

Environmental Biotechnology Theory And Application

Biotechnology in Industrial Waste Treatment and Bioremediation addresses the increasingly important topic of waste treatment. Focusing on microbiological degradation of contaminants, it offers a representative picture of the current status of environmental biotechnology and lays a solid foundation of the methods and applications of bioremediation. The expert presentations of case studies in this new book demonstrate successful treatment schemes and technologies meeting regulatory standards. These case studies represent an international cross-section of strategies for developing and implementing the evolving technologies of bioremediation. Biotechnology in Industrial Waste Treatment and Bioremediation examines the primary waste streams, including air, water, soils, and sediments, and explores specific treatment methodologies for industrial and environmental contaminants. This broad and unique coverage allows treatment firms and regulatory authorities to determine and develop appropriate treatment strategies for site-specific problems of waste remediation. The observations and successful field applications compiled in Biotechnology in Industrial Waste Treatment and Bioremediation make it an excellent reference for understanding, evaluating, developing, and operating efficient and cost-effective full-scale treatment systems.

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.

New analytical techniques have enhanced current understanding of the behavior of trace and ultratrace elements in the biogeochemical cycling, chemical speciation, bioavailability, bioaccumulation, and as applied to the phytoremediation of contaminated soils. Addressing worldwide regulatory, scientific, and environmental issues, Trace Elements in the Environment explores these frontiers, including biotechnological aspects of metal-binding proteins and peptides and phytoremediation strategies using trees, grasses, crop plants, aquatics, and risks to ecological and human health. Discussing trace elements in the holistic environment, this book covers advances in state-of-the-art analytical techniques, molecular biotechnology, and contemporary biotechnology that enhances knowledge of the behavior of trace elements in the biogeosphere and at the cellular and molecular level. The editors and their hand-picked panel of contributors provide authoritative coverage of trace elements in the environment. They highlight cutting-edge applications of emerging strategies and technologies to the problems of trace elements in the environment. The editors discuss emerging areas such as bacterial biosorption of trace elements, processes, and applications of electroremediation of heavy metals-contaminated soils, application of novel nanoporous sorbents for the removal of heavy metals, metalloids, and radionuclides. The book focuses on the effects of increasing levels of trace elements on ecological and human health, evaluates the effectiveness of methods of phytoremediation, and covers risk assessment, pathways, and trace element

Read PDF Environmental Biotechnology Theory And Application

toxicity. Containing more than 150 illustrations, tables, photographs, and equations, the book's coverage spans the entire body of knowledge available about how and why plants interact with metals and other trace elements.

This book provides information essential to students taking courses in biotechnology as part of environmental sciences, environmental management, or environmental biology programs. It is also suitable for those studying water, waste management, and pollution abatement. Topics include biodiversity, renewable energy, bioremediation technology, recombinant DNA technology, genetic engineering, solid waste management, composting, vermicomposting, biofertilizer, chemical pesticides, biological control of pests, and genetically modified organisms. The book also discusses bioethics and risk assessment, intellectual property rights, environmental cleanup technologies, and environmental nanotechnology.

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.

A deeper insight into the complex processes involved in this field, covering the biological, chemical and engineering fundamentals needed to further develop effective methodologies. The book devotes detailed chapters to each of the four main areas of environmental biotechnology -- wastewater treatment, soil treatment, solid waste treatment, and waste gas treatment -- dealing with both the microbiological and process engineering aspects. The result is the combined knowledge contained in the extremely successful volumes 11a through 11c of the "Biotechnology" series in a handy and compact form.

Environmental Biotechnology: A Biosystems Approach introduces a systems approach to environmental biotechnology and its applications to a range of environmental problems. A systems approach requires a basic understanding of four disciplines: environmental engineering, systems biology, environmental microbiology, and ecology. These disciplines are discussed in the context of their application to achieve specific environmental outcomes and to avoid problems in such applications. The book begins with a discussion of the background and historical context of contemporary issues in biotechnology. It then explains the scientific principles of environmental biotechnologies; environmental biochemodynamic processes; environmental risk assessment; and the reduction and management of biotechnological risks. It describes ways to address environmental problems caused or exacerbated by biotechnologies. It also emphasizes need for professionalism in environmental biotechnological enterprises. This book was designed to serve as a primary text for two full semesters of undergraduate

