



Pharmaceutical Chemistry

For D. Pharm 1st Year



Author :
Rehan Uddin
Shipra Verma
Abdul Baseer Khan
Shashi Shekhar Tripathi

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As per the latest syllabus of PCI,

New Delhi

Author

Dr. Rehan Uddin

M. Pharm (Pharmaceutics) & Ph.D.
Associate Professor & Academic
Incharge
Sir Madanlal Institute of Pharmacy,
Etawah (U.P.)

Shipra Verma

M. Pharm (Pharmachemistry)
Assistant Professor
Ch. Sughar Singh College of
Pharmacy, Jaswantnagar, Etawah
(U.P.)

Dr. Abdul Baseer Khan

M. Pharm (Pharmacognosy) & Ph.D.
Associate Professor
College of Pharmacy, Integral
University, Lucknow (U.P.)

Dr. Shashi Shekhar Tripathi

M. Pharm (Pharmaceutics) & Ph.D.
Professor & HOD
Sir Madanlal Institute of Pharmacy,
Etawah (U.P.)



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PREFACE

Pharmaceutical Chemistry is a fundamental subject in the D. Pharm curriculum that forms the scientific basis for understanding the chemical and analytical aspects of drugs and pharmaceuticals. This textbook has been prepared strictly according to the Pharmacy Council of India (PCI) Education Regulations – ER-2020, with the purpose of offering D. Pharm 1st Year students a comprehensive, systematic, and concept-oriented understanding of the chemical nature, structure, properties, and therapeutic relevance of pharmacologically active substances. The book aims to simplify the complex relationship between chemical structure and biological activity, enabling students to appreciate the scientific logic behind drug action, stability, purity, formulation, and storage.

The content begins by introducing students to the scope of pharmaceutical chemistry, sources of errors in analysis, accuracy, precision, significant figures, and the study of impurities. Special emphasis is placed on the principles and procedures of pharmacopoeial limit tests for chloride, sulphate, iron, heavy metals, and arsenic, as these analytical skills form the foundation of pharmaceutical quality control. Further chapters on volumetric and gravimetric analysis provide a strong conceptual base for both qualitative and quantitative assessment of chemical substances used in pharmaceuticals.

The syllabus-mapped sections on inorganic pharmaceuticals present the chemistry, market preparations, storage conditions, and therapeutic uses of haematinics, antacids, anti-microbial agents, dental products, and medicinal gases. This provides students with essential knowledge of commonly used inorganic drug substances and their pharmaceutical applications. The introduction to organic nomenclature with emphasis on heterocyclic compounds helps learners interpret the structural features of medicinal molecules with accuracy and confidence.

A major portion of the text is devoted to detailed study of organic chemical substances across various therapeutic classes, including drugs acting on the central nervous system, autonomic nervous system, cardiovascular system, diuretics, hypoglycemic agents, analgesics, anti-inflammatory agents, anti-infective agents, antibiotics, and anti-neoplastic drugs. Each drug is presented with its chemical classification, chemical name, essential structural characteristics, uses, stability considerations, storage requirements, available formulations, and popular brand names, ensuring complete alignment with the PCI syllabus.

This book has been written with clarity, accuracy, and student-friendliness in mind. It is intended not only to serve as a dependable textbook for academic study but also as a practical reference for laboratory work, pharmaceutical analysis, and foundational understanding of medicinal chemistry. I hope that this book will support the learners' academic growth and inspire them to build strong professional competences in the field of pharmacy.

Author

Dr. Rehan Uddin

Dr. Rehan Uddin, M.Pharm., Ph.D., is an accomplished academician and prolific author with a Ph.D. in Pharmacy and around ten years of teaching experience. Currently serving as Associate Professor and HOD at Sir Madanlal Institute of Pharmacy, Etawah (U.P.), he has authored about 50 textbooks in both English and Hindi for M. Pharm, B. Pharm, D. Pharm, and B.Sc. Nursing, as per PCI and INC syllabi. His contributions span across Pharmaceutics, Pharmaceutical Chemistry, Pharmacognosy, Pharmacology and more. Renowned for his dedication to academic excellence and innovation in pharmaceutical sciences, he has been honored with prestigious awards including the "Youngest Author Award 2022" and "Best Book Author Award 2023" and "Excellence in Teaching and Education Award 2024". His research on oral microemulsion-based drug delivery has led to a published patent, and he has authored numerous research and review articles in reputed journals. Rehan is passionate about advancing pharmaceutical education and empowering students through quality academic resources.



