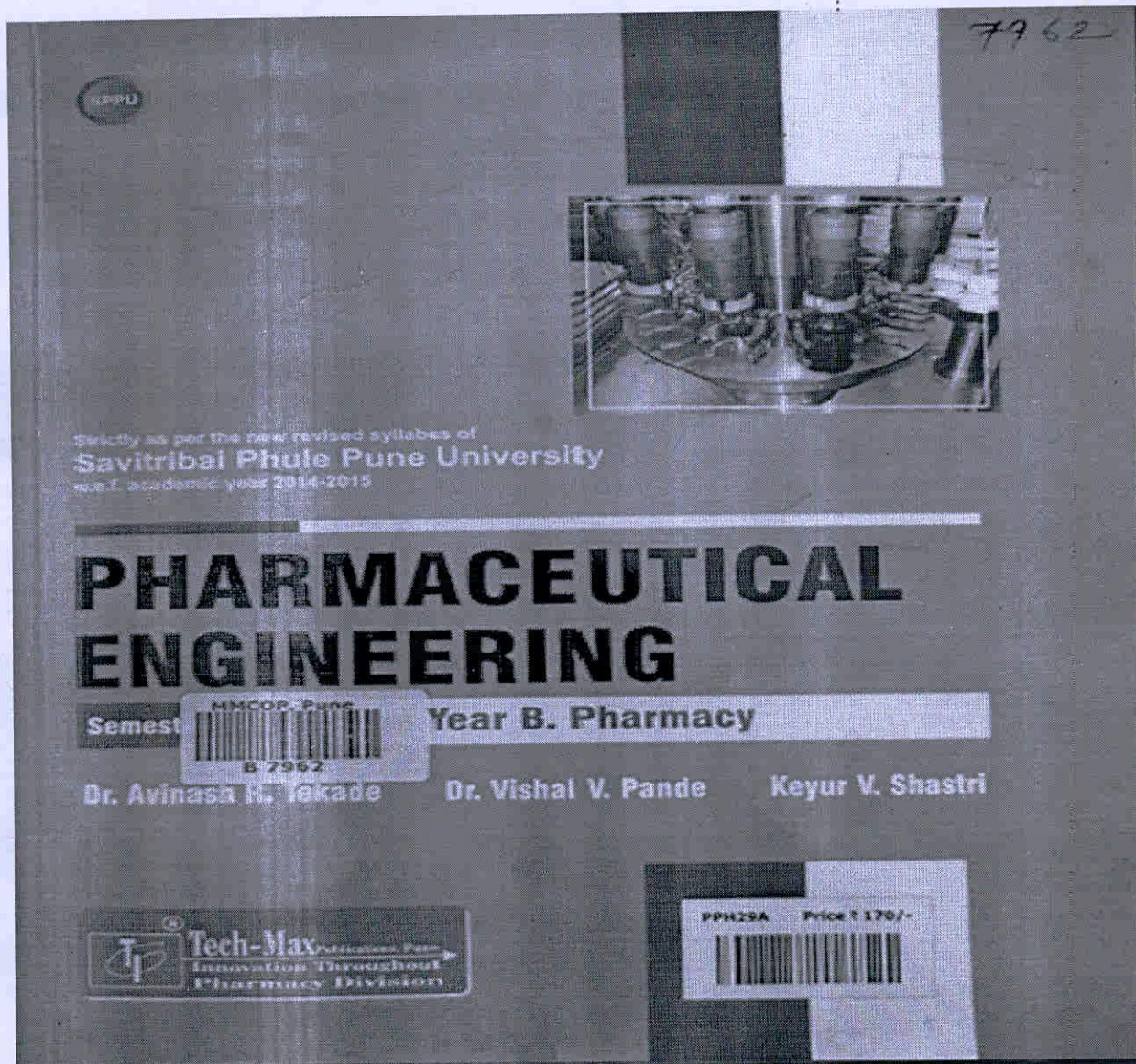


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Pharmaceutical Engineering

Dr. Avinash R. Tekade, Dr. Vishal V. Pande, Keyur V. Shastrri

Semester IV - Second Year B. Pharmacy (SPPU)

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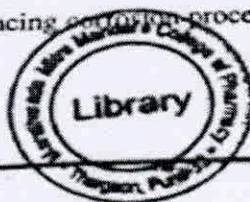



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Syllabus

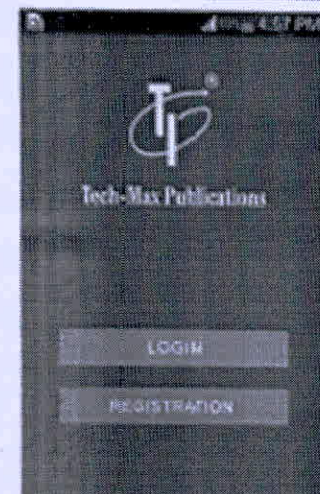
1. **Mass Transfer :**
Molecular diffusion in gases & liquids, theories of interphase mass transfer.
(Refer Chapter 1)
2. **Drying :**
Mechanism, theory, factors affecting, Driers- tray drier, fluidized bed drier, spray drier, freeze drier, flash drier, drum drier.
(Refer Chapter 2)
3. **Heat Transfer :**
Mechanisms – conduction, convection, radiation, Fourier's law, Stefan-Boltzmann's constant, Kirchoff's law, Heat exchangers- heat transfer in parallel flow & counter flow, tubular heat exchangers, plate heat exchangers and applications.
(Refer Chapter 3)
4. **Evaporation :**
Theory, evaporator capacity-heat & material balances, factors influencing heat transfer coefficients. Evaporators-pan, tubular (horizontal, vertical-short, long & their subtypes), wipe film, centrifugal rotary, multiple effect evaporator-economy, capacity, methods of feeding, etc. Evaporator accessories-condensers, vacuum pump, removal of condensate, entrainment separators, foam.
(Refer Chapter 4)
5. **Crystallization :**
Miers' theory of supersaturation, nucleation, crystal growth, classification of crystallizers, tank, Swenson walker crystallizer, caking of crystals.
(Refer Chapter 5)
6. **Flow of Fluids :**
Fluid statics- pressure, pressure measurement-manometers & pressure gauge, fluid dynamics, mechanism of fluid flow, material & energy balance, pressure differential flow meter-principle, orifice meter, pitot tube; Variable area flow meter-principle, rotameter orifice & plug meter, quantity flow meters.
(Refer Chapter 6)
7. **Distillation :**
Vapour liquid equilibrium, distillation of miscible systems, boiling point diagram, equilibrium, distillation, differential distillation, rectification, fractionating column, heat & material balance, factors affecting plate theory efficiency, molecular distillation, separation of azeotropes and distillation of immiscible system.
(Refer Chapter 7)
8. **Corrosion :**
Mechanisms, factors influencing corrosion process, method of combating it.
(Refer Chapter 8)

