

## Microbial Biotechnology Principles And Applications Free

In the second edition of this bestselling textbook, new materials have been added, including a new chapter on real time polymerase chain reaction (RT-PCR) and a chapter on fungal solid state cultivation. There already exist a number of excellent general textbooks on microbiology and biotechnology that deal with the basic principles of microbial biotechnology. To complement them, this book focuses 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, supplement the main text. The book also includes real life examples of how the application of microbial-biotechnological principles has achieved breakthroughs in both research and industrial production. Although written for polytechnic students and undergraduates, the book contains sufficient information to be used as a reference for postgraduate students and lecturers. It may also serve as a resource book for corporate planners, managers and applied research personnel.

In developing countries, traditional fermentation serves many purposes. It can improve the taste of an otherwise bland food, enhance the digestibility of a food that is difficult to assimilate, preserve food from degradation by noxious organisms, and increase nutritional value through the synthesis of essential amino acids and vitamins. Although "fermented food" has a vaguely distasteful ring, bread, wine, cheese, and yogurt are all familiar fermented foods. Less familiar are gari, ogi, idli, ugba, and other relatively unstudied but important foods in some African and Asian countries. This book reports on current research to improve the safety and nutrition of these foods through an elucidation of the microorganisms and mechanisms involved in their production. Also included are recommendations for needed research. Introduction to Petroleum Biotechnology introduces the petroleum engineer to biotechnology, bringing together the various biotechnology methods that are applied to recovery, refining and remediation in the uses of petroleum and petroleum products. A significant amount of petroleum is undiscoverable in reservoirs today using conventional and secondary methods. This reference explains how microbial enhanced oil recovery is aiding to produce more economical and environmentally-friendly metabolic events that lead to improved oil recovery. Meanwhile, in the downstream side of the industry, petroleum refining operators are facing the highest levels of environmental regulations while struggling to process more of the heavier crude oils since conventional physical and chemical refining techniques may not be applicable to heavier crudes. This reference proposes to the engineer and refining manager the concepts of bio-refining applications to not only render heavier crudes as lighter crudes through microbial degradation, but also through biodenitrogenation, biodemetalization and biodesulfurization, making more petroleum derivatives purified and upgraded

without the release of more pollutants. Equipped for both upstream and downstream to learn the basics, this book is a necessary primer for today's petroleum engineer. Presents the fundamentals behind petroleum biotechnology for both upstream and downstream oil and gas operations Provides the latest technology in reservoir recovery using microbial enhanced oil recovery methods Helps readers gain insight into the current and future application of using biotechnology as a refining and fuel blending method for heavy oil and tar sands

Updated Edition Includes a New Chapter and Enhanced Study Material The second edition of Environmental Microbiology for Engineers explores the role that microorganisms play in the engineered protection and enhancement of an environment. Offering a perfect balance of microbiological knowledge and environmental biotechnology principles, it provides a practical understanding of microorganisms and their functions in the environment and in the environmental engineering systems. The book also presents a quantitative description of applied microbiological processes and their engineering design. This updated edition adds a new chapter on construction biotechnology, and offers new end-of-chapter exam questions with solutions to aid readers with performing the design calculations needed and to enhance understanding of the material. The book covers essential topics that include: Diversity and functions of microorganisms in environmental engineering systems Environmental bioengineering processes Applied microbial genetics and molecular biology Microbiology of water and wastewater treatment Biotreatment of solid waste and soil bioremediation Microbial monitoring of environmental engineering systems Biocorrosion and biodeterioration of materials Biocementation and bioclogging of soil Biopollution of indoor environment Biofouling of facilities, and more Environmental Microbiology for Engineers provides a practical understanding of microorganisms in the civil engineering process and their functions in the environmental engineering systems, and is designed for practicing environmental engineers working in the areas of wastewater, solid waste treatment, soil remediation and ground improvement.

