

# Advances In Applied Bioremediation Soil Biology Hardcover 2009 By Ajay Singheditor

**Advances in Applied Bioremediation** *Applied Bioremediation and Phytoremediation* **Applied Bioremediation Advances in Applied Bioremediation** *Applied Bioremediation of Petroleum Hydrocarbons* Bioremediation and Sustainability Bioremediation Soil Microenvironment for Bioremediation and Polymer Production **Biodegradation and Bioremediation** Synergistic Approaches for Bioremediation of Environmental Pollutants: Recent Advances and Challenges **Metagenomics to Bioremediation** **Integrative Strategies for Bioremediation of Environmental Contaminants, Vol. 2** **Applied Environmental Biotechnology: Present Scenario and Future Trends** *Current and Future Directions in Applied Mathematics* **Toxicity and Waste Management Using Bioremediation** Handbook of Research on Inventive Bioremediation Techniques **Microbial Biodegradation and Bioremediation** *Emerging Technologies in Environmental Bioremediation* **Bioremediation and Phytoremediation Technologies in Sustainable Soil Management** *The Utilization of Bioremediation to Reduce Soil Contamination* Bioremediation for marine oil spills. Practical Environmental Bioremediation Bioremediation of Environmental Pollutants **Advances in Biodegradation and Bioremediation of Industrial Waste** *Soil Bioremediation* Bioremediation and Sustainability Current Advances in Applied Microbiology & Biotechnology **Microbial Biodegradation and Bioremediation**

**Smart Bioremediation Technologies Microbial Bioremediation & Biodegradation** In Situ Bioremediation Rhizobiont in Bioremediation of Hazardous Waste Fungi as Bioremediators Bioremediation Emerging Technologies in Applied and Environmental Microbiology Rhizomicrobiome Dynamics in Bioremediation Microbial and Biotechnological Interventions in Bioremediation and Phytoremediation Manual for Soil Analysis - Monitoring and Assessing Soil Bioremediation Microbes and Enzymes in Soil Health and Bioremediation Microbes in Applied Research

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*Soil Microenvironment for Bioremediation and Polymer Production* Jun 01 2022

Describes harmful elements and their bioremediation

techniques for tannery waste, oil spills, wastewater, greenhouse gases, plastic and other wastes.

Microenvironmental conditions in soil provide a natural niche

for ultra-structures, microbes and microenvironments. The natural biodiversity of these microenvironments is being disturbed by industrialization and the proliferation of urban centers, and synthetic contaminants found in these micro-places are causing stress and instability in the biochemical systems of microbes. The development of new metabolic pathways from intrinsic metabolic cycles facilitate microbial degradation of diverse resistant synthetic compounds present in soil. These are a vital, competent and cost-effective substitute to conventional treatments. Highly developed techniques for bioremediation of these synthetic compounds are increasing and these techniques facilitate the development of a safe environment using renewable biomaterial for removal of toxic heavy metals and xenobiotics. Soil Microenvironment for Bioremediation and Polymer Production consists of 21 chapters by subject matter experts and is divided into four

parts: Soil Microenvironment and Biotransformation Mechanisms; Synergistic Effects between Substrates and Microbes; Polyhydroxyalakananoates: Resources, Demands and Sustainability; and Cellulose-Based Biomaterials. This timely and important book highlights Chapters on classical bioremediation approaches and advances in the use of nanoparticles for removal of radioactive waste Discusses the production of applied emerging biopolymers using diverse microorganisms Provides the most innovative practices in the field of bioremediation Explores new techniques that will help to improve biopolymer production from bacteria Provides novel concepts for the most affordable and economic societal benefits. *Emerging Technologies in Environmental Bioremediation* Jul 22 2021 Emerging Technologies in Environmental Bioremediation introduces emerging bioremediation technologies for the treatment