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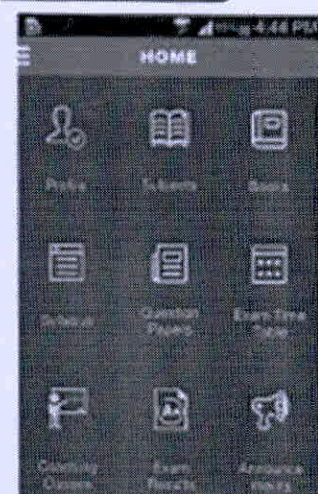
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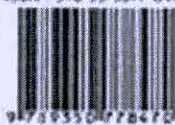
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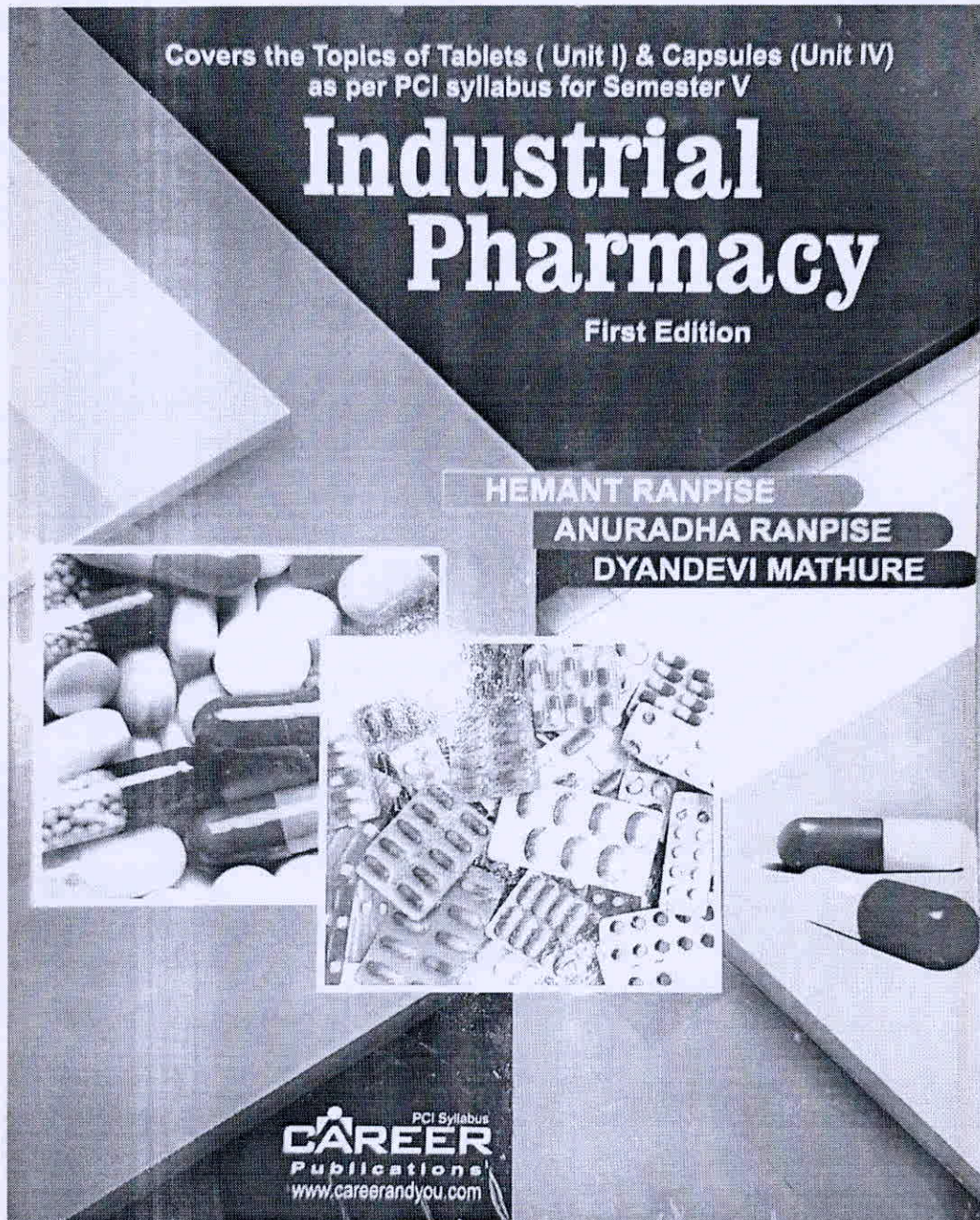



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Industrial Pharmacy

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Industrial Pharmacy

First Edition

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About the Book

The book, Industrial Pharmacy- I is meant for B. Pharm. students. It provides an in-depth knowledge of Dosage Form Design & Formulation Strategies. The text covers information on tablet & capsule as dosage forms with their physico-chemical principles, additives, methods of formulation, IPQC & QC tests as per IP, BP, USP, equipments, defects & remedies. It also highlights concept, types, pharmacopoeial specifications, techniques & equipments used in tablet coating. Plant layout design and technology transfer for tablet & capsule manufacturing allows widening of students horizons of knowledge. The authors have taken great efforts to explain all topics lucidly, with diagrams and charts.