An accessible introduction to the world of microbes—from basic microbe biology through industrial applications Microbes affect our lives in a variety of ways—playing an important role in our health, food, agriculture, and environment. While some microbes are beneficial, others are pathogenic or opportunistic. Microbes: Concepts and Applications describes basic microbe biology and identification and shows not only how they operate in the subfields of medicine, biotechnology, environmental science, bioengineering, agriculture, and food science, but how they can be harnessed as a resource. It provides readers with a solid grasp of etiologic agents, pathogenic processes, epidemiology, and the role of microbes as therapeutic agents. Placing a major emphasis on omics technology, the book covers recent developments in the arena of microbes and discusses their role in industry and agriculture, as well as in related fields such as immunology, cell biology, and molecular biology. It offers complete discussions of the major bacterial, viral, fungal, and parasitic pathogens; includes

information on emerging infectious diseases, antibiotic resistance, and bioterrorism; and talks about the future challenges in microbiology. The most complete treatment of microbial biology available, *Microbes* features eye-opening chapters on: Human and Microbial World Gene Technology: Application and Techniques Molecular Diagnostic and Medical Microbiology Identification and Classification of Microbes Diversity of Microorganisms Microbes in Agriculture Microbes as a Tool for Industry and Research Complete with charts and figures, this book is an invaluable textbook for university teachers, students, researchers, and people everywhere who care about microorganisms.

The use of microbial plant protection products is growing and their importance will strongly increase due to political and public pressure. World population is growing and the amount of food needed by 2050 will be double of what is produced now whereas the area of agricultural land is decreasing. We must increase crop yield in a sustainable way. Chemical plant growth promoters must be replaced by microbiological products. Also here, the use of microbial products is growing and their importance will strongly increase. A growing area of agricultural land is salinated. Global warming will increase this process. Plants growth is inhibited by salt or even made impossible and farmers tend to disuse the most salinated lands. Microbes have been very successfully used to alleviate salt stress of plants. Chemical pollution of land can make plant growth difficult and crops grown are often polluted and not suitable for consumption. Microbes have been used to degrade these chemical pollutants.

*Principles and Applications of Antimicrobial Nanomaterials* introduces the reader to the microbial world, antimicrobial nanomaterials, how microbial evolution works, and how knowledge of these areas can facilitate the development of sustainable antimicrobials. Due to the widespread occurrence of multidrug-resistant microbes, there is an increasing interest in the use of novel nanostructured materials as antimicrobials. This book is designed to help researchers from fields such as materials science, nanoscience, and nanoengineering who are attempting to develop these antimicrobial materials. Provides crucial background in microbiology and microbial evolution to help researchers design experiments that can produce sustainable results Offers detailed coverage on the antimicrobial properties of different types of nanomaterials Discusses the major challenges of using nanomaterials for antimicrobial applications

Anaerobic biotechnology is a cost-effective and sustainable means of treating waste and wastewaters that couples treatment processes with the reclamation of useful by-products and renewable biofuels. This means of treating municipal, agricultural, and industrial wastes allows waste products to be converted to value-added products such as biofuels, biofertilizers, and other chemicals. *Anaerobic Biotechnology for Bioenergy Production: Principles and Applications* provides the reader with basic principles of anaerobic processes alongside practical uses of anaerobic biotechnology options. This book will be a valuable reference to any professional currently considering or working with anaerobic

biotechnology options.

Biotechnology for Biofuel Production and Optimization is the compilation of current research findings that cover the entire process of biofuels production from manipulation of genes and pathways to organisms and renewable feedstocks for efficient biofuel production as well as different cultivation techniques and process scale-up considerations. This book captures recent breakthroughs in the interdisciplinary areas of systems and synthetic biology, metabolic engineering, and bioprocess engineering for renewable, cleaner sources of energy. Describes state-of-the-art engineering of metabolic pathways for the production of a variety of fuel molecules Discusses recent advances in synthetic biology and metabolic engineering for rational design, construction, evaluation of novel pathways and cell chassis Covers genome engineering technologies to address complex biofuel-tolerant phenotypes for enhanced biofuel production in engineered chassis Presents the use of novel microorganisms and expanded substrate utilization strategies for production of targeted fuel molecules Explores biohybrid methods for harvesting bioenergy Discusses bioreactor design and optimization of scale-up The book will highlight major trends and developments in the field of microbial fuels, with contributions from a number of highly experienced researchers. It will serve as a comprehensive reference for industrial stakeholders, scientists, researchers and graduate students interested in microbial fuels. The aims of this work are to present the technologies and perspectives taking into account different socio-economical contexts. A specific chapter will focus on the general perspectives of microbial fuels for low-income and emerging countries.