and management of industrial wastes and other environmental pollutants for the sake of environmental sustainability. Emerging bioremediation approaches such as nano-bioremediation technology, electro-bioremediation technology, microbial fuel cell technology, Modified Ludzack-Ettinger Process, Modified Activated Sludge Process, and phytotechnologies for the remediation of industrial wastes/pollutants are discussed in a comprehensive manner not found in other books. Furthermore, the book includes updated information as well as future directions for research in the field of bioremediation of industrial wastes. This book will be extremely useful to students, researchers, scientists and professionals in the field of microbiology and biotechnology, Bio (chemical) engineers, environmental researchers, eco-toxicology, and many more. Includes the recovery of resources from wastewater Describes the importance of microorganisms

in environmental bioremediation technologies Points out the reuse of treated wastewater through emerging technologies Pays attention to the occurrence of novel micro-pollutants Emphasizes the role of nanotechnology in pollutant bioremediation

**Bioremediation** Mar 06 2020

In the field of biosensors the previous focus has been almost entirely on medical diagnostics. Here it is discussed in relation to bioremediation. The application of new biosensing techniques to environmental monitoring promises to be a more economical approach to monitoring both soil consortia and levels of pollutants. Significantly, functional biosensors can determine such parameters as 'How clean is clean?' This new edition is targeted specifically at graduate students and environmental professionals.

**Microbes and Enzymes in Soil Health and**

**Bioremediation** Oct 01 2019

Microbial enzymes play a vital role in maintaining soil health and removing pollutants from

contaminated land. Soil microflora is closely associated with maintaining soil fertility, and the use of chemical pesticides, fertilizers and other volatile sprays in agriculture threatens the health of the microbial population in the soil. Every single particle of healthy soil contains millions of bacteria, which interact with the nutrients available, sustaining the nutrient cycle and making this microflora an essential component of life on earth. How do microbes help in the nutrient cycle? Either by intracellular digestion of macromolecules and converting these into smaller units in their metabolic pathways, or by secreting enzymes into the extracellular environment to facilitate the conversion of complex macromolecules into micro-molecules that can be easily absorbed by other living species. To meet demands for energy and food for the growing global population, it is important to protect agricultural land from contamination and maintain its

productivity. Heavy metal ions from contaminated land can enter crops, fish or aquatic organisms via contaminated water, and these are then taken up by the human body, where they can accumulate and alter the normal microflora. The microbiological component of the soil is a highly complex system and is still not fully understood. How do microbes survive in the changing physicochemical environment of soil?. This book helps readers understand the mechanism, various routes of microbial soil remediation, the interactions of different genera, and how microbial enzymes support the sustainable restoration of healthy soil. Practical Environmental Bioremediation Mar 18 2021 Bioremediation, or enhanced microbiological treatment, of environments contaminated with a variety of organic and inorganic compounds is one of the most effective innovative technologies to come around this century! Practical Environmental Bioremediation: The Field Guide presents

updated material, case histories and many instructive illustrations to reflect the evolving image of this fast-emerging industry. Bioremediation technology has witnessed great strides towards simplifying treatability formats, finding new approaches to field application, more potent nutrient formulations, monitoring protocols and the resulting general improvement in results. This new guide condenses all current available knowledge and presents necessary technical aspects and concepts in language that can be readily comprehended by the technical student, experienced scientist or engineer, the aspiring newcomer, or anyone else interested in this exciting natural cleanup technique. *Emerging Technologies in Applied and Environmental Microbiology* Feb 03 2020 *Emerging Technologies in Applied and Environmental Microbiology* describes various problems and solutions that arise in applied and

environmental microbiology using scientific technologies. The book summarizes the main omic-based methods currently used to characterize environmental microorganisms, as well as approaches to analyzing and interpreting the bio information generated by experimentally based studies. Sections explore the current understanding of bacterial signaling through examples of communication systems that include signaling in gram-positive and gram-negative bacteria, along with discussions on how microorganisms interact with each other, with other organisms, and with the environment. In addition, this comprehensive resource highlights the importance of various emerging technologies for cleaning up pollution in the environment caused by human activities. Final sections assess the potential application of several existing, applied and environmental microbiological techniques and introduces new and emerging technologies through applied aspects.