Read PDF Environmental Biotechnology Theory And Application

study (e.g., Introduction to Environmental Biotechnology or Advanced Environmental Biotechnology). It will also be a resource text for a graduate-level seminar in environmental biotechnology (e.g., Environmental Implications of Biotechnology). * Provides a systems approach to biotechnologies which includes the physical, biological, and chemical processes in context * Case studies include cutting-edge technologies such as nanobiotechnologies and green engineering * Addresses both the applications and implications of biotechnologies by following the life-cycle of a variety of established and developing biotechnologies

Genetic-based animal biotechnology has produced new food and pharmaceutical products and promises many more advances to benefit humankind. These exciting prospects are accompanied by considerable unease, however, about matters such as safety and ethics. This book identifies science-based and policy-related concerns about animal biotechnologyâ€"key issues that must be resolved before the new breakthroughs can reach their potential. The book includes a short history of the field and provides understandable definitions of terms like cloning. Looking at technologies on the near horizon, the authors discuss what we know and what we fear about their effectsâ€"the inadvertent release of dangerous microorganisms, the safety of products derived from biotechnology, the impact of genetically engineered animals on their environment. In addition to these concerns, the book explores animal welfare concerns, and our societal and institutional capacity to manage and regulate the technology and its products. This accessible volume will be important to everyone interested in the implications of the use of animal biotechnology.

The United States is among the wealthiest nations in the world, but it is far from the healthiest. Although life expectancy and survival rates in the United States have improved dramatically over the past century, Americans live shorter lives and experience more injuries and illnesses than people in other high-income countries. The U.S. health disadvantage cannot be attributed solely to the adverse health status of racial or ethnic minorities or poor people: even highly advantaged Americans are in worse health than their counterparts in other, "peer" countries. In light of the new and growing evidence about the U.S. health disadvantage, the National Institutes of Health asked the National Research Council (NRC) and the Institute of Medicine (IOM) to convene a panel of experts to study the issue. The Panel on Understanding Cross-National Health Differences Among High-Income Countries examined whether the U.S. health disadvantage exists across the life span, considered potential explanations, and assessed the larger implications of the findings. U.S. Health in International Perspective presents detailed evidence on the issue, explores the possible explanations for the shorter and less healthy lives of Americans than those of people in comparable countries, and recommends actions by both government and nongovernment agencies and organizations to address the U.S. health disadvantage.

Designed to inform and inspire the next generation of plant biotechnologists Plant Biotechnology and Genetics explores contemporary techniques and applications of plant biotechnology, illustrating the tremendous potential this technology has to change our world by improving the food supply. As an introductory text, its focus is on basic science and processes. It guides students from plant biology and genetics to breeding to principles and applications of plant biotechnology. Next, the text examines the critical issues of patents and intellectual property and then tackles the many controversies and consumer concerns over transgenic plants. The final chapter of the book provides an expert forecast of the future of plant biotechnology. Each chapter has been written by one or more leading practitioners in the field and then carefully edited to ensure thoroughness and consistency. The chapters are organized so that each one progressively builds upon the previous chapters. Questions set forth in each chapter help students deepen their understanding and facilitate classroom discussions. Inspirational autobiographical essays, written by pioneers and eminent scientists in the field today, are interspersed throughout the text. Authors explain

Read PDF Environmental Biotechnology Theory And Application

how they became involved in the field and offer a personal perspective on their contributions and the future of the field. The text's accompanying CD-ROM offers full-color figures that can be used in classroom presentations with other teaching aids available online. This text is recommended for junior- and senior-level courses in plant biotechnology or plant genetics and for courses devoted to special topics at both the undergraduate and graduate levels. It is also an ideal reference for practitioners.

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

The development of biologically based processes for the treatment of hazardous inorganic and organic wastes is a multi-disciplinary effort requiring the consideration of a number of biological, chemical, and physical parameters, as well as the effective teaming of biologists, chemists, engineers, and regulatory agencies. This new text/reference bridges the disciplines in a unique way, allowing an exchange of fundamental information to take place. The book begins with a description of the biological transformations of inorganic and organic compounds and a review of strategies that may be used for the treatment of hazardous wastes. It continues with a discussion of the physiological and engineering factors that must be considered for successful process development and concludes with a discussion of the regulations that have influenced biological waste treatment and environmental remediation.