Knowledge in microbiology is growing exponentially through the determination of genomic sequences of hundreds of microorganisms and the invention of new technologies such as genomics, transcriptomics, and proteomics, to deal with this avalanche of information. These genomic data are now exploited in thousands of applications, ranging from those in medicine, agriculture, organic chemistry, public health, biomass conversion, to biomining. Microbial Biotechnology. Fundamentals of Applied Microbiology focuses on uses of major societal importance, enabling an in-depth analysis of these critically important applications. Some, such as wastewater treatment, have changed only modestly over time, others, such as directed molecular evolution, or 'green' chemistry, are as current as today's headlines. This fully revised second edition provides an exciting interdisciplinary journey through the rapidly changing landscape of discovery in microbial biotechnology. An ideal text for courses in applied microbiology and biotechnology courses, this book will also serve as an invaluable overview of recent advances in this field for professional life scientists and for the diverse community of other professionals with interests in biotechnology.

This book describes techniques of microbial genetics and how they may be applied to biotechnology. The text is concerned largely with the application of these techniques to microbial technology. We have therefore utilised illustrative

material that is given in our own courses in applied micro biology. The book assumes in the reader a basic knowledge of microbial will prove useful to under genetics and industrial microbiology. We hope it graduates, postgraduates and others taking courses in applied micro biology. We would like to thank various colleagues, including John Carter, Julian Davies, Gordon Dougan, David Hopwood, Gwyn Humphreys, Alan McCarthy, David O'Connor, Tony Hart, Steve Oliver, Roger Pickup, Hilary Richards, Bob Rowlands, David Sherratt, Peter Strike, Richard Sykes and Liz Wellington, all of whom provided information at various stages during the writing of this book. Many thanks are also due to Linda Marsh for patiently typing the many drafts of the manuscript.

1 Introduction Natural genetic variation has always been exploited by man to improve the properties of microbial strains. Spontaneous mutations that arise in micro bial populations and that have properties advantageous to man have been gradually selected over centuries of use. However, it is only since the development of modern genetic techniques that more rational approaches have been possible. Such newer technologies have permitted the tailoring of microorganisms, plant or animal cells to manufacture specific products of commercial or social benefit and to manage the environment.

Crop Improvement through Microbial Biotechnology explains how certain techniques can be used to manipulate plant growth and development, focusing on the cross-kingdom transfer of genes to incorporate novel phenotypes in plants, including the utilization of microbes at every step, from cloning and characterization, to the production of a genetically engineered plant. This book covers microbial biotechnology in sustainable agriculture, aiming to improve crop productivity under stress conditions. It includes sections on genes encoding avirulence factors of bacteria and fungi, viral coat proteins of plant viruses, chitinase from fungi, virulence factors from nematodes and mycoplasma, insecticidal toxins from *Bacillus thuringiensis*, and herbicide tolerance enzymes from bacteria. Introduces the principles of microbial biotechnology and its application in crop improvement Lists various new developments in enhancing plant productivity and efficiency Explains the mechanisms of plant/microbial interactions and the beneficial use of these interactions in crop improvement Explores various bacteria classes and their beneficial effects in plant growth and efficiency

The field of industrial microbiology involves a thorough knowledge of the microbial physiology behind the processes in the large-scale, profit-oriented production of microbe-related goods which are the subject of the field. In recent times a paradigm shift has occurred, and a molecular understanding of the various processes by which plants, animals and microorganisms are manipulated is now central to industrial microbiology. Thus the various applications of industrial microbiology are covered broadly, with emphasis on the physiological and genomic principles behind these applications. Relevance of the new elements such as bioinformatics, genomics, proteomics, site-directed mutation and metabolic engineering, which have necessitated the paradigm shift in industrial microbiology are discussed.