Describes various problems and solutions that arise in applied and environmental microbiology using scientific technologies Summarizes the main omics-based methods currently used to characterize environmental microorganisms, as well as approaches to analyzing and interpreting the bio information generated by experimentally based studies Explores the current understanding of bacterial signaling through examples of communication systems that include signaling in gram-positive and gram-negative bacteria Shows the presence of all kinds of microbes in the natural environment for the removal of organic pollutants through various emerging technologies

*Current and Future Directions in Applied Mathematics* Nov 25 2021 In order to tackle complex problems in the applied sciences, there is an increased demand for interdisciplinary research between mathematicians and researchers working in engineering, the sciences, and

business. The mathematical sciences are undergoing rapid changes and the boundaries between them and other disciplines are blurring. This volume contains survey articles and general thoughts and views on applied mathematics by the plenary speakers and panelists of a symposium on current and future directions in applied mathematics, which was held in the spring of 1996 at the University of Notre Dame.

[Bioremediation for marine oil spills](#). Apr 18 2021

*Applied Bioremediation of Petroleum Hydrocarbons* Sep 04 2022 This volume covers bioremediation markets, general technology overviews, and selected case studies of crude oil spills in marine environments, heavy-metal co-contamination, steam injection, nitrate-based bioremediation, land farming, nutrient addition, confined aquifers, anaerobic biodegradation, free-product recovery technologies, bioremediation in low permeability soils and rock, biopile treatment, field-scale

studies, oily waste organics as soil amendments, BTEX degradation in a biofilter, surfactant-aided recovery, mass transport in BTEX removal, electron acceptor selection and delivery strategies, and electrokinetic moisture and nutrient control in unsaturated soils.

### **Advances in Applied**

**Bioremediation** Jan 08 2023

Bioremediation is a rapidly advancing field and the technology has been applied successfully to remediate many contaminated sites. The goal of every soil remediation method is to enhance the degradation, transformation, or detoxification of pollutants and to protect, maintain and sustain environmental quality. Advances in our understanding of the ecology of microbial communities capable of breaking down various pollutants and the molecular and biochemical mechanisms by which biodegradation occurs have helped us in developing practical soil bioremediation strategies. Chapters dealing with the

application of biological methods to soil remediation are contributed from experts - authorities in the area of environmental science including microbiology and molecular biology - from academic institutions and industry.

Bioremediation and Sustainability Aug 03 2022

Bioremediation and Sustainability is an up-to-date and comprehensive treatment of research and applications for some of the most important low-cost, "green," emerging technologies in chemical and environmental engineering. Sustainable development requires the development and promotion of environmental management and a constant search for green technologies to treat a wide range of aquatic and terrestrial habitats contaminated by increasing anthropogenic activities with the main sources of contaminants being the chemical industries. Bioremediation is a technique that uses living organisms in order to degrade or transform



contaminants into their less toxic forms. It is based on the existence of microorganisms with the capacity to attack the compounds on the enzymatic level. Bioremediation is an increasingly popular low-cost alternative to conventional methods for treating wastes and contaminated media with the possibility to degrade these contaminants using natural microbial activity mediated by different consortia of microbes. Over the last few years, the scientific literature has revealed the progressive emergence of various bioremediation techniques. Bioremediation and Sustainability presents an up-to-date and comprehensive collection of chapters prepared in bioremediation technology research and applications. The strategies covered in this volume can be applied in situ or ex situ, depending on the site in which they will be applied. In situ is the treatment done in the site of the contamination, and ex situ involves the removal of soil or water to subsequent treatment.

There is a wide variety of techniques that have been developed in the past and are covered in this volume, such as natural attenuation, bioaugmentation, biostimulation, biosorption, composting, phytoremediation, rhizoremediation, and bioleaching.

### **Biodegradation and Bioremediation** Apr 30 2022

In this volume, experts from universities, government labs and industry share their findings on the microbiological, biochemical and molecular aspects of biodegradation and bioremediation. The text covers numerous topics, including: bioavailability, biodegradation of various pollutants, microbial community dynamics, properties and engineering of important biocatalysts, and methods for monitoring bioremediation processes. Microbial processes are environmentally compatible and can be integrated with non-biological processes to detoxify, degrade and immobilize environmental contaminants.