Shipra Verma

She is currently working as an Assistant Professor at Ch. Sughar Singh Pharmacy College, Jaswantnagar, Etawah, Uttar Pradesh, India, where she actively contributes to teaching and academic development in the field of pharmaceutical sciences. She has completed her M. Pharm in Pharmaceutical Chemistry from Shri Ramnath Singh Mahavidhyalaya, Formi, Bhind, Madhya Pradesh, after completing her B. Pharm from Sir Madanlal Institute of Pharmacy, Etawah, Uttar Pradesh. She possesses an excellent academic record that reflects her dedication, hard work, and strong command over the subject. Over the years, she has authored multiple books for B. Pharm and D. Pharm students, contributing significantly to pharmacy education through her clear explanations, structured content, and student-friendly approach. Her work continues to support and guide learners in understanding core concepts of pharmaceutical sciences with greater clarity and confidence.



Dr. Abdul Baseer Khan

He is an Associate Professor in the College of Pharmacy, Integral University, Lucknow, Uttar Pradesh, with fifteen years of teaching experience in pharmaceutical sciences. He completed his Ph.D. in Pharmacognosy from the Faculty of Pharmacy, Integral University, after earning his B. Pharm and M. Pharm degrees in Pharmacognosy from Al-Ameen College of Pharmacy, Bangalore, Karnataka. His strong academic background reflects his dedication to the field and his consistent pursuit of



contributing to scientific knowledge in pharmacognosy. He has also participated in more than twenty-five conferences, seminars, and faculty development programs, demonstrating his commitment to academic enrichment and professional advancement. Over the years, he has written several textbooks for B. Pharm and D. Pharm students, making valuable contributions to pharmacy education through his lucid writing style, comprehensive coverage of topics, and learner-oriented presentation.

Dr. Shashi Shekhar Tripathi



Dr. Shashi Shekhar Tripathi, M.Pharm., Ph.D. is a distinguished academician and healthcare professional with more than 19 years of comprehensive experience spanning pharmacy education, research, and institutional leadership. He is currently serving as Professor at Sir Madanlal Institute of Pharmacy, Etawah, where he continues to inspire excellence in Pharmaceutical Sciences through his visionary teaching, research, and mentorship. Dr. Tripathi's career reflects a strong blend of academic and industrial expertise. He began his professional journey with advanced industrial training at Merck India Ltd. and Sigma Laboratories Ltd. He worked at Wyeth Pharmaceuticals (now part of Pfizer following its 2009 global acquisition) followed by his tenure at Unichem Laboratories that further enriched his technical acumen where he gained extensive hands-on experience in Formulation Research and Development for highly regulated markets, including Brazil, Mexico, and the U.S. FDA territories. An accomplished researcher and academic leader, Dr. Tripathi has authored and co-authored several research publications in reputed journals, supervised numerous M. Pharm. dissertations, and contributed academic content for international Universities. His areas of expertise encompass regulatory affairs, formulation development, academic administration, and pharmaceutical innovation. Driven by a commitment to excellence, Dr. Tripathi continually strives to elevate the standards of pharmacy education and healthcare through innovation, quality research, and transformative leadership. His dynamic career exemplifies the integration of scientific insight, practical experience, and academic stewardship in shaping the next generation of pharmaceutical professionals.

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Regional Office:

Reyaansh Medical Publishers Pvt. Ltd.

C-105 - Ashiyani Apartment, Saraswati Kunj, Chipiyana Khurd, Noida - 201009

Contact - +919257220221

Email : reyaanshcare@gmail.com

Website : www.reyaanshmedicalpublishers.com

Registered Office:

Reyaansh Medical Publishers Pvt. Ltd.

Scheme No. 1, A 28 Murtikala Colony, Gopalpura Bypass Road, Near Hotel Lalita Palace,
Adjoining to Triveni Flyover, Jaipur-302018, (Raj.)

Contact : +919828547888

E-mail : reyaanshmedicalpublishers@gmail.com

Website : www.reyaanshmedicalpublishers.com

Reyaansh Care : +91 9256567888

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Author : Rehan Uddin

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