This work focuses 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, supplement the main text. The volume also includes real-life examples.

This textbook teaches the principles and applications of fermentation technology, bioreactors, bioprocess variables and their measurement, key product separation and purification techniques as well as bioprocess economics in an easy to understand way. The multidisciplinary science of fermentation applies scientific and engineering principles to living organisms or their useful components to produce products and services beneficial for our society. Successful exploitation of fermentation technology involves knowledge of microbiology and engineering. Thus the book serves as a must-have guide for undergraduates and graduate students interested in Biochemical Engineering and Microbial Biotechnology

Completely revised and updated, the second edition of the best-selling *Molecular Biotechnology: Principles and Applications of Recombinant DNA* covers both the underlying scientific principles and the wide-ranging industrial, agricultural, pharmaceutical, and biomedical applications of recombinant DNA technology. Ideally suited as a text, this book is also an excellent reference for health professionals, scientists, engineers, or attorneys interested in biotechnology.

Industrial biotechnology can be defined as the use of modern biological life sciences in various industries. Biotechnology has a myriad of applications in our day to day life such as with simple processes such as the brewing of beer, use of enzymes in detergents, production of fermented food, production of antibiotics, nutritional supplements etc. This book also includes processes (production of biofuels, treatment of effluents) that contribute to creating efficient, eco-friendly environments. This book discusses the different aspects of bioprocesses; media design, fermenter design and the economics of it. It also explains in detail the processes and techniques involved in the production of commercially important products. This book is an up-to-date collection of the latest practices being followed in the field of industrial biotechnology for students both at the undergraduate and postgraduate level.

*New and Future Developments in Microbial Biotechnology and Bioengineering: Trends of Microbial Biotechnology for Sustainable Agriculture and Biomedicine Systems: Perspectives for Human Health* discusses how microbial biotechnology helps us understand new strategies to reduce pathogens and drug resistance through microbial biotechnology. The most commonly used probiotic bacteria are *Lactobacillus* and *Bifidobacterium*. Therefore, the probiotic strains exhibit powerful anti-inflammatory, antiallergic and other important properties. This new book provides an indispensable reference source for engineers/bioengineers, biochemists, biotechnologists, microbiologists, pharmacologists, and researchers who want to know about the unique properties of this microbe and explore its sustainable biomedicine future applications.

Introduces the principles of microbial biotechnology and its application for sustainable biomedicine system Explores various microbes and their beneficial application for biofortification of crops for micronutrients Explains the potentials and significance of probiotics, prebiotics and synbiotics in health and disease Includes current applications of beneficial microbes as Functional Food Products of Pharmaceutical Importance

*Microbial Biotechnology in Food and Health Science*, volume one in the *Applied Biotechnology Reviews* series, offers two unique sections within the theme of genomics and bioprocessing and the bioengineering of microorganisms in the role of food science and human health.

This volume provides review articles as the basis supporting biotechnological research useful to a wide scope of research initiatives. Important relevant information on genomics, proteomics and metabolomics are included as well as the emerging interdisciplinary area of synthetic biology which enables the metabolic engineering of microorganisms to produce pharmaceuticals. Applied Biotechnology Reviews is a series aimed at bringing all aspects of biotechnology as it is applied to food science – from agriculture through product processing into focus through topical volumes. Each volume will cover a relevant application approach in industrial biotechnology. Covers the latest biotechnological research articles on applications of microbes for food and health science Presents research articles to emphasize research methods and techniques useful for research outcomes Analysis detoxification properties of microorganisms in foods Includes methods of bioengineering of microbes to improve human insulin synthesis/recombinant protein

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 already exist a number of excellent general textbooks on microbiology and biotechnology that deal with the basic principles of the field. To complement them, this book focuses 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, supplement the main text. The book also includes real life examples of how the application of microbial-biotechnological principles has achieved breakthroughs in both research and industrial production. Although Microbial Biotechnology has been written for polytechnic students and undergraduates, it contains sufficient information to be used as a reference for postgraduate students and lecturers. It may also serve as a resource book for corporate planners, managers and applied research personnel.