*The Utilization of  
Bioremediation to Reduce Soil  
Contamination* May 20 2021  
Proceedings of the NATO  
Advanced Research Workshop  
held in Prague, Czech  
Republic, 14-19 June 2000

**Applied Bioremediation** Nov  
06 2022 Bioremediation  
technologies are gaining  
immense credibility in the field  
of waste management because  
of their eco-compatibility  
nature. Biomass can interact  
and confront with water and  
soil pollutants in both active  
(live) as well as passive (dead)  
way, thereby offering  
numerous opportunities of  
exploring them for  
environmental clean-up. In 21st  
century, wastes are no longer a  
waste but are recognized as a  
valuable Resource. Employing  
novel and integrated strategies  
for the development of modern  
bioremediation processes is  
desperate need of the hour.  
This edited book on Applied  
Bioremediation - Active and  
Passive Approaches contains  
mix of interesting chapters that  
will certainly add to the  
advancement of knowledge and

will provide the required  
valuable resource and stimulus  
to the researchers worldwide.

**Bioremediation and  
Phytoremediation  
Technologies in Sustainable  
Soil Management** Jun 20

2021 This 4-volume set focuses  
on the use of microbial  
bioremediation and  
phytoremediation to clean up  
pollutants in soil, such as  
pesticides, petroleum  
hydrocarbons, metals, and  
chlorinated solvents, which  
reduce the soil's fertility and  
renders it unfit for plant  
growth. Volume 1:  
Fundamental Aspects and  
Contaminated Sites begins  
with an overview of  
phytoremediation and the role  
of environmental factors. It  
goes on to introduce soil  
assessment techniques and  
offers methods of remediation  
designed to combat soil and  
agricultural degradation. It  
discusses soils contaminated by  
heavy metals; microbial and  
phytoremediation-based  
removal of polycyclic aromatic  
hydrocarbons (PAHs) from  
coal, crude oil, and gasoline;

microbial bioremediation and amelioration of pesticide-contaminated soils; phytoremediation techniques for biomedical waste contaminated sites; as well as biomediation processes for human waste sites. Biopesticides are also explained as an alternative to conventional pesticides. Other volumes in the 4-volume set: • Volume 2: Microbial Approaches and Recent Trends • Volume 3: Inventive Techniques, Research Methods, and Case Studies • Volume 4: Degradation of Pesticides and Polychlorinated Biphenyls Together, these four volumes provide in-depth coverage of the mechanisms, advantages, and disadvantages of the bioremediation and phytoremediation technologies for safe and sustainable soil management.

*Bioremediation of Environmental Pollutants* Feb 14 2021 This book collates the latest trends and technological advancements in bioremediation, especially for its monitoring and assessment.

Divided into 18 chapters, the book summarizes basic concepts of waste management and bioremediation, describes advancements of the existing technologies, and highlights the role of modern instrumentation and analytical methods, for environmental clean-up and sustainability. The chapters cover topics such as the role of microbial fuel cells in waste management, microbial biosensors for real-time monitoring of bioremediation processes, genetically modified microorganisms for bioremediation, application of immobilized enzyme reactors, spectroscopic techniques, and in-silico approaches in bioremediation monitoring and assessment. The book will be advantageous not only to researchers and scholars interested in bioremediation and sustainability but also to professionals and policymakers.

