



Pharmaceutical Science

Research and Innovation

Dr. Faruk Alam
Dr. Ruhul Amin
Mr. Mohidul Islam
Mr. Josef Yakin



PHARMACEUTICAL SCIENCE: RESEARCH AND INNOVATION

First Volume

Editors

Dr. Faruk Alam
Dr. Ruhul Amin
Mr. Mohidul Islam
Mr. Josef Yakin



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Dr. Faruk Alam, Associate Professor, Faculty of Pharmaceutical Science, Assam down town University, Panikhaiti, Guwahati-781026 Assam.

Dr. Ruhul Amin, Senior Assistant Professor, Faculty of Pharmaceutical Science, Assam down town Panikhaiti, Guwahati-781026 Assam.

Mr. Mohidul Islam, Assistant Professor, Faculty of Pharmaceutical Science, Assam down town University, Panikhaiti, Guwahati-781026 Assam.

Mr. Josef Yakin, Assistant Professor, Faculty of Pharmaceutical Science, Assam down town University, Panikhaiti, Guwahati-781026 Assam.

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For Sales Enquiries:

Contact: +91- 8861511583
E-mail: sales@iipbooks.com

PREFACE

Welcome to *Pharmaceutical Science: Research and Innovation*, a comprehensive exploration of the dynamic and ever-evolving field of pharmaceutical science. This book is intended to serve as both a resource and an inspiration for students, researchers, practitioners, and anyone with a keen interest in the development of medications that improve and save lives.

The pharmaceutical sciences sit at the intersection of various disciplines, including chemistry, biology, pharmacology, and medicine. This convergence allows for the innovative approaches that are crucial to advancing drug discovery and development. The goal of this book is to provide a detailed yet accessible overview of the current state of research and innovation in pharmaceutical science.

The journey of writing this book has been both rewarding and enlightening. It has allowed us to delve deeply into the cutting-edge research that is shaping the future of pharmaceuticals.

A key theme throughout this book is the importance of innovation. In an era where the pace of technological advancement is accelerating, the pharmaceutical industry must continually adapt and evolve. This book not only examines the current landscape of pharmaceutical research but also looks forward to the emerging trends and technologies that promise to revolutionize the industry. Topics such as personalized medicine, nutraceuticals, drug discovery, phytoconstituents used for different treatments and novel therapeutic approaches are explored in detail, providing readers with a glimpse into the future of pharmaceuticals.

This book would not have been possible without the contributions of many individuals. We are deeply grateful to our colleagues, who have shared their insights and expertise, and to the countless researchers whose work has paved the way for the advancements discussed in these pages. Special thanks go to the peer reviewers whose feedback has been invaluable in shaping the final manuscript.

To the students and budding researchers who are just beginning their journey in pharmaceutical science, we hope this book serves as a valuable guide and inspires you to push the boundaries of what is possible. To the seasoned professionals, we hope it provides new insights and sparks innovative ideas that contribute to your ongoing work.

Writing this book has been a journey of discovery and reflection. It has reinforced our belief in the power of scientific inquiry and the critical role of innovation in addressing the health challenges of our time. As you read through these chapters, we encourage you to think about how the principles and discoveries outlined here can be applied to your own work and how you can contribute to the ongoing evolution of pharmaceutical science.

Thank you for choosing to embark on this journey with us. We hope you find *Pharmaceutical Science: Research and Innovation* to be both informative and inspiring, and that it fuels your passion for advancing the field of pharmaceutical science.

ACKNOWLEDGEMENT

The journey of bringing *Pharmaceutical Science: Research and Innovation* to fruition has been a collaborative effort, enriched by the contributions and support of many individuals and institutions. We are deeply grateful to all those who have played a part in this endeavour.

First and foremost, we would like to extend our heartfelt thanks to the Faculty of Pharmaceutical Science at Assam down town University, Panikhaiti, Guwahati, Assam. Your unwavering support, encouragement, and intellectual contributions have been fundamental in shaping this book. The collaborative environment and dedication to excellence that characterize the faculty have greatly enriched this work. Special thanks to the Dean and all the faculty members for their invaluable insights and constructive feedback.

We also wish to acknowledge the different authors from various esteemed institutions who have contributed their expertise to this book. Your diverse perspectives and pioneering research have significantly broadened the scope and depth of this work. Each chapter reflects the dedication and passion you bring to the field of pharmaceutical science.

Our sincere gratitude goes to the Editors of this book. Your meticulous attention to detail, thoughtful suggestions, and tireless efforts in refining the manuscript have been instrumental in enhancing the quality of this publication. Your commitment to excellence is deeply appreciated.