This book includes following chapters :

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- 2) Tablets Formulation and Technology.
- 3) Capsules.
- 4) Coating Technology

About the Authors



Mr. Hemantkumar A. Ranpise completed his graduation from S. G. R.S. College of Pharmacy, Saswad in April 2008 and post graduation from Govt. College of Pharmacy, Karad in 2010. Presently, he is working as Assistant Professor in Sinhgad College of Pharmacy, Vadgaon Bk., Pune.

He is actively involved in research on formulation development of Nanocarriers for antifungals.



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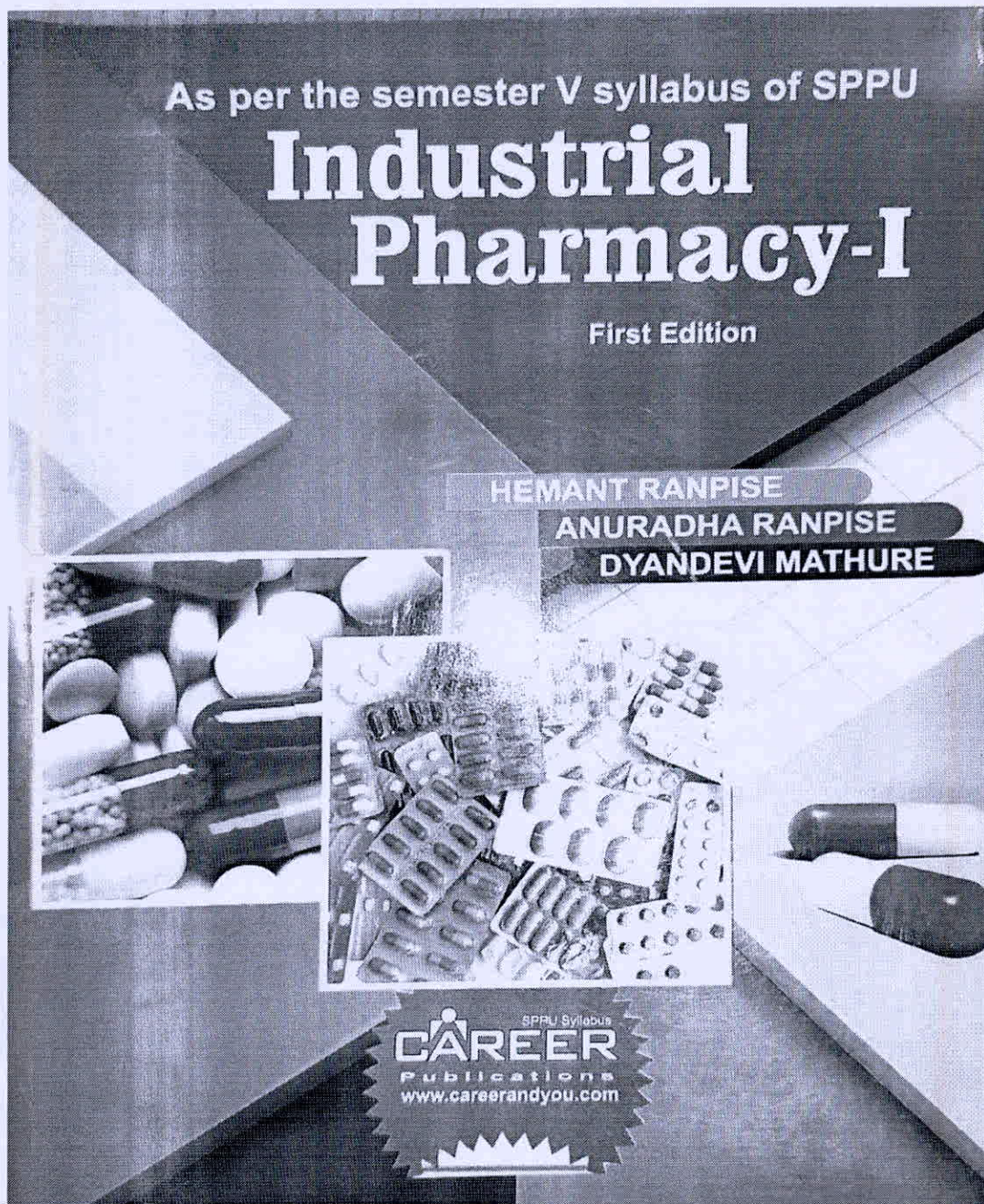


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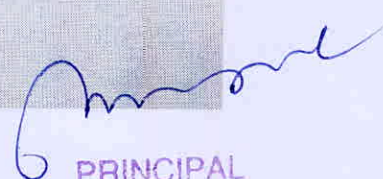
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PREFACE

We take this opportunity to express our sincere gratitude to our parents and family members, especially our mothers, spouse and our children for providing their moral support and enabling us to utilize our spare time which was crucial for successful completion of this book,

We are thankful to Dr. K. N. Gujar, Principal, Sinhgad College of Pharmacy, Vadgoan Bk., for encouragement in writing this book.