Microbial biotechnology is an important area that promotes advanced research into using microbes for value-added products, human nutrition, and the overall wellbeing of society. This book presents the latest information on the use of microbes for sustainable development, and highlights state-of-the-art biotechnological techniques used to harness microbial biotechnological traits on a commercial scale. Gathering contributions from authoritative researchers in the field, it addresses recent advances in microbial biotechnological approaches that offer sustainable options for future generations. Exploring a broad range of microbial products and their uses, the book specifically places emphasis on the application of microorganisms in healthcare, the environment and industry. It also discusses various compound classes derived from microbial metabolites. Pursuing a holistic approach to recent advances in the utilization of various microbes as biotechnological tools, the book also covers traditional uses, and explores emerging strategies to harness their full potential. Accordingly, it offers a valuable resource for researchers and graduate students alike.

Fermentation Microbiology and Biotechnology, Third Edition explores and illustrates the diverse array of metabolic pathways employed for the production of primary and secondary metabolites as well as biopharmaceuticals. This updated and expanded edition addresses the whole spectrum of fermentation biotechnology, from fermentation kinetics and dynamics to protein and co-factor engineering. The third edition builds upon the fine pedigree of its earlier predecessors and extends the spectrum of the book to reflect the multidisciplinary and buoyant nature of this subject area. To that end, the book contains four new chapters: Functional Genomics Solid-State Fermentations Applications of Metabolomics to Microbial Cell Factories Current Trends in Culturing Complex Plant Tissues for the Production of Metabolites and Elite Genotypes Organized and written in a concise manner, the book's accessibility is enhanced by the inclusion of definition boxes in the margins explaining any new concept or specific term. The text also contains a significant number of case studies that illustrate current trends and their applications in the field. With contributions from a global group of eminent academics and industry experts, this book is certain to

pave the way for new innovations in the exploitation of microorganisms for the benefit of mankind.

Written primarily for mid-to-upper level undergraduates, this primer will introduce students to topics at the forefront of the subject that are being applied to probe biological problems, or to address the most pressing issues facing society. These topics will include those that form the cornerstone of contemporary research, helping students to make the transition to active researcher. Students will acquire a solid understanding of the essentials of microbial biotechnology, its applications in agriculture, diagnostics and urban and artistic conservation, as well as the potential threats genetic modification may pose to public health, the environment and intellectual property.

In the second edition of this bestselling textbook, new materials have been added, including a new chapter on real time polymerase chain reaction (RT-PCR) and a chapter on fungal solid state cultivation. There already exist a number of excellent general textbooks on microbiology and biotechnology that deal with the basic principles of microbial biotechnology. To complement them, this book focuses 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, supplement the main text. The book also includes real life examples of how the application of microbial-biotechnological principles has achieved breakthroughs in both research and industrial production. Although written for polytechnic students and undergraduates, the book contains sufficient information to be used as a reference for postgraduate students and lecturers. It may also serve as a resource book for corporate planners, managers and applied research personnel.

A text for courses in biotechnology and applied molecular biology, covering both the underlying scientific principles and the wide-ranging industrial, agricultural, pharmaceutical, and biomedical applications of recombinant DNA technology. The volume is divided into four major sections: fundamentals of molecular biotechnology, microbial systems, eukaryotic systems, and regulating and patenting molecular biotechnology. Includes a 34-page glossary. Annotation copyright by Book News, Inc., Portland, OR

Microbial Resources: From Functional Existence in Nature to Applications provides an exciting interdisciplinary journey through the rapidly developing field of microbial resources, including relationships to aspects of microbiology. Covers the functional existence of microorganisms in nature, as well as the transfer of this knowledge for industrial and other applications. Examines the economic perspective of revealing the potential value of microbial material and figuring it into socio-economic value; legal perspectives; and how to organize a fair allotment of socio-economic benefits to all stakeholders who have effectively contributed to the preservation, study, and exploitation of microbiological material. Covers aspects of foundational information related to microbiology, microbial ecology, and diversity, as well as new advances in microbial genomics Provides information on the utilization of microbial resources in biotechnology Covers legislative issues and related law in biodiscovery Fills a need for a very broad audience and is a good resource for

microbiologists seeking to know the extent of microbiology approaches, the policies associated with microbiology, and potential career paths for researchers Has significant added value due to the inclusion of comprehensive coverage of the biology, ecology, biochemistry and international legislation surrounding these applications