Anthropogenic activity has clearly altered the N cycle contributing (among other factors) to climate change. This book aims to provide new biotechnological approach representing innovative strategies to solve specific problems related to the imbalance originating in the N cycle. Aspects such as new conceptions in agriculture, wastewater treatment, and greenhouse gas emissions are discussed in this book with a multidisciplinary vision. A team of international authors with wide experience have contributed up-to-date reviews, highlighting scientific principles and their environmental importance and integrating different biotechnological processes in environmental technology.

This book provides an example of the successful and rapid expansion of bioengineering within the world of the science. It includes a core of studies on bioengineering technology applications so important that their progress is expected to improve both human health and ecosystem. These studies provide an important update on technology and achievements in molecular and cellular engineering as well as in the relatively new field of environmental bioengineering. The book will hopefully attract the interest of not only the bioengineers, researchers or professionals, but also of everyone who appreciates life and environmental sciences.

The fourth edition of *The Immunoassay Handbook* provides an excellent, thoroughly updated guide to the science, technology and applications of ELISA and other immunoassays, including a wealth of practical advice. It encompasses a wide range of methods and gives an insight into the latest developments and applications in clinical and veterinary practice and in pharmaceutical and life science research. Highly

Read PDF Environmental Biotechnology Theory And Application

illustrated and clearly written, this award-winning reference work provides an excellent guide to this fast-growing field. Revised and extensively updated, with over 30% new material and 77 chapters, it reveals the underlying common principles and simplifies an abundance of innovation. The Immunoassay Handbook reviews a wide range of topics, now including lateral flow, microsphere multiplex assays, immunohistochemistry, practical ELISA development, assay interferences, pharmaceutical applications, qualitative immunoassays, antibody detection and lab-on-a-chip. This handbook is a must-read for all who use immunoassay as a tool, including clinicians, clinical and veterinary chemists, biochemists, food technologists, environmental scientists, and students and researchers in medicine, immunology and proteomics. It is an essential reference for the immunoassay industry. Provides an excellent revised guide to this commercially highly successful technology in diagnostics and research, from consumer home pregnancy kits to AIDS testing. www.immunoassayhandbook.com is a great resource that we put a lot of effort into. The content is designed to encourage purchases of single chapters or the entire book. David Wild is a healthcare industry veteran, with experience in biotechnology, pharmaceuticals, medical devices and immunodiagnostics, which remains his passion. He worked for Amersham, Eastman-Kodak, Johnson & Johnson, and Bristol-Myers Squibb, and consulted for diagnostics and biotechnology companies. He led research and development programs, design and construction of chemical and biotechnology plants, and integration of acquired companies. Director-level positions included Research and Development, Design Engineering, Operations and Strategy, for billion dollar businesses. He retired from full-time work in 2012 to focus on his role as Editor of The Immunoassay Handbook, and advises on product development, manufacturing and marketing. Provides a unique mix of theory, practical advice and applications, with numerous examples Offers explanations of technologies under development and practical insider tips that are sometimes omitted from scientific papers Includes a comprehensive troubleshooting guide, useful for solving problems and improving assay performancee Provides valuable chapter updates, now available on www.immunoassayhandbook.com

Modern Applications of Plant Biotechnology in Pharmaceutical Sciences explores advanced techniques in plant biotechnology, their applications to pharmaceutical sciences, and how these methods can lead to more effective, safe, and affordable drugs. The book covers modern approaches in a practical, step-by-step manner, and includes illustrations, examples, and case studies to enhance understanding. Key topics include plant-made pharmaceuticals, classical and non-classical techniques for secondary metabolite production in plant cell culture and their relevance to pharmaceutical science, edible vaccines, novel delivery systems for plant-based products, international industry regulatory guidelines, and more. Readers will find the book to be a comprehensive and valuable resource for the study of modern plant biotechnology approaches and their pharmaceutical applications. Builds upon the basic concepts of cell and plant tissue culture and recombinant DNA technology to better illustrate the modern and potential applications of plant biotechnology to the pharmaceutical sciences Provides detailed yet practical coverage of complex techniques, such as micropropagation, gene transfer, and biosynthesis Examines critical issues of international importance and offers real-life examples and potential solutions

Scholars of bioethics, environmental philosophy, religious studies, sociology, public policy, and political theory will find much merit in this book's lively discussion.