Dr. M. G. Patil, Principal, M. M. M. College of Pharmacy, Thergoan, Dr. S. D. Sawant, Principal, Smt. Kashibai Navale College of Pharmacy, Kondhwa and Dr. A. V. Bhosale, Principal, S. G. R. S. College of Pharmacy, Saswad, who themselves have authored several books have been pillars of inspiration for us.

We are also indebted to Dr. Milind Wagh, Professor, N. D. M. V. P's College of Pharmacy, Nashik who encouraged us to write this book.


We also thank Dr. R. Y. Patil, Principal, Shankarrao Urasal College of Pharmaceutical Sciences and Research, Kharadi for always supporting us in publishing books and research papers.

We also thank Mrs. Sarika Deshmukh and entire staff of career Publications, Nashik for encouraging us to complete this book in stipulated time frame and market it professionally as well.

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FOREWORD

A long cherished dream of bringing forth a comprehensive book which is easy for the Third year B. Pharm students and at the same time exhaustive and handy reference book for the teachers has been fulfilled in the form of "Industrial Pharmacy-I"

The book has total four chapters based upon syllabus of Savitribai Phule Pune University, Pune. The chapters cover principles of Dosage form Design, Tablet Formulation and Technology, Coating Technology and Capsules. Tablet formulation and various technologies used in tablet manufacturing have been discussed elaborately.

Lots of efforts have been taken by authors about schematic representation of various technologies involved in tablet and capsule manufacturing. The chapters are written in simple and comprehensible language which will help in making things easy to grasp.

I hope the book will be useful for all teachers and the students involved in the process of teaching and learning subject of Industrial Pharmacy.

Dr. Ashok Bhosale

Principal,

P.D. E. A. 's Seth Govind Raghunath Sable

College of Pharmacy, Saswad


Ex-Chairman, Board of Studies-Pharmaceutics,

Savitribai Phule Pune University, Pune.

Ex-Member, Management Council

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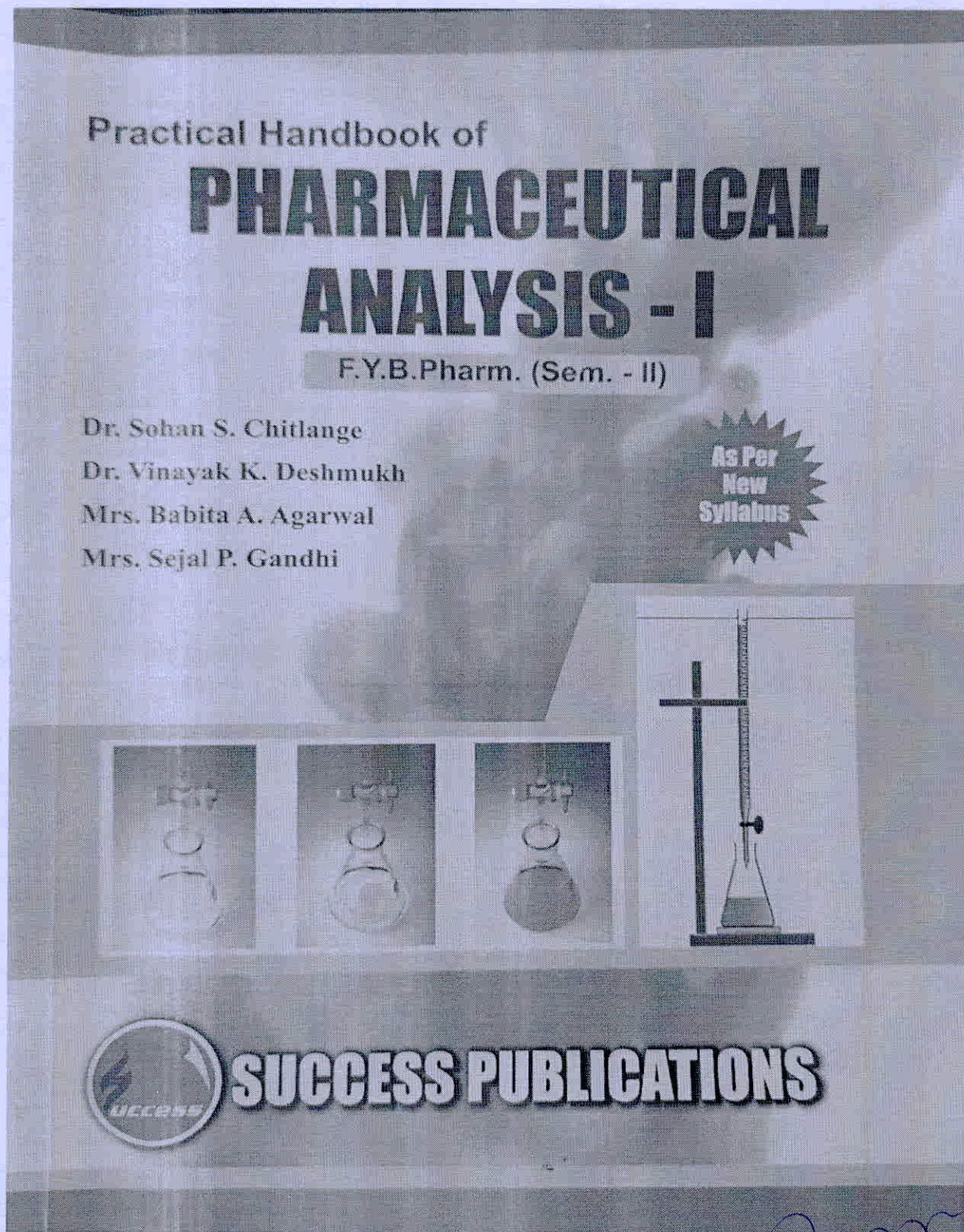
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This Handbook is useful for
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Preface

It is a matter of great pleasure for us to present this Simplified Handbook of Pharmaceutical Analysis - I to our professional colleagues and beloved students.

