemic effects when utilized medicinally. These diverse pharmacological activities stem from the rich phytochemical composition of teak, including phenolic compounds, flavonoids, tannins, terpenoids, and alkaloids.

**Keywords:** *Tectona grandis*, teak wood, verbenaceae, antipyretic, analgesic, antibacterial, antioxidant, antifungal, anti-inflammatory, anti-diuretic, hypoglycaemic

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***DIST/2025/163***

# Therapeutic and Pharmaceutical Potential of Nigella sativa and Its Bioactive Constituents in Chronic Inflammatory Diseases: Progress, Challenges, and Future Perspectives

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**Abstract:**

Black cumin, or *Nigella sativa*, is well known for its many therapeutic uses, especially in the treatment of inflammation and as a possible permeation enhancer for medication administration. The phytochemical profile of *Nigella sativa* is examined in this study, with particular attention paid to bioactive substances like thymoquinone, which have strong anti-inflammatory properties by reducing oxidative stress, inhibiting pro-inflammatory enzymes, and modifying cytokine synthesis. The capacity of *Nigella sativa* to improve the penetration of medicinal substances across biological barriers including skin and mucosa is investigated. Because of its multiple uses, *Nigella sativa* is a good choice for pharmaceutical applications, when it comes to creating formulations that work well together to treat chronic inflammatory illnesses. There is also discussion of future prospects that emphasize the need for cutting-edge research and creative drug delivery technologies, as well as challenges including standardization barriers, insufficient clinical data, and variability in bioactive content. By offering a thorough grasp of *Nigella sativa's* medicinal potential, this review hopes to facilitate the plant's incorporation into contemporary medicine and drug research.

**Keywords:** *Nigella sativa*, black cumin, anti-inflammatory, thymoquinone

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***DIST/2025/164***

# Chloroquine as an Antimalarial Drug

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**Abstract:**

Chloroquine, a 4-aminoquinoline derivative, has been widely used as an antimalarial drug for decades. It is highly effective against *Plasmodium vivax*, *P. ovale*, *P. malariae*, and sensitive strains of P. falciparum by interfering with the parasite's heme detoxification process within red blood cells. However, due to widespread resistance, particularly in P. falciparum, its efficacy has declined, leading to the adoption of alternative treatments such as artemisinin-based combination therapies (ACTs). Despite resistance issues, chloroquine remains relevant in certain regions and is also investigated for its anti-inflammatory and antiviral properties. Further research continues to explore its potential in combination therapies and other medical applications.

**Keywords:** Chloroquine, *Plasmodium vivax*, *P. ovale*, *P. malariae*, antimalarial drug, anti-inflammatory, antiviral

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***DIST/2025/165***

# Vaccines and Pharmaceuticals in Emerging Health Challenges

Preety Vishnoi*, Jolly Chauhan

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**Abstract:**

Emerging infections provide serious obstacles to global health, requiring the creation of novel vaccines and immunization protocols. Even while it works well, traditional vaccine development techniques can take a long time, which might make it more difficult to respond quickly to epidemics. Recent developments, such as protein subunit vaccines, viral vector vaccines, and mRNA vaccines, have shown the capacity to improve efficacy and speed up development. The effectiveness of mRNA vaccines against COVID-19 is proof that they have transformed the field by facilitating quick design and production. Viral vector vaccines have demonstrated potential in generating strong immune responses by using altered viruses to transport antigens. Protein subunit vaccines provide a focused strategy with possibly fewer side effects by stimulating immunity with particular antigens. Furthermore, vaccination durability and immune response have been enhanced by developments in adjuvant technology and delivery methods. Finding new antigens and creating efficient vaccinations have been made even easier by the combination of genetic and bioinformatics technologies.