Incorporates the Experiences of World-Class Researchers Microbial Biotechnology: Progress and Trends offers a theoretical take on topics that relate to microbial biotechnology. The text uses the "novel experimental experiences" of various contributors from around the world—designed as case studies—to highlight relevant topics, issues, and recent developments surrounding this highly interdisciplinary field. It factors in metagenomics and microbial biofuels production, and incorporates major contributions from a wide range of disciplines that include microbiology, biochemistry, genetics, molecular biology, chemistry, biochemical engineering, and bioprocess engineering. In addition, it also provides a variety of photos, diagrams, and tables to help illustrate the material. The book consists of 15 chapters and contains subject matter that addresses: Microbial biotechnology from its historical roots to its different processes Some of the new developments in upstream processes Solid-state fermentation as an interesting field in modern fermentation processes Recent developments in the production of valuable microbial products such as biofuels, organic acids, amino acids, probiotics, healthcare products, and edible biomass Important microbial activities such as biofertilizer, biocontrol, biodegradation, and bioremediation Students, scientists, and researchers can benefit from Microbial Biotechnology: Progress and Trends, a resource that addresses 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.

Microbial Extremozymes: Novel Sources and Industrial Applications is a unique resource of practical research information on the latest novel sources and technologies regarding extremozymes in bioremediation, waste management, valorization of industrial by-products, biotransformation of natural polymers, nutrition, food safety and diagnosis of disease. The book's broad knowledge and varying applications are useful to the food industry, dairy industry, fruit and vegetable processing, and baking and beverages industries, as well as the pharmaceutical and biomedical industries. This is a concise, all-encompassing resource for a range of scientists needing knowledge of extremozymes to enhance and research. Furthermore, it provides an updated knowledge of microbial enzymes isolated from extreme environments (temperatures, etc.) and their biotechnological applications. It will be useful to researchers, scientists and students in enzyme research. In addition, users from the dairy and baking industries will benefit from the presented content. Explores recent scientific research on extremophiles and extremozymes technologies that help innovate novel ideas Provides innovative technologies for enzyme production from extremophilic microbes Includes cutting-edge

research for applications in various industries where extreme temperature conditions exist Presents novel microorganisms and their enzymes from extreme environments (Thermophilic, Psychrophilic, Acidophilic, Alkaliphilic, Anaerobic, Halophilic, Barophilic, Metallo-tolerant, Radio-resistant, etc.)

Pharmaceutical biotechnology is evolving as an increasingly vital tool in the field of life sciences by contributing to diagnostic medical tests, therapeutic drugs and also gene therapy for hereditary diseases. Pharmaceutical biotechnology tools such as recombinant proteins and transgenic organisms have revolutionised life sciences. This book aims to explain the basics and applications of pharmaceutical biotechnology to readers new to the subject. It is written and presented in a clear, easy-to-follow manner, and contains numerous figures and illustrations to explain the material. Consisting of 25 chapters divided into 5 units:- genetic engineering, plant biotechnology, animal biotechnology, microbiology and industrial biotechnology and nanobiotechnology – the book gives concise descriptions across all areas of biotechnology, brings the reader up to date with the latest findings, and also looks at what the future prospects have in store. Each chapter also offers suggested readings for further study. The three young authors have provided an excellent overview to the field of pharmaceutical biotechnology. The book can be read both as an introduction to the subject, and a synopsis of past, present and future findings. For this reason, it will be a valuable addition in any life science library.