**Microbial Biodegradation and Bioremediation** Aug 23 2021 Microbial Biodegradation and Bioremediation:

Techniques and Case Studies for Environmental Pollution, Second Edition describes the successful application of microbes and their derivatives for bioremediation of potentially toxic and relatively novel compounds in the environment. Our natural biodiversity and environment is in danger due to the release of continuously emerging potential pollutants by anthropogenic activities. Though many attempts have been made to eradicate and remediate these noxious elements, thousands of xenobiotics of relatively new entities emerge every day, thus worsening the situation. Primitive microorganisms are highly adaptable to toxic environments, and can reduce the load of toxic elements by their successful transformation and remediation. This completely updated new edition presents many new technologies and techniques and includes theoretical context and case studies in every chapter. Microbial Biodegradation and

Bioremediation: Techniques and Case Studies for Environmental Pollution, Second Edition serves as a single-source reference and encompasses all categories of pollutants and their applications in a convenient, comprehensive format for researchers in environmental science and engineering, pollution, environmental microbiology, and biotechnology. Describes many novel approaches of microbial bioremediation including genetic engineering, metagenomics, microbial fuel cell technology, biosurfactants and biofilm-based bioremediation Introduces relatively new hazardous elements and their bioremediation practices including oil spills, military waste water, greenhouse gases, polythene wastes, and more Provides the most advanced techniques in the field of bioremediation, including insilico approach, microbes as pollution indicators, use of bioreactors, techniques of pollution

monitoring, and more  
Completely updated and  
expanded to include topics and  
techniques such as genetically  
engineered bacteria,  
environmental health,  
nanoremediation, heavy  
metals, contaminant transport,  
and in situ and ex situ methods  
Includes theoretical context  
and case studies within each  
chapter

### **Microbial Bioremediation & Biodegradation** Jul 10 2020

Microbial or biological  
degradation has long been the  
subject of active concern, and  
the rapid expansion and  
growing sophistication of  
various industries in the last  
century has significantly  
increased the volume and  
complexity of toxic residues of  
wastes. These can be  
remediated by plants and  
microbes, either natural origin  
or adapted for a specific  
purpose, in a process known as  
bioremediation. The interest in  
microbial biodegradation of  
pollutants has intensified in  
recent years in an attempt to  
find sustainable ways to clean  
contaminated environments.

These bioremediation and  
biotransformation methods  
take advantage of the  
tremendous microbial catabolic  
diversity to degrade, transform  
or accumulate a variety of  
compounds, such as  
hydrocarbons, polychlorinated  
biphenyls, polaromatic  
hydrocarbons pharmaceutical  
substances, radionuclides and  
metals. Unlike conventional  
methods, bioremediation does  
not physically disturb the site.  
This book describes the basic  
principles of biodegradation  
and shows how these principles  
are related to bioremediation.  
Authored by leading,  
international environmental  
microbiologists, it discusses  
topics such as aerobic  
biodegradation, microbial  
degradation of pollutants, and  
microbial community dynamics.  
It provides valuable insights  
into how biodegradation  
processes work and can be  
utilised for pollution  
abatement, and as such  
appeals to researchers and  
postgraduate students as well  
as experts in the field of  
bioremediation.

Microbial and Biotechnological Interventions in Bioremediation and Phytoremediation Dec 03

2019 The introduction of contaminants, due to rapid urbanisation and anthropogenic activities, into the environment causes unsteadiness, distress to the physico-chemical systems including living organisms, which possibly is threatening the dynamics of nature as well as the soil biology by producing certain xenobiotics. Hence, there is an immediate global demand for the diminution of such contaminants and xenobiotics which can otherwise adversely affect the living organisms. Some toxic xenobiotics include synthetic organochlorides such as polycyclic aromatic hydrocarbons (PAHs), and some fractions of crude oil and coal. The advancements in microbiology and biotechnology has lead to the launch of microbial biotechnology as a separate area of research and contributed dramatically to the development of the areas like

agriculture, environment, biopharmaceutics, fermented foods, etc. The evolution of new metabolic pathways from natural metabolic cycles has enabled the microorganisms to degrade almost all different complex and resistant xenobiotics found on Earth. Hence, microbes stand an imperative, efficient, green and economical alternative to conventional treatment technologies. This book comprises chapters dealing with various bioremediation strategies with the help of different groups of microorganisms along with detailed graphical/ diagrammatical representations. It also focuses on the use of microbial biotechnology and highlights the recent developments in microbial biotechnology in the area of agriculture and environment. Furthermore, it contains a detailed comprehensive account for the microbial treatment technologies from unsustainable to sustainable which includes chapters

