Microbial Biotechnology

Principles and Applications

Second Edition

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Editor

Lee Yuan Kun

National University of Singapore

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Principles and Applications

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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 (RTPCR)” and Chapter 9 “Fungal Solid State Cultivation”. RTPCR 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

Contents

List of Contributors	v
Preface	ix
Part I Principles of Microbial Biotechnology	1
Chapter 1 Screening for Microbial Products <i>Alex Y. L. Teo and Hai Meng Tan</i>	3
Chapter 2 Bioprocess Technology <i>Yuan Kun Lee</i>	23
Chapter 3 Enzymology <i>Theresa May Chin Tan</i>	73
Chapter 4 Manipulation of Genes <i>Azlinda Anwar, Heng-Phon Too and Kim Lee Chua</i>	93
Chapter 5 Applications of Bioinformatics and Biocomputing to Microbiological Research <i>Paxton Loke and Tiow Suan Sim</i>	169
Chapter 6 Real Time Polymerase Chain Reaction <i>Heng-Phon Too and Azlinda Anwar</i>	199
Part II Food Production Involving Microorganisms and Their Products	221
Annex Regulation of Foods Involving Genetically Engineered Microorganisms <i>Desmond K. O'Toole and Yuan Kun Lee</i>	222

Chapter 7	Fermented Foods <i>Desmond K. O'Toole and Yuan Kun Lee</i>	227
Chapter 8	Food Involving Yeast and Ethanol Fermentation <i>Desmond K. O'Toole and Yuan Kun Lee</i>	293
Chapter 9	Fungal Solid State Cultivation <i>Desmond K. O'Toole</i>	335
Chapter 10	Food Ingredients <i>Desmond K. O'Toole and Yuan Kun Lee</i>	351
Chapter 11	Enzyme Modified Food Products <i>Desmond K. O'Toole and Yuan Kun Lee</i>	375
Part III	Microbes in Agrobiotechnology	389
Chapter 12	Microbes and Livestock <i>Jimmy Kwang</i>	391
Chapter 13	Transgenic Plants <i>Jian-Wei Liu</i>	461
Part IV	Microbes in Medical Biotechnology	537
Chapter 14	Diagnostic Clinical Microbiology <i>Vincent T. K. Chow, Tim J. J. Inglis and Keang Peng Song</i>	539
Chapter 15	Microbes: Friends or Foes? <i>Vincent T. K. Chow, Tim J. J. Inglis and Keang Peng Song</i>	593
Part V	Microbes in Environmental Biotechnology	623
Chapter 16	Municipal Wastewater Treatment <i>Lee Man Chu and P. K. Wong</i>	625
Chapter 17	Industrial Wastewater Treatment <i>P. K. Wong and Lee Man Chu</i>	667

Chapter 18	Municipal and Industrial Solid Waste Treatment <i>P. K. Wong and Lee Man Chu</i>	701
Annex	Regulatory Issues on Application of Natural and Genetic Engineered Microbes in Environmental Biotechnology <i>P. K. Wong and Lee Man Chu</i>	725
Part VI	Microbes in Alternative Energy	729
Chapter 19	Microorganisms and Production of Alternative Energy <i>Yuan Kun Lee</i>	731
Part VII	Patenting Microbial Biotechnology	747
Chapter 20	Patenting Inventions in Microbiology <i>John Candlish</i>	749
Index		767