Between 1973 and 2016, the ways to manipulate DNA to endow new characteristics in an organism (that is, biotechnology) have advanced, enabling the development of products that were not previously possible. What will the likely future products of biotechnology be over the next 5-10 years? What scientific capabilities, tools, and/or expertise may be needed by the regulatory agencies to ensure they make efficient and sound evaluations of the likely future products of biotechnology? Preparing for Future Products of Biotechnology analyzes the future

landscape of biotechnology products and seeks to inform forthcoming policy making. This report identifies potential new risks and frameworks for risk assessment and areas in which the risks or lack of risks relating to the products of biotechnology are well understood.

This is the first collection of review articles on the use of photosynthetic microorganisms in environmental biotechnology. It serves as a quick and comprehensive reference for practitioners, researchers and students. The main theory is to use photosynthetic microorganisms, which are able to utilize solar irradiance for the transformation of carbon substrates, to solve environmental problems. This book emphasizes the importance of sustaining the natural environment with industrial development.

This new book, *Nanobiotechnology: Concepts and Applications in Health, Agriculture, and Environment*, presents a broad conceptual overview regarding the synthesis, applications, and toxicological aspects of nanobiotechnology. It focuses on the entrance into and interaction of nanomaterials in the human body, which has generated intense scientific curiosity, attracting much attention as well as increasing concern from the nanomaterial-based industries and academia across the world. This book looks at the scientific aspects of nanomaterials used in many applications of biosciences, taking an interdisciplinary approach that encompasses medicine, biology, pharmacy, physics, chemistry, engineering, nanotechnology, and materials science. The volume covers the basics of nanosciences and nanotechnology; different schemes and routes of synthesis; and various biological applications, including sensing, medicine, drug delivery systems, and remediation. Further, special chapters will be devoted to nanotoxicology and the developing risk factors associated with nanosized particles during use along with the ethical issues related to nanobiotechnology.

As we enter a new millennium, the environmental issues faced by both developing and industrialised nations are as pressing as ever. Environmental biotechnologies are increasingly being viewed as a major weapon against environmental damage. Cleaner production is part of this strategy and yet there is still widespread ignorance about this emerging technology. *Environmental Biotechnology and Cleaner Bioprocesses* provides this information at various levels, from introductory to advanced. The first section covers the development of cleaner bioprocesses within the framework of sustainable development. Aspects of environmental policy for small and medium businesses are then discussed using case studies to illustrate principles. The second section covers the recycling and treatment of organic waste, including the use of aquatic plants and microalgae for wastewater treatment and recovery of nutrients. Section three covers bioremediation technologies and finally, section four is dedicated to emerging cleaner bioprocesses and environmentally sound products. All chapters have been written and edited by leading authorities in the field. Students and professionals interested in environmental biotechnology and cleaner production will find the background information and detail they require in this one convenient source.

This volume explores developments in techniques in diagnostics, DNA sequencing, bioanalysis of immunoassays, and single-molecule detection. It promotes the measurement, identification, monitoring, analysis, and application of near-infrared spectroscopy (NIR) to medical and pharmaceutical advances. The text also considers noninvasive methods of NIR for successful, cost-effective, and prompt diagnoses of diseases.

The dangers and drawbacks inherent in radioactivity-based methods along with a demonstrated and dramatic increase in sensitivity have precipitated a major shift towards luminescence measurements and visualization techniques. Their use has now spread even to traditional clinical environments, and their applications have grown from clinical assays to DNA sequencing, antioxidant detection, and high-throughput screening. *Luminescence Biotechnology: Instruments and Applications* furnishes a thorough review of the principles and applications of luminescence. With a consistent focus on practical considerations, contributions from a team of internationally acclaimed authors take you

Read PDF Environmental Biotechnology Theory And Application

from the fundamentals of the different luminescence-based assay systems, calculation methods, and instruments through the spectrum of applications and latest research advances. Topics include gene and protein assays, oxidative stress and tissue aging, applications of luminescent microspheres, and proton image analysis. This book clearly identifies the advantages of luminescence over other assay techniques, discusses its potential pitfalls, and illustrates the broad range of its utility. Whether you are a newcomer to the field or a seasoned professional, this book provides a wealth of information that will bring you quickly up to date on the technology, recent research developments, and cutting-edge applications.