prepared by professionals, several researchers, scientists, graduate students and postdoctoral fellows across the world with expertise in environmental microbiology, biotechnology, bioremediation, and environmental engineering. The research presented also highlights some of the significantly important microbial species involved in remediation, the physiology, biochemistry and the mechanisms of remediation by various microbes, and suggestions for future improvement of bioremediation technology. This book would serve as a quick reference book for graduate and postgraduate students pursuing their study in any branch of life sciences, microbiology, health sciences and environmental biotechnology as well as researchers and scientists working in laboratories and industries involved in research related to microbiology, environmental biotechnology and allied researches.

### **Microbial Biodegradation and Bioremediation** Sep 11

2020 Microbial Biodegradation and Bioremediation brings together experts in relevant fields to describe the successful application of microbes and their derivatives for bioremediation of potentially toxic and relatively novel compounds. This single-source reference encompasses all categories of pollutants and their applications in a convenient, comprehensive package. Our natural biodiversity and environment is in danger due to the release of continuously emerging potential pollutants by anthropogenic activities. Though many attempts have been made to eradicate and remediate these noxious elements, every day thousands of xenobiotics of relatively new entities emerge, thus worsening the situation. Primitive microorganisms are highly adaptable to toxic environments, and can reduce the load of toxic elements by their successful transformation and remediation. Describes many novel approaches of microbial bioremediation

including genetic engineering, metagenomics, microbial fuel cell technology, biosurfactants and biofilm-based bioremediation. Introduces relatively new hazardous elements and their bioremediation practices including oil spills, military waste water, greenhouse gases, polythene wastes, and more. Provides the most advanced techniques in the field of bioremediation, including insilico approach, microbes as pollution indicators, use of bioreactors, techniques of pollution monitoring, and more.

*Applied Bioremediation and Phytoremediation* Dec 07 2022

The huge expansion of the chemical and petroleum industries in the twentieth century has resulted in the production of a vast array of chemical compounds and materials that have transformed our lives. The associated large-scale manufacturing, processing and handling activities have caused a serious deterioration in environmental quality and

created threats to human health. These negative impacts have led to responses and regulations requiring remedial action in support of environmental sustainability. of biotechnological methods through bioremediation, Application has gained prominence as an option for soil remediation methods. Bioremediation is a multidisciplinary approach where biologists, chemists, soil scientists and engineers work as team to develop and implement remediation processes. Bioremediation has now been used successfully to remediate many petroleum-contaminated sites. However, there are as yet no commercial technologies commonly used to remediate the most recalcitrant contaminants. Nevertheless, bioremediation is a rapidly advancing field and new bio-based remedial technologies are continuing to emerge.

**Metagenomics to Bioremediation** Feb 26 2022

Metagenomics to Bioremediation: Applications,



Cutting Edge Tools, and Future Outlook provides detailed insight into metagenomics approaches to bioremediation in a comprehensive manner, thus enabling the analysis of microbial behavior at a community level under different environmental stresses during degradation and detoxification of environmental pollutants. The book summarizes each and all aspects of metagenomics applications to bioremediation, helping readers overcome the lack of updated information on advancement in microbial ecology dealing with pollution abatement. Users will find insight not only on the fundamentals of metagenomics and bioremediation, but also on recent trends and future expectations. This book will appeal to readers from diverse backgrounds in biology, chemistry and life sciences. Reviews recently developed metagenomics approaches/strategies/ technologies to solve five major trends in environmental clean-up, including nutrient removal

and resource recovery, organometallic compounds detoxification, energy-saving and production, sustainability and community involvement Compiles authoritative information on recent advances in microbial biotechnological approaches, including the latest descriptions of the relationship between microbes and the environment Describes the knowledge gaps and future directions in the field of bioremediation of environmental contaminants Covers underlying microbial mechanisms with metabolic pathways for degradation and detoxification of emerging organic and inorganic contaminants discharged in environment