The range of vector-borne diseases is increased as a result of climate change, which also changes the distribution of vectors like mosquitoes. Furthermore, previously treated illnesses reappear as a result of antimicrobial resistance brought on by excessive use of antibiotics and other antimicrobials. Past achievements, including the elimination of smallpox and the notable decline in polio and measles infections, highlight how important vaccines are to world health. In order to ensure equitable vaccine delivery and access, infrastructure investments, healthcare personnel training, and community participation are essential. Evidence-based communication tactics that foster trust and dispel myths are necessary to address vaccine reluctance. When it comes to vaccination deployment, ethical considerations emphasize the significance of informed consent, openness, and fair distribution. The regulatory framework required to enforce orders and protect public health in times of medical emergency is provided by legal frameworks.

**Keywords:** Vaccines, diseases, vaccination, global health

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***DIST/2025/166***

# Antimicrobial Resistance in Bacteria

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**Abstract:**

Antimicrobial resistance (AMR) is defined as the ability of microorganisms to withstand the effects of antibiotics. It is considered to be a universal threat to humans, animals and the environment. One of the most important achievements in medical history is thought to have been the discovery of antibiotics. For many years, the treatment of numerous bacterial illnesses has been guaranteed by their usage in both human and animal health care. However, their apparent overuse in medical and veterinary applications is making them less effective, and the growing emergence and global spread of antimicrobial resistance (AMR), which happens when bacteria resist the effects of antimicrobial treatments, has raised serious concerns. Numerous studies have shown that bacteria employ both genetic and phenotypic methods, which allow for both the production of mechanisms that increase resistance to the antibacterial chemicals used and a natural defense against antibiotics. There are several forms of antimicrobials, which function against different types of microorganisms, such as antibacterials or antibiotics against bacteria, antivirals against viruses, antiparasitics against parasites, and antifungals against fungi. AMR is one of the major worldwide public health issues in the 21st century, which demands action across all government sectors and society. Bacterial ability to become resistant to antimicrobial drugs makes treating bacterial infections more difficult. Frequently, antimicrobial drugs are grouped based on their primary mode of action. The mechanisms involve disruption of bacterial membrane structure (polymyxins and daptomycin), inhibition of protein synthesis (macrolides and tetracyclines), interference with nucleic acid synthesis (fluoroquinolones and rifampin), inhibition of a metabolic pathway (trimethoprim-sulfamethoxazole), and interference with cell wall synthesis (e.g., β-lactams and glycopeptide agents). In the veterinary and agricultural fields, antibiotics that are essential to human treatment should be handled carefully. Nevertheless, in several nations worldwide, they are frequently utilized as growth enhancers for fish and animals. Strong infection prevention and control measures, such as regular vaccinations, stewardship programs that offer pertinent training and assistance to medical personnel in adhering to evidence-based guidelines for the prescription and administration of antibiotics, as well as the use of diagnostic tests to ensure targeted treatment, and the prudent use of antibiotics in agriculture and food production are all ways to slow the spread of AMR.

**Keywords:** Antimicrobial resistance, polymyxins, daptomycin, tetracycline

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# Formulation Development and Evaluation of Bi-Layer Tablets Containing Metformin Hydrochloride and Sitagliptin Phosphate for the Management of Type 2 Diabetes Mellitus

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**Abstract:**

The objective of this study was to design and evaluate bi-layer tablets containing metformin hydrochloride (MH) and sitagliptin phosphate (SP) for the management of type 2 diabetes mellitus. Bi-layer tablets were prepared using a combination of wet granulation and direct compression methods. The tablets were evaluated for their physical characteristics, such as hardness, thickness, friability, and weight variation. The in vitro release studies were performed using a USP dissolution apparatus. The results showed that the bi-layer tablets exhibited a biphasic release pattern, with an initial rapid release of SP followed by a sustained release of MH. The optimized formulation met the required standards of quality, and the release profile was found to be comparable with the innovator product. Stability studies were conducted on the optimized formulation, and the results indicated that the bi-layer tablets were stable for a period of 6 months. This study demonstrates the feasibility of developing bi-layer tablets containing MH and SP, which can provide an effective treatment option for patients with type 2 diabetes mellitus.