The present Handbook comprehensively covers the new syllabus of S. Y. B. Pharm. (Sem - III) Course of Savitribai Phule Pune University and It has been compiled to meet the requirements of students for effective performance in their day to day practicals.

Some of the features of the handbook are:

- *All practical's are covered as per the Prescribed syllabus*
- *Guideline for faculties and students to design and execute the experiments*
- *Question bank at the end of each experiment.*
- *Use of diagrams, tables and various tools to demonstrate the key concepts and techniques.*
- *Conversational, lucid and simple language.*

We are very grateful to publisher Mrs. and Mr. Rajesh Patne who have rendered all possible assistance in bringing out this Handbook. We also appreciate the cooperation of all our colleagues in pharmacy profession and thankful to the management of respective organizations for their constant encouragement and support. We authors are also thankful to all who directly or indirectly helped us in writing this Handbook. We duly acknowledge the authors and their scientific content referred for compilation of this handbook. We will consider our efforts amply rewarded in case the book proves useful to the students and teachers of the subject.

Constructive suggestions of readers for the improvement of the text will be highly appreciated.

With best wishes.

By Authors

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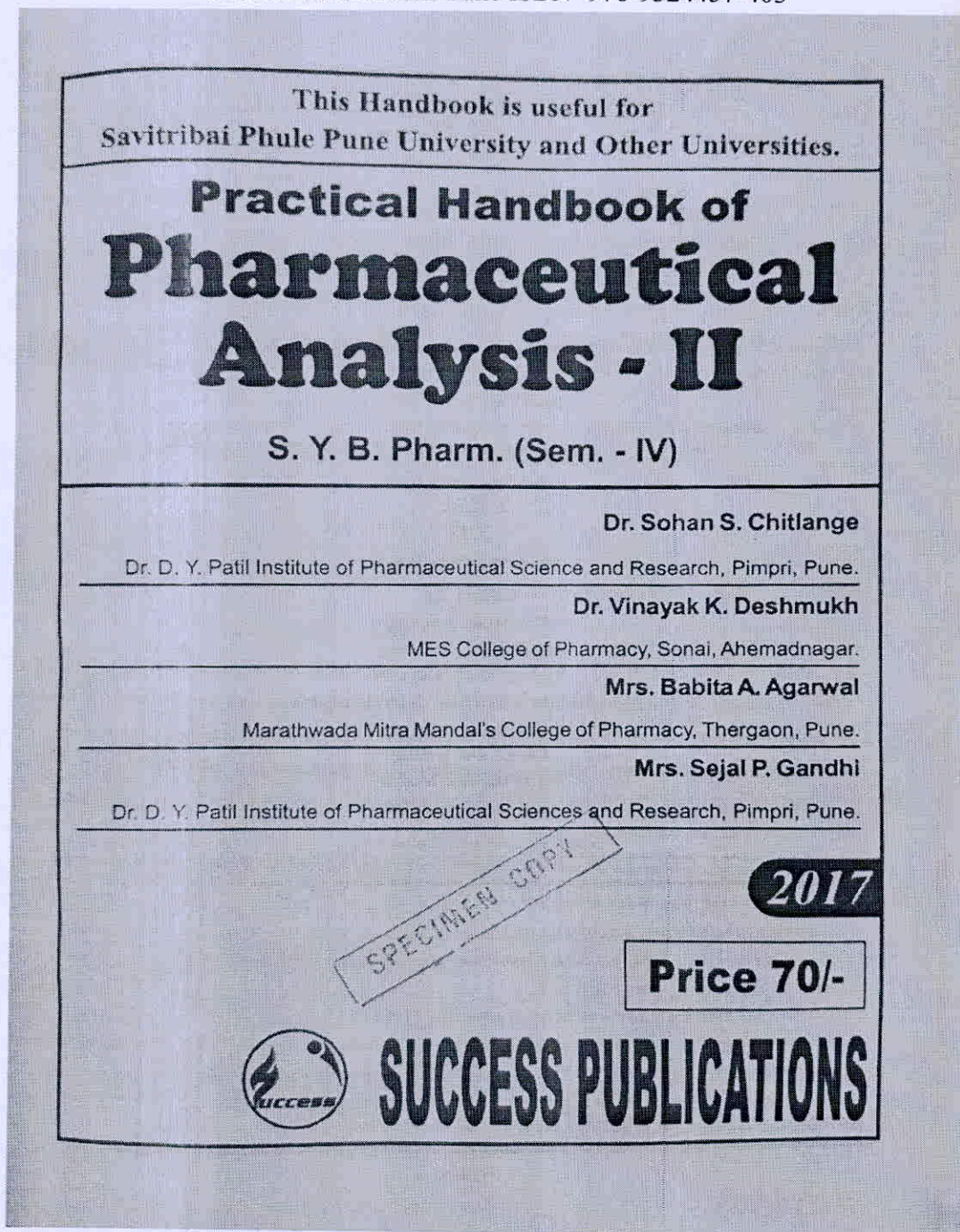
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Preface

It is a matter of great pleasure for us to present this Simplified Handbook of Pharmaceutical Analysis -II to our professional colleagues and beloved students.

The present Handbook comprehensively covers the new syllabus of S. Y. B. Pharm. (Sem - IV) Course of Savitribai Phule Pune University and It has been compiled to meet the requirements of students for effective performance in their day to day practicals.