### **Smart Bioremediation**

**Technologies** Aug 11 2020

Smart Bioremediation Technologies: Microbial Enzymes provides insights into the complex behavior of enzymes and identifies metabolites and their degradation pathways. It will help readers work towards solutions for sustainable

medicine and environmental pollution. The book highlights the microbial enzymes that have replaced many plant and animal enzymes, also presenting their applications in varying industries, including pharmaceuticals, genetic engineering, biofuels, diagnostics and therapy. In addition, new methods, including genomics and metagenomics, are being employed for the discovery of new enzymes from microbes. This book brings all of these topics together, representing the first resource on how to solve problems in bioremediation. Provides the most novel approaches in enzyme studies Gives insights in real-time enzymology that are correlated with bioremediation Serves as a valuable resource on the use of genomes, transcriptomes and proteomes with bioremediation Refers to enzymes as diagnostic tools  
*Manual for Soil Analysis - Monitoring and Assessing Soil Bioremediation* Nov 01 2019  
This volume presents detailed

descriptions of methods for evaluating, monitoring and assessing bioremediation of soil contaminated with organic pollutants or heavy metals. Traditional soil investigation techniques, including chemical, physical and microbiological methods, are complemented by the most suitable modern methods, including bioreporter technology, immunological, ecotoxicological and molecular assays. Step-by-step procedures, lists of required equipment and reagents and notes on evaluation and quality control allow immediate application

### **Rhizobiont in Bioremediation of**

**Hazardous Waste** May 08

2020 This book describes many novel approaches of microbial bioremediation including conventional and modern approaches, metagenomics, biosurfactants and nano-based bioremediation. Also presents up-to-date knowledge about biodegradation of solid and liquid contaminants in the rhizospheric zone by plant (rhizo)-microbiome interface. It

also illustrates communication pathways based on evolving methodologies, bioinformatic tools which provides insights into the functional dynamics of bioremediation process by the host-microbiome interface. The different chapters explain the mechanism and outcomes during the process of bioremediation. The book broadly depicts the following: Advances in bioremediation through nanoremediation, rhizo-remediation, bioremediation of different ecosystems like polluted waters, industrial effluents, bioremediation of metal and organic pollutants, toxic dyes etc. The book is very useful for researchers and students in the fields of applied and environmental microbiology. It is also meant for industry experts and professionals working in the field of bioremediation and waste management.

Synergistic Approaches for Bioremediation of Environmental Pollutants: Recent Advances and Challenges Mar 30 2022

Synergistic Approaches for Bioremediation of Environmental Pollutants: Recent Advances and Challenges focuses on the exploitation of various biological treatment technologies and their use to treat toxic contaminants present in industrial effluent and in restoring contaminated sites, which lacks in a more comprehensive manner in existing titles on similar topics available on the global market. The book comprises advanced biotechnologies and updated information, along with sustainable waste management developments and future directions for researchers and scientists working in the field of microbiology. Provides wide information to readers on the state-of-the-art in the application of biochar, microbes, and their synergistic use for wastewater/industrial effluent treatment and environment protection Summarizes current knowledge on the use of biochar and microbes, even dead biomass, for dye decolorization,

degradation and removal of heavy metals which may play a key role in achieving a more productive and sustainable environment Explores different aspects of biological methods for contaminants removal for better insights into basic and advanced biotechnological applications Includes supplemented tables and figures

Handbook of Research on Inventive Bioremediation Techniques

Sep 23 2021 The rapid progression of technology has significantly impacted population growth, urbanization, and industrialization in modern society. These developments, while positive on the surface, have created critical environmental problems in recent years. The Handbook of Research on Inventive Bioremediation Techniques is a comprehensive reference source for the latest scholarly information on optimizing bioremediation technologies and methods to control pollution and enhance sustainability and conservation

initiatives for the environment. Highlighting pivotal research perspectives on topics such as biodegradation, microbial tools, and green technology, this publication is ideally designed for academics, professionals, graduate students, and practitioners interested in emerging techniques for environmental decontamination.