Revised and updated to reflect the latest research and advances available, Food Biotechnology, Second Edition demonstrates the effect that biotechnology has on food production and processing. It is an authoritative and exhaustive compilation that discusses the bioconversion of raw food materials to processed products, the improvement of food. This textbook on Environmental Biotechnology not only presents an unbiased overview of the practical biological approaches currently employed to address environmental problems, but also equips readers with a working knowledge of the science that underpins them. Starting with the fundamentals of biotechnology, it subsequently provides detailed discussions of global environmental problems including microbes and their interaction with the environment, xenobiotics and their remediation, solid waste management, waste water treatment, bioreactors, biosensors, biomining and biopesticides. This book also covers renewable and non-renewable bioenergy resources, biodiversity and its conservation, and approaches to monitoring biotechnological industries, genetically modified microorganism and foods so as to increase awareness. All chapters are written in a highly accessible style, and each also includes a short bibliography for further research. In summary this textbook offers a valuable asset, allowing students, young researchers and professionals in the biotechnology industry to grasp the basics of environmental biotechnology.

This second edition has been thoroughly updated to include recent advances and developments in the field of fermentation technology, focusing on industrial applications. The book now covers new aspects such as recombinant

DNA techniques in the improvement of industrial micro-organisms, as well as including comprehensive information on fermentation media, sterilization procedures, inocula, and fermenter design. Chapters on effluent treatment and fermentation economics are also incorporated. The text is supported by plenty of clear, informative diagrams. This book is of great interest to final year and post-graduate students of applied biology, biotechnology, microbiology, biochemical and chemical engineering.

Publisher's Note: Products purchased from Third Party sellers are not guaranteed by the publisher for quality, authenticity, or access to any online entitlements included with the product. The classic environmental biotechnology textbook—fully updated for the latest advances This thoroughly revised educational resource presents the biological principles that underlie modern microbiological treatment technologies. Written by two of the field's foremost researchers, *Environmental Biotechnology: Principles and Applications, Second Edition*, clearly explains the new technologies that have evolved over the past 20 years, including direct anaerobic treatments, membrane-based processes, and granular processes. The first half of the book focuses on theory and tools; the second half offers practical applications that are clearly illustrated through real-world examples. Coverage includes:

- Moving toward sustainability
- Basics of microbiology
- Biochemistry, metabolism, genetics, and information flow
- Microbial ecology
- Stoichiometry and energetics
- Microbial kinetics and products
- Biofilm kinetics
- Reactor characteristics and kinetics
- Methanogenesis
- Aerobic suspended-growth processes
- Aerobic biofilm processes
- Nitrogen transformation and recovery
- Phosphorus removal and recovery
- Biological treatment of drinking water

This book covers application of food microbiology principles into food preservation and processing. Main aspects of the food preservation techniques, alternative food preservation techniques, role of microorganisms in food processing and their positive and negative features are covered. Features subjects on mechanism of antimicrobial action of heat, thermal process, mechanisms for microbial control by low temperature, mechanism of food preservation, control of microorganisms and mycotoxin formation by reducing water activity, food preservation by additives and biocontrol, food preservation by modified atmosphere, alternative food processing techniques, and traditional fermented products processing. The book is designed for students in food engineering, health science, food science, agricultural engineering, food technology, nutrition and dietetic, biological sciences and biotechnology fields. It will also be valuable to researchers, teachers and practising food microbiologists as well as anyone interested in different branches of food. The rapidly expanding molecular biological techniques and approaches have significant impact on microbial biotechnology, hence the need for the addition of four new chapters in the third edition of this textbook — “Chapter 3: Application of ‘Omics’ Technologies in Microbial Fermentation”, “Chapter 5: Microbial Genome Mining for Identifying

Antimicrobial Targets”, “Chapter 21: Bacterial Biofilm: Molecular Characterization and Impacts on Water Management” and “Chapter 23: Microbial Biomining”. “Chapter 15: Transgenic Plants” has been completely revised while most of the other chapters have been thoroughly updated in this new edition. There already exist a number of excellent general textbooks on microbiology and biotechnology that deal with the basic principles of microbial biotechnology. To complement them, this book focuses 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, supplement the main text. The book also includes real life examples of how the application of microbial-biotechnological principles has achieved breakthroughs in both research and industrial production. Although written for polytechnic students and undergraduates, the book contains sufficient information to be used as a reference for postgraduate students and lecturers. It may also serve as a resource book for corporate planners, managers and applied research personnel.

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