Some of the features of the handbook are:

- *All practical's are covered as per the Prescribed syllabus*
- *Guideline for faculties and students to design and execute the experiments*
- *Question bank at the end of each experiment.*
- *Use of diagrams, tables and various tools to demonstrate the key concepts and techniques.*
- *Conversational, lucid and simple language.*

We are very grateful to publisher Mrs. and Mr. Rajesh Patne who have rendered all possible assistance in bringing out this Handbook. We also appreciate the cooperation of all our colleagues in pharmacy profession and thankful to the management of respective organizations for their constant encouragement and support. We authors are also thankful to all who directly or indirectly helped us in writing this Handbook. We duly acknowledge the authors and their scientific content referred for compilation of this handbook. We will consider our efforts amply rewarded in case the book proves useful to the students and teachers of the subject.

Constructive suggestions of readers for the improvement of the text will be highly appreciated.

With best wishes.

By Authors

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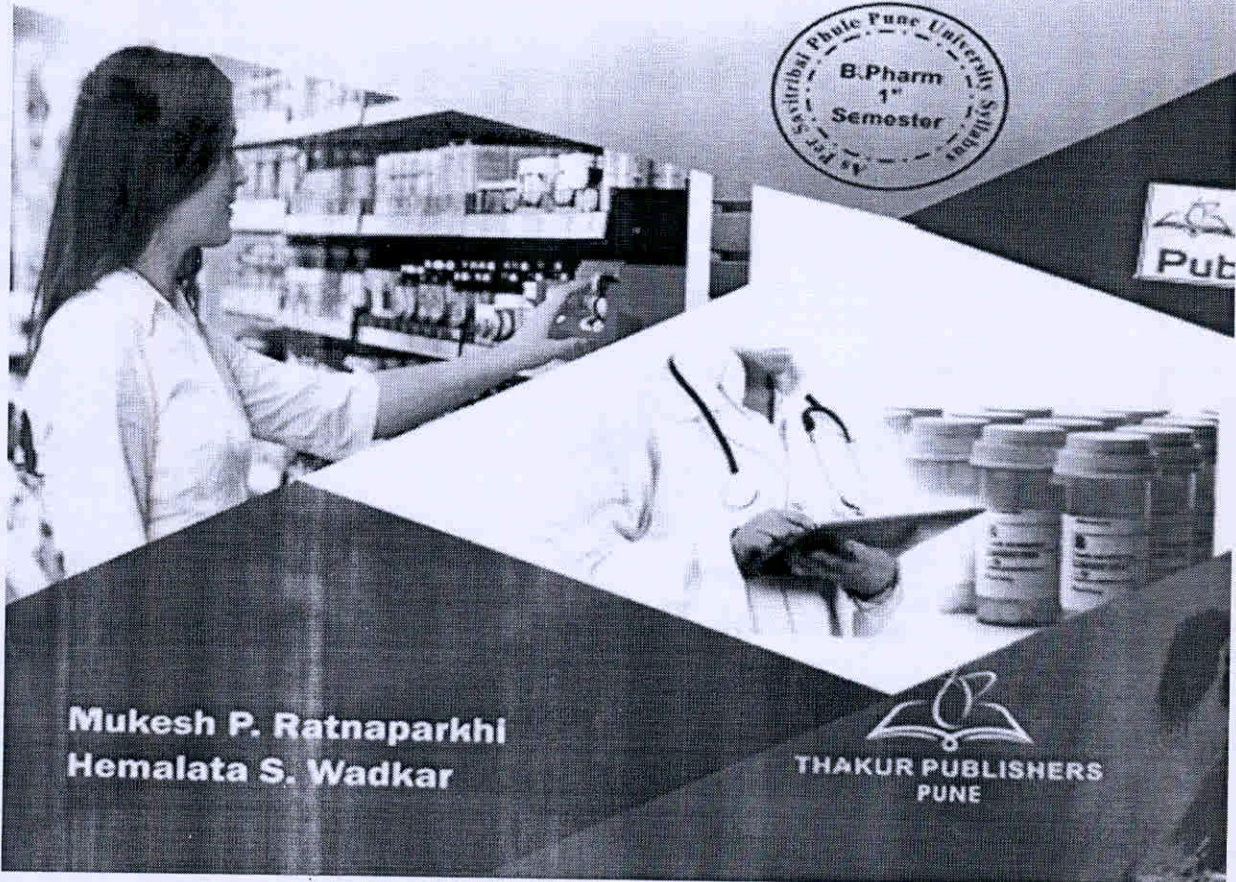
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About the Book

This textbook introduces about compounding and dispensing practices. It includes detailed information about prescription, its parts, and incompatibilities. This book explains about the different pharmaceutical calculations, posology, community pharmacy, and patient counselling steps. Written with the needs of the student in mind, this clear, theoretical guide includes exercise at the end of each unit.

Unit 1 discusses about the fundamental operations involved in compounding and dispensing, packaging and labelling of dispensed medicines, and their storage and stability. This unit also explains the concept of prescription and its parts. Unit 2 summarizes the compounding and dispensing practices, and documentation techniques such as prescription filling, purchase records, etc. This unit also illustrates the skill required in performing the common pharmaceutical calculations (such as molarity, normality, alligation, proof spirit, etc.). Unit 3 explains the meaning of posology, factors affecting dose, calculation of doses for infants and children, and the incompatibility types in prescription. Unit 4 elaborates the organization of community pharmacy, role of pharmacists in community health care and education, and patient counselling.

Key features of this book are

- Language is consistent, and easy for students to follow.
- Systematic arrangement of contents.
- Exercise is added at the end of each unit.