Environmental Biotechnology: Theory and Applications, 2nd Edition is designed to draw together the microscopic, functional level and the macroscopic, practical applications of biotechnology and to explain how the two relate within an environmental context. It presents the practical biological approaches currently employed to address environmental problems and provides the reader with a working knowledge of the science that underpins them. Biotechnology has now become a realistic alternative to many established approaches for manufacturing, land remediation, pollution control and waste management and is therefore an essential aspect of environmental studies. Fully updated to reflect new developments in the field and with numerous new case studies throughout this edition will be essential reading for undergraduates and masters students taking modules in Biotechnology or Pollution Control as part of Environmental Science, Environmental Management or Environmental Biology programmes. Quote from the first edition: "There is no doubt that this book will be one of inspiration for all professionals in the field. It is a very good framework for understanding the complex nature of processes and technology and as such it will be useful for researchers, practitioners and other parties who need a working knowledge of this fascinating subject." —Professor Bjorn Jensen, Chairman of the European Federation of Biotechnology, Environmental Biotechnology section and Research and Innovation Director, DHI Water and Environment

Soil is an irreplaceable resource that sustains life on the planet, challenged by food and energy demands of an increasing population. Therefore, soil contamination constitutes a critical issue to be addressed if we are to secure the life quality of present and future generations. Integrated efforts from researchers and policy makers are required to develop sound risk assessment procedures, remediation strategies and sustainable soil management policies. Environmental Risk Assessment of Soil Contamination provides a wide depiction of current research in soil contamination and risk assessment, encompassing reviews and case studies on soil pollution by heavy metals and organic pollutants. The book introduces several innovative approaches for soil remediation and risk assessment, including advances in phytoremediation and implementation of metabolomics in soil sciences.

For microbiology and environmental microbiology courses, this leading textbook builds on the academic success of the previous edition by including a comprehensive and up-to-date discussion of environmental microbiology as a discipline that has grown in scope and interest in recent years. From environmental science and microbial ecology to topics in molecular genetics, this edition relates environmental microbiology to the work of a variety of life science, ecology, and environmental science investigators. The authors and editors have taken the care to highlight links between environmental microbiology and topics important to our changing world such as bioterrorism and national security with sections on practical issues such as bioremediation, waterborne pathogens, microbial risk assessment, and environmental biotechnology. WHY ADOPT THIS EDITION? New chapters on: Urban Environmental Microbiology Bacterial Communities in Natural Ecosystems Global Change and Microbial Infectious Disease Microorganisms and Bioterrorism Extreme Environments (emphasizing the ecology of these environments) Aquatic Environments (now devoted to its own chapter- was combined with Extreme Environments) Updates

Read PDF Environmental Biotechnology Theory And Application

to Methodologies: Nucleic Acid -Based Methods: microarrays, phyloarrays, real-time PCR, metagenomics, and comparative genomics
Physiological Methods: stable isotope fingerprinting and functional genomics and proteomics-based approaches
Microscopic Techniques: FISH (fluorescent in situ hybridization) and atomic force microscopy
Cultural Methods: new approaches to enhanced cultivation of environmental bacteria
Environmental Sample Collection and Processing: added section on air sampling

The objective of this book is to give a general view of the different areas of environmental biotechnology and its applications. A field of study that is used for harnessing biological process for industrial purposes is known as environmental biotechnology. This book covers in detail some existent theories and innovative concepts revolving around this field of study. From theories to research to practical applications, case studies related to all contemporary topics of relevance to this field have been included in this text. It is appropriate for students seeking detailed information in this area as well as for experts. Coherent flow of topics, student-friendly language and extensive use of examples make this book an invaluable source of knowledge.

The past 30 years have seen the emergence of a growing desire worldwide that positive actions be taken to restore and protect the environment from the degrading effects of all forms of pollution – air, water, soil, and noise. Since pollution is a direct or indirect consequence of waste production, the seemingly idealistic demand for “zero discharge” can be construed as an unrealistic demand for zero waste. However, as long as waste continues to exist, we can only attempt to abate the subsequent pollution by converting it to a less noxious form. Three major questions usually arise when a particular type of pollution has been identified: (1) How serious is the pollution? (2) Is the technology to abate it available? and (3) Do the costs of abatement justify the degree of abatement achieved? This book is one of the volumes of the Handbook of Environmental Engineering series. The principal intention of this series is to help readers formulate answers to the last two questions above. The traditional approach of applying tried-and-true solutions to specific pollution problems has been a major contributing factor to the success of environmental engineering, and has accounted in large measure for the establishment of a “methodology of pollution control.” However, the realization of the ever-increasing complexity and interrelated nature of current environmental problems renders it imperative that intelligent planning of pollution abatement systems be undertaken.

