

Preface

Life science research and industry is developing rapidly all over the world. Microbial biotechnology is increasingly being regarded as a core subject in most university and polytechnic life science courses. There are already a number of excellent general textbooks on microbiology and biotechnology in the market that deal with the basic principles of the field. In order to complement this, this book aims to focus on the various applications of microbial biotechnological principles. A teaching-based format is adopted, whereby working problems, as well as answers to frequently asked questions, will supplement the main text. This textbook also includes real life examples on how the application of microbial biotechnological principles has achieved breakthroughs in both research and industrial production.

The first edition of the textbook was divided into seven parts:

Part I deals with the *Principles of Microbial Biotechnology*, which contains *Screening for Microbial Products, Bioprocess Technology, Enzymology, Manipulation of Genes, Applications of Bioinformatics and Biocomputing to Microbiological Research, and Real Time Polymerase Chain Reaction*.

Part II focuses on the *Food Production Involving Microorganisms and Their Products*, which includes the subheadings *Fermented Foods, Food Involving Yeast and Ethanol Fermentation, Fungal Solid State Cultivation, Food Ingredients, Enzyme Modified Food Products, and Regulation of Foods Involving Genetically Engineered Microorganisms*.

Part III deals with *Microbes in Agrobiotechnology*, and is subdivided into *Microbes and Livestock* and *Transgenic Plants*.

Part IV probes into the area of *Microbes in Medical Biotechnology*, under the subheadings of *Diagnostic Clinical Microbiology* and *Microbes: Friends or Foes?*

Part V elaborates on the roles of *Microbes in Environmental Biotechnology*. These include *Municipal Wastewater Treatment*, *Industrial Wastewater Treatment*, *Municipal and Industrial Solid Waste Treatment*, and *Regulatory Issues on Application of Natural and Genetic Engineered Microbes in Environmental Biotechnology*.

Part VI explores the potential of *Microbes in Alternative Energy*.

Part VII provides a glimpse of *Patenting Inventions in Microbiology*.

In this second edition of the textbook, most chapters were revised and two additional chapters were included. They are: Chapter 6 “Real Time Polymerase Chain Reaction (RT-PCR)” and Chapter 9 “Fungal Solid State Cultivation”. RT-PCR is becoming a widely used molecular biology technique in biotechnology research and application, and it is our belief that a special chapter should be devoted to this subject. Growing fungi on wet substrate (solid state) is common in fermentation production of food. The inclusion of the chapter on “Fungal Solid State Cultivation” compliments the other chapters in the “Food” section of this textbook.

Although this book is written for university undergraduates and polytechnic students, it contains sufficient details to be used as a reference book for postgraduate students and lecturers. It may also serve as a source book for corporate planners, managers and applied research personnel.

Lee Yuan Kun
Editor