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Practical Handbook of

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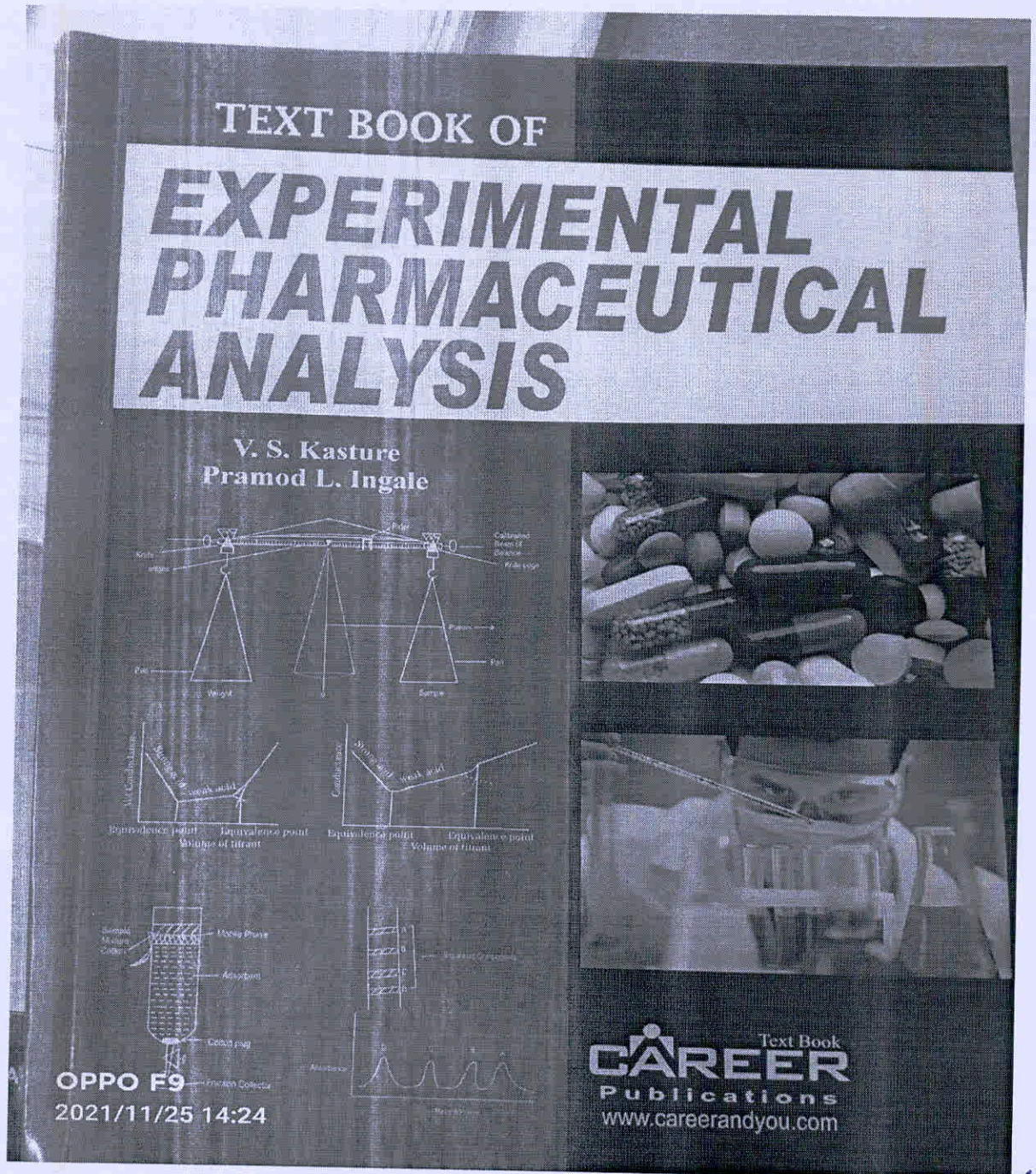


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8. Experimental Pharmaceutical Analysis, Dr, Pramod L. Ingale, V.S. Kasture.

Marathwada Mitra Mandal's College of Pharmacy, Thergaon, Pune
Career Publications. ISBN- 976-93-82322-59-7



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About the Book

The book Experimental Analysis covers classical methods of analysis. These methods started the discipline of chemical analysis both qualitatively & quantitatively, which includes gravimetric and volumetric methods of analysis. In gravimetry, the stoichiometry of analysis is suited. All calculations based on chemical equivalence are explained with specific examples. The gravimetric method is not very sensitive in terms of percentage purity determination, but it is a specific method for qualitative analysis.

The Volumetric methods are sensitive analytical methods compared to gravimetry. Volumetric methods are of four categories based on chemical reactions. Aqueous & Non-aqueous acid-base titrimetric methods; Complexometric methods which covers complex-forming reactions, both insoluble (precipitation) & soluble complex-forming reactions and Redox reactions, i.e. Reduction-Oxidation titrimetry. All volumetric methods of analysis are based on stoichiometry of the reactions between titr and titrant. Volumetry is a more sensitive and selective method of analysis of 20th century. In volumetric methods, the chemical compounds called Indicators are used to indicate completion of chemical reactions.

Further development in Volumetric methods of analysis was Instrumental methods, where all these titrations were performed using instruments. Quantitative parameters for analysis of chemical constituents are potential, conductance, pH, current. All electrical instruments are designed to quantify analyte in terms of these parameters based on Ohm's law. Experiments based on analysis of samples by potentiometry, conductometry and PH metry are discussed.

Further development in chemical analysis is Spectroscopy where trace amounts of sample is analysed. Spectroscopy is method of choice for analysis of biological samples. Experiments based on both absorption & emission spectroscopical methods of analysis are discussed.

Complex mixtures are first fractionated for smooth analysis. Initially, extraction of sample with various solvents was the method of choice for separation of chemical constituents, but complex mixtures are resolved by Chromatography. Various chromatographic methods of separation and analysis are discussed with suitable experiments. Introduction to advanced methods like High Performance Liquid Chromatography, (HPLC) High Performance Thin Layer Chromatography are discussed with experiments.

