



**"CHEMICAL SCIENCES AT THE
NEXUS OF SUSTAINABILITY:
BRIDGING DISCIPLINES"**

EDITORS:
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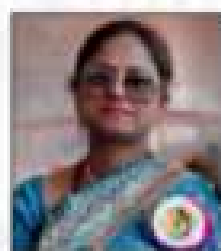
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PREFACE

This edited volume brings together a diverse collection of scholarly contributions addressing some of the most pressing challenges at the intersection of environmental science, chemistry, health, and sustainability. The chapters in this book reflect a multidisciplinary approach, highlighting recent advancements, innovative methodologies, and practical solutions that aim to build a more sustainable and resilient future.

The book begins with discussions on air pollution, climate change, and their far-reaching impacts on human health and ecological systems. It further explores critical topics such as water quality assessment, climate change effects on aquatic life, and the transmission dynamics of infectious diseases. These contributions highlight the importance of integrated frameworks and global collaboration.

A significant portion of the volume is dedicated to advancements in green chemistry, sustainable materials, nanotechnology, and catalysis, showcasing their potential in addressing environmental and industrial challenges. The role of phytochemicals, bioactive compounds, and natural resources in improving health and sustainability is also thoroughly examined.

In addition, the book covers emerging research in waste management, circular economy approaches, environmental monitoring, and ecological restoration, including coral reef conservation and sustainable water resource management. The inclusion of chapters on advanced

materials, pharmacological compounds, and computational studies further broadens the scientific scope of this volume.

The editors sincerely acknowledge the valuable contributions of all authors whose efforts have made this compilation possible. It is hoped that this book will serve as a useful resource for researchers, academicians, and students, inspiring further research and innovation in the pursuit of sustainable development.

ACKNOWLEDGEMENT

The editors express their sincere gratitude to all the authors for their valuable contributions and for sharing their research work in this volume, which forms a part of the conference proceedings of the *International Conference on Bridging Disciplines through Chemical Sciences for a Sustainable Future*; Organized by Department of Chemistry, Navyug Kanya Mahavidyalaya, Rajendra Nagar, Lucknow in association with IQAC, Research & Development Cell, and Association of Chemistry Teacher, India. Their efforts and commitment have made this compilation meaningful and impactful.

We gratefully acknowledge the support of Anusandhan National Research Foundation (DST-SERB), ACT, and other generous funding agencies whose assistance has played a significant role in facilitating this work. Their continued support for research and innovation is deeply appreciated.

We also extend our appreciation to all individuals and institutions who provided support and encouragement during the organization of the conference and the preparation of this book. Their cooperation has been instrumental in bringing this work to completion.

Finally, we express our sincere gratitude to the Honourable Manager and Principal for their constant guidance, encouragement, and unwavering support throughout this endeavour.

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Pyrazolone Derivatives: A Comprehensive Review of Pharmacological Evaluations as Potent Anti-Inflammatory Agents



Bashir Ali Modu
Dr. Farhat Aisha Ansari

Abstract

Pyrazolone, a key pyrazole derivative, has attracted significant attention from medicinal chemists for decades owing to its strong anti-inflammatory properties, serving as a foundational scaffold for novel drug development. This review traces the progression of pyrazolone-based research, emphasizing its incorporation into bioactive hybrids aimed at enhancing therapeutic efficacy beyond that of traditional non-steroidal anti-inflammatory drugs (NSAIDs). Global studies underscore pyrazolone's effectiveness in managing inflammation associated with autoimmune diseases, arthritis, and pain, especially in cases where standard treatments are limited by adverse effects such as gastrointestinal toxicity and cardiovascular risks. Green synthetic methodologies, including microwave- and ultrasound-assisted techniques, have streamlined the production of pyrazolone derivatives, generating diverse compound libraries with improved pharmacokinetic profiles. Emerging research trends focus on pyrazolone hybrids combined with flavonoids, sulfonamides, and metal chelators, which hold promise for expanded clinical applications.

Keywords: *Pyrazolone, anti-inflammatory agents, pyrazole scaffold, green synthesis, drug hybrids.*

1. Introduction

An essential component of the body's defensive mechanism, inflammation promotes tissue regeneration and the immune system's ability to identify and eliminate undesirable or harmful substances. The body's defensive reaction to stimuli

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