We would also like to thank Iterative International Publishers for their unwavering support and belief in this project. Your professional guidance and resources have been invaluable in bringing this book to life. The collaborative spirit and dedication to disseminating knowledge have made this journey a rewarding experience.

Additionally, we are grateful to the administration and staff at Assam down town University for providing the necessary resources and a supportive environment that has enabled the successful completion of this project. Your efforts in facilitating research and academic excellence are deeply appreciated.

To the peer reviewers who provided critical feedback and suggestions, your meticulous attention to detail and constructive criticism have significantly enhanced the quality of this book. Thank you for your time and dedication.

Lastly, we wish to acknowledge all the researchers, scientists, and professionals whose pioneering work and innovations in the field of pharmaceutical science have paved the way for the advancements discussed in this book. Your contributions to the field are invaluable and continue to inspire future generations.

Thank you all for your support, contributions, and encouragement.

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ABOUT EDITORS



Dr. Faruk Alam works as an Associate Professor (Pharmaceutical Chemistry) in the Faculty of Pharmaceutical Science, Assam down town University, Panikhaiti, Guwahati, Assam. He earned his M. Pharm from J.S.S College of Pharmacy, Ooty affiliated to The Tamil Nadu M.G.R Medical University, Chennai. He has completed his Doctoral Degree (Ph.D.) from Assam down town University, Guwahati, Assam. His credentials include 54 publications, including at national and international His seminars Include 45 National and International, more than 45 Seminars, Papers presentations, Workshops, and Conferences. He has published 10 book chapters and is the author of 8 books. He has to his credit 2 National Patents. He has guided several B. Pharm and M. Pharm students. He is presently guiding 6 Ph. D students and 1 Ph. D scholar has been awarded. To his credit, he has undertaken an AICTE project and is a Reviewer for many national and international journals. He is a recipient of the Best Senior Scientist Award for outstanding contribution to Synthetic Chemistry during the academic session 2023-24 by Novel Research Academy, under the Ministry of MSME, India. He has more than 15 years of teaching experience. His area of interest is Synthetic Chemistry, Drug design, and Molecular Docking



Dr. Ruhul Amin is a Sr. Assistant Professor and Research Faculty at the Faculty of Pharmaceutical Science, Assam down town University. With over 8 years of experience, he specializes in Pharmacy Practice, combining academic, research, and industry expertise. He has a Ph.D. focused on pharmaceutical care for chronic kidney disease patients and holds multiple degrees, including an EPGDM in Marketing. Dr. Amin has published 42 research articles with a cumulative impact factor of 140.85 and holds several patents in pharmaceutical innovations. His work spans teaching, program coordination, and clinical research, with notable achievements in medical writing and scientific communication. Additionally, he has contributed to numerous international conferences and authored several books and book chapters. His extensive background underscores his commitment to advancing pharmaceutical science and education.



Mr. Mohidul Islam obtained his B. Pharm. From Assam down town University, Guwahati, Assam, and M. Pharm. From Dibrugarh University, Dibrugarh, Assam. After obtaining his M. Pharm., he worked as Assistant Professor at North East Frontier Technical University (NEFTU), Aalo, Arunachal Pradesh, from March 2018 to May 2019. In August 2019, he worked as Assistant Professor at Crescent Institute of Pharmacy, Hatigaon, Guwahati, Assam until April 2021. In the month of 2021, he joined the Faculty of Pharmaceutical Science, Assam down town University, Panikhaiti, Guwahati, Assam, as Assistant Professor and taught courses related to medicinal plants (Pharmacognosy). He has authored one book for Diploma in Pharmacy, various book chapters as well as a number of research and review articles in national and international journals. He has presented various oral and poster presentations and received an award for the same. Presently, he is in the midst of a study of the molecular mechanism of north-east Indian herbal drugs that are effective against jaundice.



Mr. Josef Yakin earned his M. Pharm (Pharmaceutical Analysis) from the Karnataka College of Pharmacy affiliated with Rajiv Gandhi University of Health Sciences, Bengaluru, Karnataka. Following the completion of his postgraduate studies, he embarked on a professional career at Sun Pharma Laboratories Ltd. Guwahati, where he held the position of Quality Control Officer until February 2020. His responsibilities in this role included ensuring the quality and safety of pharmaceutical products, adhering to regulatory standards, and conducting various analytical procedures. In March 2020, he joined the Faculty of Pharmaceutical Science, Assam down town University, Guwahati, Assam, as an Assistant Professor. In this capacity, he has been involved in teaching, mentoring students, and conducting research. He has published more than 15 scientific papers/book chapters/articles in peer-reviewed journals. He worked in the areas of Pharmaceutical Analysis, Pharmaceutical Chemistry and Natural Products.



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