Perspectives of Medicinal, Material and Environmental Chemistry

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PREFACE

Chemistry is central to scientific advancement, connecting fundamental knowledge with applications in health, materials, and environmental sustainability. *Perspectives of Medicinal, Material and Environmental Chemistry* presents current research and emerging trends that demonstrate the vital role of chemical sciences in drug discovery, functional materials, green technologies, and environmental remediation.

This book integrates experimental, computational, and analytical approaches, covering the synthesis and biological relevance of key organic compounds alongside recent developments in nanotechnology, metal–organic frameworks, and photocatalysis. It also highlights green chemistry strategies such as plant-mediated nanoparticle synthesis, biochar-based materials, and sustainable extraction from natural resources.

The inclusion of computational chemistry and ADMET studies reflects the growing importance of in silico tools in predicting molecular behavior and improving research efficiency. Environmental perspectives, including dye degradation and sustainable material design, further emphasize chemistry's contribution to pollution control and sustainable development.

TABLE OF CONTENTS

Chapters	Title	Page No.
Chapter 1	Computational Studies of (*E*)-Chalcone and (*E*)-3-(2-Hydroxyphenyl)-1-Phenylprop-2-En-1-One and Their Metal Complexes ***Aakash Verma, Mohammad Imran Ahmad, Tahmeena Khan***	**1-13**
Chapter 2	The Study on Extraction Process and Analysis of Components in Black Pepper and White Pepper ***Saimah Khan, Afifa Baig, Abdul Rahman Khan***	**14-32**
Chapter 3	Green Synthesis of Iron Nanoparticles Supported on Biochar ***Iqbal Azad, Hammnah Ali, Arshad Iqbal, Nafees Ahmad, Abdul Rahman Khan, Naseem Ahmad***	**33-61**
Chapter 4	Green Nanotechnology for Sustainable Development: Plant-Mediated Nanoparticle Synthesis and Applications ***Mohd Arsh Khan, Qazi Inamur Rahman, Abdul Rahman Khan***	**62-81**
Chapter 5	Synthesis, Characterization, Pharmacokinetics & Admet Studies of Schiff Bases ***Ayesha Anwer, Mohammad Amir, Umme Habiba Malik, Malik Nasibullah***	**82-98**
Chapter 6	A Computational Study of Chalcone Derived Cu(II) And Zn(II) Complexes ***Supreet, Tahmeena Khan, Mohammad Imran Ahmad***	**99-118**

Chapter 7	Development of A Zinc-Based Metal-Organic Framework for Efficient Photocatalytic Degradation of Rhodamine B Dye ***Naseem Ahmad, Lubna Tarique, Abhi, Neda Afreen, Nafees Ahmad***	**119-129**
Chapter 8	Isatin and Its Analogues as Promising Biological Agents ***Mohd Arsh Khan, Ziaul Husain, Sabahat Yasmeen Sheikh, Firoj Hassan***	**130-152**
Chapter 9	An Introduction to The Synthesis of Biologically Active Chalcones ***Mohd Akil, Naseem Ahmad, Kajal Singh, Shruti Srivastava, Abdul Rahman Khan, Iqbal Azad***	**153-172**
Chapter 10	Gc-Ms Profiling and Antioxidant Activity of Musa Paradisiaca L. Peels Fractions ***Azeem Fatima, Mohd Arsh Khan, Shahzadi Bano, Abdul Rahman Khan, Jamal Akhtar Ansari***	**173-188**

CHAPTER – 8

Isatin and its Analogues as Promising Biological Agents

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Abstract

The synthesis of isatin derivatives hold significant potential in various fields, particularly in pharmaceuticals and materials science. The synthesis of isatin derivatives represents a significant area of research with promising implications across various fields including medicinal chemistry, materials science, and organic synthesis. Through this, we have delved into the intricate methodologies and strategies employed in the synthesis of these compounds, aiming to provide a comprehensive overview of the advancements, challenges, and future prospects in this domain. Our investigation began with an exploration of the significance of isatin derivatives, highlighting their diverse biological activities and potential therapeutic applications. Structure-activity relationship (SAR) analysis was conducted to correlate the chemical modifications with observed biological activities, providing a foundation for future optimization and development. In conclusion, this chapter contributes to the growing body of knowledge on isatin chemistry, offering new insights into the synthesis, and potential applications. The findings underscore the importance of tailored chemical modifications in enhancing the properties and functionalities of isatin-based compounds.

[17] Bagnyukova, T. V., Serebriiskii, I. G., Zhou, Y., Hopper-Borge, E. A., Golemis, E. A., & Astsaturov, I. (2010). Chemotherapy and signaling: How can targeted therapies supercharge cytotoxic agents?. *Cancer biology & therapy*, *10*(9), 839-853.