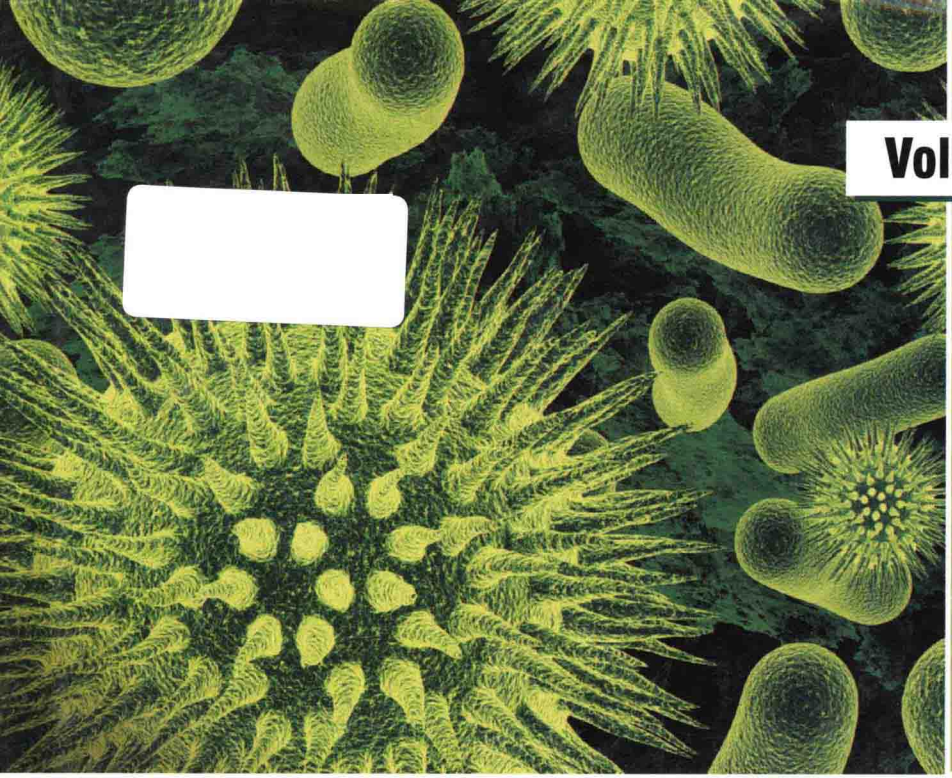

Volume 1

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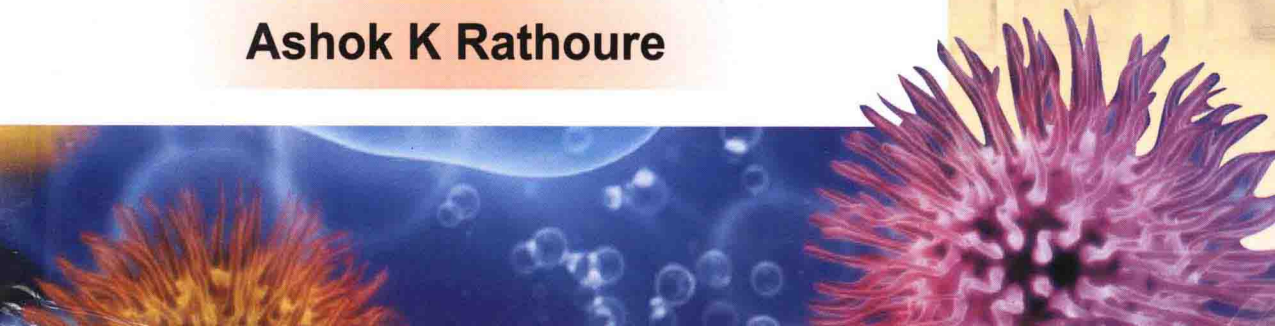

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This book is
Dedicated to
My Lovely Wife Meenu
(Mrs. K.P. Rathour)

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Preface

The book of "Biochemical Engineering" is designed in two volumes so that graduates are familiar with the techniques used in analyzing the problems associated with the biochemical and related industries like breweries, petroleum, pharmaceutical, metallurgical, plastics, pollution control, etc. The goal of this book is to educate men and women who are able to analyze industrial biochemical engineering problems and synthesize solutions to those problems, compare favourably in their knowledge of biochemical engineering. In addition to preparing students for rewarding jobs in the biochemical process industries, it provides an excellent background for the study in engineering and science. The biochemical engineering is defined as mathematical and natural sciences gained by study, experience and practice is applied with judgment to develop ways to utilize, economically, the materials and forces of nature for the benefit of mankind. The biochemical engineering emphasizes the application of principles from many fields of study. This book helps to graduate and undergraduate students of chemical and biochemical engineering disciplines to analyse various problems.

This book is written keeping in mind the need for a text book on the aforesaid subject for students from both engineering and biology backgrounds. This book has 22 chapters in two volumes. The brief overview and commercial scope of biochemical engineering is given in chapter 1. The second chapter deals with basics of sterilization process, design of air filters and kinetics. The third chapter deals aeration and agitation in bioreactor and rheology of fluid. Chapter 4 is concerned about the microbial growth kinetics in batch, fed batch and continuous culture system. Chapter 5 introduces students with basics of mass transfer and gas absorption. Chapter 6 deals with design of bioreactor and distillation covered in chapter 7. The chapter 8 deals liquid extraction including concurrent and counter current operations in single and multistage solvent extraction, triangular diagrams. The ninth chapter includes drying for batch and freeze drying. The chapter 10 deals with various aspects of thermodynamics used in biochemical engineering including co-ordination of microbial metabolism with reference to carbohydrates, lipids and proteins. Eleventh

chapter describes the metabolism and metabolic pathway with its regulation. Chapter 12 concerned with cell growth stoichiometry and product formation kinetics. The chapter 13 describes general fermentation technology, its various products, bacterial fermentation and yeast fermentation. Fourteenth chapter includes beer production, wine manufacturing and other distilled liquors and fifteenth chapter provides the description of Microbial production of organic acids and fermentation processes. The chapter 16 concerned with biomass as a fermentation product. Chapter 17 describes the commercial production of amino acids e.g. lysine, glutamic acid along with solid and submerged process. Eighteenth chapter discusses the scale up and fed batch fermentation whereas continuous fermentation discussed in chapter 19. The downstream processing found in chapter 20 and hazards managements in chapter 21. The last chapter deals with brief introduction to biochemical engineering and biotechnology including role of biotechnology in biochemical engineering and Environmental Impact Assessment.

Author

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