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Preface

Microbial biotechnology is a technology based on microbiology. Microbial biotechnology is the use of microorganisms and their derivatives to make or modify specific products or processes. Microbial biotechnology is closely related to applied and industrial microbiology. Microbial biotechnology is sometimes considered synonymous with modern industrial microbiology.

The microorganisms used in industrial processes are natural, laboratory-selected mutants, or genetically engineered strains to obtain an economically valuable product or activity on a commercial and large scale. Natural and mixed microbial strains were used in ancient or traditional industrial microbiology, whereas pure or mutant microbial strains are used in classic industrial microbiology. The use of genetically engineered microbial strains began with modern industrial microbiology or microbial biotechnology.

Microbial biotechnology is an interdisciplinary field, and successful development in this field requires major contributions in a wide range of disciplines, particularly microbiology, biochemistry, genetics, molecular biology, chemistry, biochemical engineering, bioprocess engineering, and so on.

Recently, new methods of metabolic engineering, industrial systems biology, bioinformatics, and X-omics science such as genomics, metagenomics, transcriptomics, proteomics, metabolomics, fluxomics, and even nanobiotechnology, have been used to find and modify microorganisms with industrial capacity and their valuable products.

In general, the production of products in industrial microbiology and microbial biotechnology are typically investigated under upstream processes, fermentation processes, and downstream processes.

Microbial Biotechnology: Progress and Trends covers recent developments in some fields of microbial biotechnology. Chapter 1 reviews microbial biotechnology from its historical roots to its different processes. Chapters 2 through 5 discuss some of the new developments in upstream processes. Chapter 6 considers solid-state fermentation as an interesting field in fermentation processes. Chapters 7 through 12 argue about recent developments in the production of valuable microbial products such as biofuels, organic acids, amino acids, probiotics, healthcare products, and edible biomass. Chapters 13 through 15 discuss important microbial activities such as biofertilizer, biocontrol, biodegradation, and bioremediation.

The book is written in simple and clear text, and we also used many figures and tables to make the book easier to understand. Furthermore, case studies are included at the end of some chapters.

Overall, this book will serve as a suitable reference for students, scientists, and researchers at universities, industries, corporations, and government agencies interested in biotechnology, applied microbiology, bioprocess/fermentation technology, healthcare/

pharmaceutical products, food innovations/food processing, plant agriculture/crop improvement, energy and environment management, and all disciplines related to microbial biotechnology.

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