**Keywords:** Bi-layer tablets, metformin hydrochloride, sitagliptin phosphate, type 2 diabetes mellitus.

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# Formulation Development and Evaluation of Immediate Release Bilayer Tablets Containing Amlodipine Besylate and Losartan Potassium for the Management of Hypertension

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**Abstract:**

The objective of this study was to design and evaluate immediate release bilayer tablets containing amlodipine besylate (AML) and losartan potassium (LOS) for the management of hypertension. Bilayer tablets were prepared using a combination of wet granulation and direct compression methods. The tablets were evaluated for their physical characteristics, such as hardness, thickness, friability, and weight variation. The in vitro release studies were performed using a USP dissolution apparatus. The results showed that the bilayer tablets exhibited a rapid release of both AML and LOS, with more than 80% of the drug released within 30 minutes. The optimized formulation met the required standards of quality, and the release profile was found to be comparable with the innovator product. Stability studies were conducted on the optimized formulation, and the results indicated that the bilayer tablets were stable for a period of 6 months.

**Keywords:** Immediate release bilayer tablets, amlodipine besylate, losartan potassium, hypertension

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# Formulation Development and Evaluation of Immediate Release Bilayer Tablets Containing Aspirin and Clopidogrel as Antiplatelet Drugs for the Prevention of Cardiovascular Events

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**Abstract:**

The objective of this study was to design and evaluate immediate release bilayer tablets containing aspirin (ASP) and clopidogrel (CLP) as antiplatelet drugs for the prevention of cardiovascular events. Bilayer tablets were prepared using a combination of wet granulation and direct compression methods. The tablets were evaluated for their physical characteristics, such as hardness, thickness, friability, and weight variation. The in vitro release studies were performed using a USP dissolution apparatus. The results showed that the bilayer tablets exhibited a rapid release of both ASP and CLP, with more than 80% of the drug released within 30 minutes. The optimized formulation met the required standards of quality, and the release profile was found to be comparable with the innovator product. Stability studies were conducted on the optimized formulation, and the results indicated that the bilayer tablets were stable for a period of 6 months. This study demonstrates the feasibility of developing immediate release bilayer tablets containing ASP and CLP, which can provide an effective treatment option for patients at risk of cardiovascular events.

**Keywords:** Immediate release bilayer tablets, aspirin, clopidogrel, antiplatelet drugs cardiovascular disease

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***DIST/2025/170***

# Research innovations and Intellectual Property rights

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## Abstract

Innovation is the cornerstone of progress in science, technology, medicine, and industry. As research efforts continue to accelerate worldwide, protecting the outcomes of these innovations has become increasingly vital. Intellectual Property Rights (IPR) provide a legal framework that safeguards the creations of inventors, researchers, and entrepreneurs, encouraging further innovation by ensuring recognition and economic benefits. This abstract explores the intricate relationship between research innovations and IPR, highlighting how robust intellectual property systems promote creativity, investment, and commercialization of new technologies. It also examines the challenges researchers face in navigating complex patent landscapes, ensuring novelty, and maintaining compliance with international IPR laws. With an increasing emphasis on interdisciplinary research and global collaborations, securing intellectual property has become more nuanced, necessitating strategic planning and awareness among innovators. Furthermore, the role of academic institutions, startups, and government policies in fostering an innovation-driven IP culture is discussed. The abstract underscores the importance of early-stage IP education, technology transfer offices, and legal support in bridging the gap between research and market readiness. By recognizing the dual role of IPR as a protector and promoter of research outputs, this study advocates for stronger integration of IP considerations in the research lifecycle. Ultimately, fostering a research ecosystem that values both innovation and intellectual property is essential for sustainable development, economic growth, and societal benefit.

**Keywords:** Innovation, Intellectual Property Rights, Patent Protection, Technology Commercialization, Research Ecosystem

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