Contributions from 80 world-renowned authorities representing a broad international background lend Fungal Biotechnology in Agricultural, Food, and Environmental Applications first-class information on the biotechnological potential of entomopathogenic fungi and ergot alkaloids, applications of Trichoderma in disease control, and the development of mycoherbicides. Additional topics include fungal control of nematodes, control of plant disease by arbuscular mycorrhizal fungi, strategies for controlling vegetable and fruit crops, molecular biology tactics with mycotoxigenic fungi and the development of biofungicides, production of edible fungi, fermented foods, and high-value products like mycoprotein.

Considering the ever-increasing global population and finite arable land, technology and sustainable agricultural practices are required to improve crop yield. This book examines the interaction between plants and microbes and considers the use of advanced techniques such as genetic engineering, revolutionary gene editing technologies, and their applications to understand how plants and microbes help or harm each other at the molecular level. Understanding plant-microbe interactions and related gene editing technologies will provide new possibilities for sustainable agriculture. The book will be extremely useful for researchers working in the fields of plant science, molecular plant biology, plant-microbe interactions, plant engineering technology, agricultural microbiology, and related fields. It will be useful for upper-level students and instructors specifically in the field of biotechnology, microbiology, biochemistry, and agricultural science. Features:

Read PDF Environmental Biotechnology Theory And Application

Examines the most advanced approaches for genetic engineering of agriculture (CRISPR, TALAN, ZFN, etc.). Discusses the microbiological control of various plant diseases. Explores future perspectives for research in microbiological plant science. Plant-Microbial Interactions and Smart Agricultural Biotechnology will serve as a useful source of cutting-edge information for researchers and innovative professionals, as well as upper-level undergraduate and graduate students taking related agriculture and environmental science courses.

The rapid growth of industries has resulted in the generation of high volume of solid and liquid waste. Today, there is a need of Clean and Green technology for the sustainable waste management. Biochemical and Environmental Bioprocessing: Challenges and Developments explore the State-of-art green technologies to manage the waste and to recover value added products. Microbes play an important role in the bioremediation. Bioprocess engineering an interdisciplinary connects the Science and Technology. The bioconversion and bioremediation is essentially required for the management of various hazardous substances in the environment. This book will give an intensive knowledge on the application of Biochemical and Bioprocess technologies for the eco-friendly management of pollution. This book serves as a fundamental to the students, researchers, academicians and Engineers working in the area of Environmental Bioremediation and in the exploration of various bioproducts from waste. Features Reviews various biological methods for the treatment of effluents from Industries by using biomass and biopolymers. Highlights the applications of various bioreactors like Anaerobic Sequential Batch Reactor, Continuously stirred anaerobic digester, Up-flow anaerobic sludge blanket reactor, Fluidized and expanded bed reactors. Presents the cultivation of algae in Open Pond, Closed loop System, and Photo-bioreactors for bioenergy production. Discusses the intensified and integrated biorefinery approach by Microwave Irradiation, Pyrolysis, Acoustic cavitation, Hydrodynamic cavitation, Electron beam irradiation, High pressure Autoclave reactor, Steam explosion and photochemical oxidation. Outlines the usage of microbial fuel cell (MFC) for the production bioelectricity generation in different modules Tubular MFC, Stacked MFC, Separate electrode modules Cutting edge research of synthesis of biogenic nanoparticles and Pigments by green route for the health care and environment management.

Reflecting the interdisciplinary nature of biotechnology, this book covers the role of targeted delivery of polymeric nanodrugs to cancer cells, microbial detoxifying enzymes in bioremediation and bacterial plasmids in antimicrobial resistance. It addresses modern trends such as pharmacogenomics, evaluation of gene expression, recombinant proteins from methylotrophic yeast, identification of novel fermentation inhibitors of bioethanol production, and polyhydroxyalkanoate based biomaterials. The book highlights the practical utility of biotechnology and bioinformatics for bioenergy, production of high value biochemicals, modeling molecular interactions, drug discovery, and personalized medicine.