Infrared Spectroscopy with analytically important group frequencies for organic functional groups are stated. Differential Scanning Calorimetric method for Pharmaceutical analysis are discussed with suitable examples.

The book is very informative for all science branches, especially under graduate & post graduate students not only for pharmacy students but of analytical chemistry.

About the Author

Prof. V. S. Kasture has 30 yrs of teaching experience in Pharmaceutical Analysis at various levels, which includes lecturer, Associate Professor to Professor. The experiments written in this book have been performed in the laboratories of Pharmaceutical Sciences. The experiments are explained in simple language with suitable examples and graphical presentations.

This is the second book written by the author, the first being Spectroscopy, which covers advanced analytical methods of analysis, like UV-Visible, IR, NMR, & Mass Spectroscopy for structural elucidation of organic molecules and also problems based on the same.

At present, the author is founder member and Director of Pinnacle Biomedical Research Institute, Bhopal (MP), popularly known as PBRI (Visit www.pbri.in). PBRI is the first institute in India which extends instrumental, chemical, biological and microbiological facilities for Post Graduate and Doctoral students to pursue research.

The author has Completed research projects funded by UGC, AICTE, and Industries. She has guided more than hundred Post-graduate students and seven doctoral students for extraction, isolation & confirmation of structure of Phytoconstituents like Steroids, Triterpenoids, Flavonoids, Alkaloids, Iridoid type Glycosides, Fatty acids & Tannins. Her research has been recognised by several indexing agencies like, Google Scholar, Research Gate, Academia.edu, Pubmed-NCBI, Pubfacts, Semantic Scholar, etc.

She has published more than 100 research papers and has received more than 950 citations. She has collaboration with COSMESE of University of Cagliari, Italy, and Banasthali University, Rajasthan. She had visited the Government University of Gondar, Ethiopia, in 2010.

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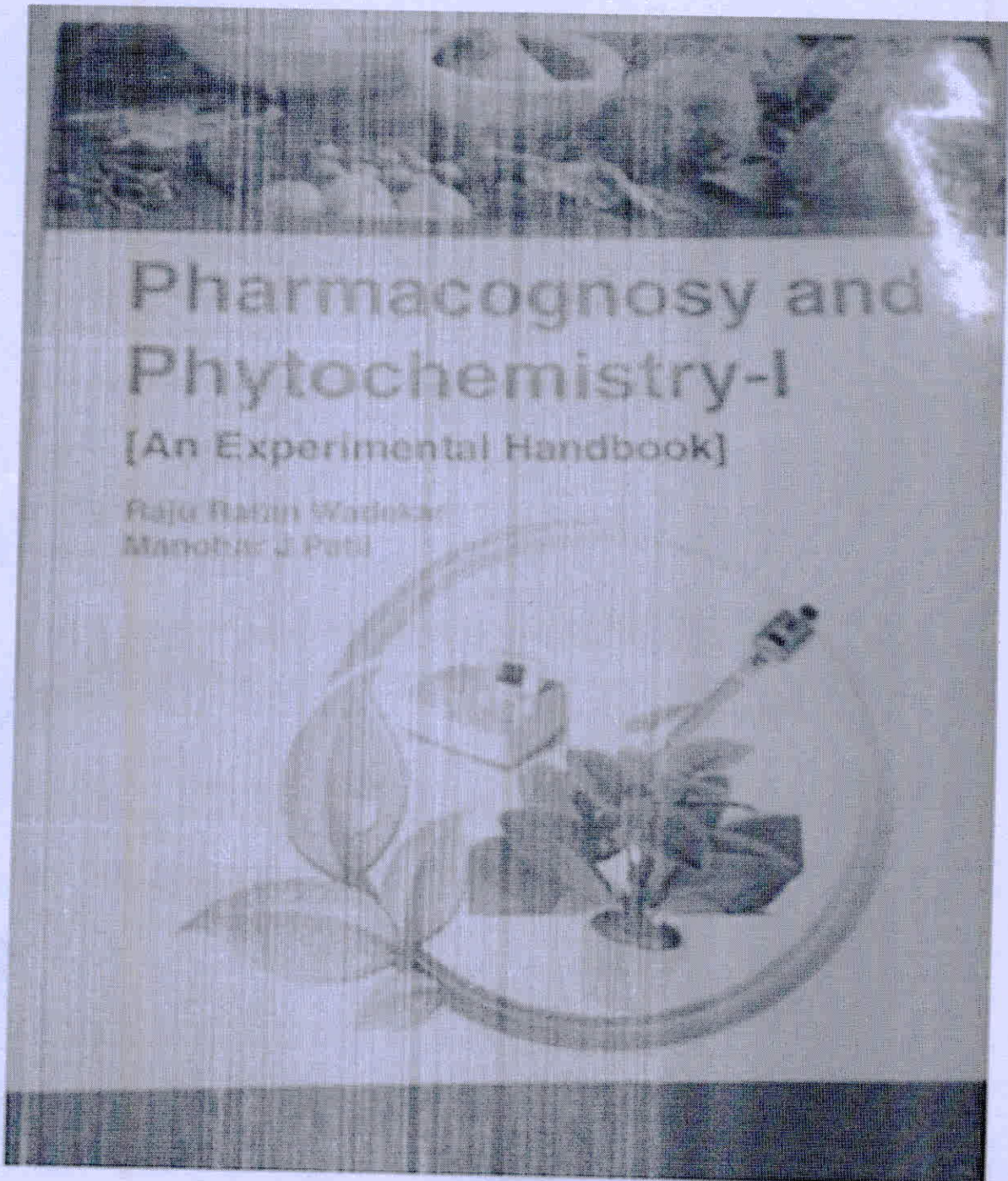
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Pharmacognosy and Phytochemistry-I

(An Experimental Handbook)

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