

Frontiers in Pharmaceutical, Material, and Environmental Sciences: Innovative Approaches and Applications

Editors

Tahmeena Khan

Qazi Inamur Rahman

Nafees Ahmad

Shahla Tanveer

*Department of Chemistry,
Integral University, Lucknow*



No part of this publication may be reproduced, transmitted or stored in a retrieval system, in any form or by any means, electronic, mechanical, photocopying recording or otherwise, without the prior permission of the author.

Published by: - Book Rivers

Website: - <https://www.bookrivers.com>

Email: publish@bookrivers.com

1st Print Edition - 2026

Copyright©: Editors

Title: *Frontiers in Pharmaceutical, Material, and Environmental Sciences: Innovative Approaches and Applications*

Editors: *Tahmeena Khan, Qazi Inamur Rahman, Nafees Ahmad, Shahla Tanveer*

All Rights Reserved

ISBN: 978-93-6884-630-7

MRP: 370/-INR

(Printed in India)

Contents

Chapter 1 Formulation and Evaluation of Telmisartan Sustained-Release Tablets **1 - 18**

Suraj Kumar, Mohd Arsh Khan, Sabahat Yasmeeen Sheikh, Firoz Hassan

- Introduction
- Method of Preparation of Granules and Tablets
- Hypertension
- Mechanism of Action
- Preparation of tablets by direct compression
- Drug Profile
- Conclusion

Chapter 2 Synthesis of p-Toulenesulfonylisocyanate and amines with acetonitrile solvent **19 - 30**

Afifa Baig, Mohd Arsh Khan, Fiza Farooqui, Malik Nasibullah, Jamal Akhtar Ansari

- Introduction
- Material and Method
- Result and Discussion
- Conclusion

Chapter 3 Nanoparticle-Mediated Removal of Polycyclic Aromatic Hydrocarbons (PAHs) **31 - 52**

Hammnah Ali, Naseem Ahmad, Arshad Iqbal, Nafees Ahmad, Abdul Rahman Khan, Iqbal Azad

- Introduction
- Nanotechnology
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Environmental Protection Agency (EPA)
- Conclusion

Chapter 4 Coumarin: A Versatile Therapeutic Agent **54 - 64**

Mohammad Imran Ahmad

- Introduction
- Classification of Coumarins
- Pharmacological Applications of Coumarin
- Conclusion

Chapter 5 Synthesis of oxindole Schiff's base derivatives: Drug likeness and ADMET Studies **65 - 78**

Mohammad Amir, Ayesha Anwer, Umme Habiba Malik, Malik Nasibullah

- Introduction
- Review of Literature
- Chemistry of Oxindoles
- Result and Discussion
- Computational chemistry
- Conclusion

Chapter 6 Fabrication, characterization and adsorption kinetics of Polyaniline towards organic pollutant **79 - 88**

Fiza Khan, Amrita, Adeeba Meraj, Nafees Ahmad

- Introduction
- Contaminants removed by Polyaniline
- Synthesis of Polyaniline (PANI)
- Results and discussion
- Conclusion

Chapter 7 Influence of Plasticizers on Thermoplastic Starch (TPS) Properties developed from Polystyrene **89 - 100**

Suneel, Devendra Pratap Mishra

- Introduction
- Synthesis of Thermoplastics starch (TPS) and Sheet
- Characterization
- Thermogravimetric analysis
- Conclusion

Chapter 8 Extraction of Piperine from Black Pepper **101 - 118**

Saimah Khan, Zeba Ali Mumtaj, Mohd Arsh Khan

- Introduction
- Materials and methods
- Methods of extraction of Piperine
- Isolation
- Result and Discussion
- Conclusion

Chapter 9 Removal of Orange G and Heavy Metals using Chitosan-coated Bamboo Biochar **119 - 137**

Abdul Faiz Ansari, Iqbal Azad, Naseem Ahmad

- Introduction
- Materials and methods
- Result and Discussion
- Conclusion

Chapter 10 Synthesis and Characterization of some Thiosemicarbazones and their Complexes **138 - 155**

Atiya Khan, Tahmeena Khan

- Introduction
- Metal ligand complexes and their utility
- Transition metal complexes
- Transition metal complexes of thiosemicarbazones
- Antifungal activity
- Antiviral activity
- Computational Drug likeness assessment
- Conclusion

Chapter 11 An Introduction to Chalcone Derivatives as Antimicrobial Agents **156 - 172**

Chandra Shekhar Yadav, Minaxi B. Lohani

- Introduction
- Naturally occurring chalcones
- Synthetic chalcones
- Chalcones with antimicrobial activity
- Future aspects
- Conclusion

CHAPTER – 3

Nanoparticle-Mediated Removal of Polycyclic Aromatic Hydrocarbons (PAHs)

**Hammnah Ali¹, Naseem Ahmad¹, Arshad Iqbal², Nafees Ahmad¹,
Abdul Rahman Khan¹, Iqbal Azad^{1*}**

¹*Department of Chemistry, Integral University, Lucknow-226026, U.P.,
India*

²*Department of Physics, Integral University, Lucknow-226026, U.P.,
India*

*Corresponding email: iazad@iul.ac.in

Abstract

Nano-biocomposite remediation represents an innovative nanotechnological approach that utilizes biosynthesized nanoparticles for effective pollutant remediation. This technique leverages advanced biochar-blend nanoparticles, including nanobiochar and nanocomposites, to provide sustainable solutions to contemporary environmental challenges. By combining the benefits of biochar and nanoparticles, these materials exhibit enhanced performance due to their active functional groups, porous structure, high surface area, catalytic degradation capabilities, and ease of pollutant recovery or separation. This chapter focuses on the remediation of toxic pollutants, particularly polycyclic aromatic hydrocarbons (PAHs), highlighting the efficacy of this method as a viable bioremediation strategy.

Keywords: Remediation; Green synthesis; Organochlorine pesticides; Polycyclic Aromatic Hydrocarbons; Nanoparticles.

- [31] T.M. Mogashane, J.P. Maree, L. Mokoena, Adsorption of Polycyclic Aromatic Hydrocarbons from Wastewater Using Iron Oxide Nanomaterials Recovered from Acid Mine Water: A Review, *Miner.* 2024, Vol. 14, Page 826 14 (2024) 826. <https://doi.org/10.3390/MIN14080826>.
- [32] S. Sher, M. Waseem, M.K. Leta, Review of Techniques for the Removal of Polycyclic Aromatic Hydrocarbons from Produced Water, *Environ.* 2023, Vol. 10, Page 40 10 (2023) 40. <https://doi.org/10.3390/ENVIRONMENTS10030040>.