Environmental Biotechnology provides a broad overview of the subject, focusing on how biotechnological techniques are applied to solve environmental problems, rather than giving detailed explanations of the techniques themselves. Capturing the current excitement in a field reinvigorated by advances in genetic manipulation, and emerging genomic and proteomic technologies, Environmental Biotechnology is the perfect resource for any student needing to develop a sound understanding of biotechnology, and the diverse ways it can be applied to address important environmental issues.

Microbial biotechnology is an important contributor to global business, especially in agriculture, the environment, healthcare, and the medical, food, and chemical industries. This volume provides an exciting interdisciplinary journey through the rapidly changing backdrop of invention in microbial biotechnology, covering a range of topics, including microbial properties and characterization, cultivation and production strategies, and applications in healthcare, bioremediation, nanotechnology, and more. Key features: Explains the diverse aspects of and strategies for

Read PDF Environmental Biotechnology Theory And Application

cultivation of microbial species Describes biodiversity and biotechnology of microbes Provides an understanding of microorganisms in bioremediation of pollutants Explores various applications of microbes in agriculture, food, health, industry, and the environment Considers production issues and applications of microbial secondary metabolites Underscores the importance of integrating genomics of microorganisms in ecological restoration of contaminated environments

This book introduces various fields of metal biotechnology, emphasizing applications for the fields of environment conservation and resource recycling. The topics discussed include wastewater treatment and bioremediation technologies for hazardous metals making use of metal metabolism by microorganisms and other organisms; recovery and recycling of metals from drainage and waste sources; the biological synthesis and processing of new metallic materials and monitoring of metals for industrial uses; and bio-informatics in metal biotechnology. These topics are expected to be of great help for new developments in these new technologies.

This book includes reviews of molecular- and organismal-level studies in bioluminescence in order to elucidate the mechanisms behind this phenomenon. It is intended for molecular biology researchers involved in bioluminescent reactions, molecular engineering of bioluminescent sensor probes, and biomonitoring of environmental toxins.. Field researchers as well as students will also find this volume to be of interest. With focus on the practical use of modern biotechnology for environmental sustainability, this book provides a thoughtful overview of molecular aspects of environmental studies to create a new awareness of fundamental biological processes and sustainable ecological concerns. It covers the latest research by prominent scientists in modern biology and delineates recent and prospective applications in the sub-areas of environmental biotechnology with special focus on the biodegradation of toxic pollutants, bioremediation of contaminated environments, and bioconversion of organic wastes toward a green economy and sustainable future.

The book includes current and emerging concepts in the areas of environmental biotechnology such as pollution sources, control and measurement, solid waste management, bioremediation, biofuels, biosensors, bioleaching, conservation biotechnology and more. The book also includes recent innovations made in this field and incorporates case studies to help in understanding the concepts. This book applies principles from multidisciplinary sciences of environmental engineering, metabolic engineering, rDNA technology and omics to study the role of microbes and plants in tackling environmental issues. It also includes content related to risk assessment and environmental management systems. Each chapter provides problems and solutions of different topics with diagrammatic illustrations and tables for students, researchers and other professionals in environmental biotechnology. Explores cutting-edge technologies, including nanotechnology-based bioremediation, value-added products from waste and emerging techniques related to environmental risk assessment and monitoring Reviews the current methods being applied in the environment field for pollution control, waste management, biodegradation of organic and inorganic pollutants and so on Provides in-depth knowledge of the latest advancements in the field of environmental biotechnology such as bioleaching, biomining and advances in biotechnology-based conservation of biodiversity Introduces undergraduate and post-graduate students to basic concepts of environmental biotechnology and allied fields Discusses different products such as biofuels, biopolymers and biosensors that are being produced using biotechnological methods, thus contributing towards the goal of sustainable development Dr. Neetu Sharma is Assistant Professor in the Department of Biotechnology, GGSDS College, Chandigarh, India. The main thrust of her research centers on biotechnology, bioremediation and nanotechnology. Abhinashi Singh Sodhi is Assistant Professor in the Department of Biotechnology, GGSDS College, Chandigarh, India. His current research focuses on waste reduction, valorization and bioproduct formation. Dr. Navneet Batra is Associate Professor and Head, Department of Biotechnology, GGSDS College, Chandigarh, India. He has extensive academic and