**Advances in Biodegradation and Bioremediation of**

**Industrial Waste** Jan 16 2021

Addresses a Global Challenge to Sustainable Development Advances in Biodegradation and Bioremediation of Industrial Waste examines and compiles the latest information on the industrial waste biodegradation process and provides a comprehensive review. Dedicated to reducing pollutants generated by agriculturally contaminated soil, and plastic waste from various industries, this text is a book that begs the question: Is a pollution-free environment possible? The book combines with current available data with the expert knowledge of

specialists from around the world to evaluate various aspects of environmental microbiology and biotechnology. It emphasizes the role of different bioreactors for the treatment of complex industrial waste and provides specific chapters on bioreactors and membrane process integrated with biodegradation process. It also places special emphasis on phytoremediation and the role of wetland plant rhizosphere bacterial ecology and the bioremediation of complex industrial wastewater. The authors address the microbiological, biochemical, and molecular aspects of biodegradation and bioremediation which cover numerous topics, including microbial genomics and proteomics for the bioremediation of industrial waste. This text contains 14 chapters and covers: Bioprocess engineering and mathematical modelling with a focus on environmental engineering The roles of siderophores and the

rhizosphere bacterial community for phytoremediation of heavy metals Current advances in phytoremediation, especially as it relates to the mechanism of phytoremediation of soil polluted with heavy metals Microbial degradation of aromatic compounds and pesticides: Challenges and solution Bioremediation of hydrocarbon contaminated wastewater of refinery plants The role of biosurfactants for bioremediation and biodegradation of various pollutants discharged from industrial waste as they are tools of biotechnology The role of potential microbial enzymatic processes for bioremediation of industrial waste The latest knowledge regarding the biodegradation of tannery and textile waste A resource for students interested in the field of environment, microbiology, industrial engineering, biotechnology, botany, and agricultural sciences, Advances in Biodegradation and Bioremediation of Industrial

Waste provides recent knowledge and approaches on the bioremediation of complex industrial waste.

Bioremediation Jul 02 2022

Annotation Bioremediation: Applied Microbial Solutions for RealWorld Environmental Cleanup is a fascinating examination of research and its realworld application. Intended for both academics and practitioners, the book presents information on the legal, scientific, and engineering principles behind bioremediation for cleaning up contaminated soil and groundwater sources. Provides global perspective in coverage of a broad range of bioremediation technologies including bioinjection, bioaugmentation, and phytoremediationOffers viewpoints from contributors who are recognized leaders in their fieldsPresents over 130 figures including highquality line drawingsExamines practical examples of bioremediation application, including relevant case studiesDiscusses the

interactions of legal, scientific, and engineering principles behind use of bioremediation for cleanup of contaminated land and aquifers.

In Situ Bioremediation Jun 08

2020 In situ bioremediation"the use of microorganisms for on-site removal of contaminants" is potentially cheaper, faster, and safer than conventional cleanup methods. But in situ bioremediation is also clouded in uncertainty, controversy, and mistrust. This volume from the National Research Council provides direction for decisionmakers and offers detailed and readable explanations of: the processes involved in in situ bioremediation, circumstances in which it is best used, and methods of measurement, field testing, and modeling to evaluate the results of bioremediation projects. Bioremediation experts representing academic research, field practice, regulation, and industry provide accessible information and case examples; they

explore how in situ bioremediation works, how it has developed since its first commercial use in 1972, and what research and education efforts are recommended for the future. The volume includes a series of perspective papers. The book will be immediately useful to policymakers, regulators, bioremediation practitioners and purchasers, environmental groups, concerned citizens, faculty, and students.

### **Toxicity and Waste Management Using**

**Bioremediation** Oct 25 2021  
Bioremediation is an emerging field of environmental research. The objective of a bioremediation process is to immobilize contaminants (reactants) or to transform them into chemical products that do not pose a risk to human health and the environment. Toxicity and Waste Management Using Bioremediation provides relevant theoretical and practical frameworks and the latest empirical research findings on the remediation of

contaminated soil and groundwater using bioorganisms. Focusing on effective waste treatment methodologies and management strategies that lead to improved human and environmental health, this timely publication is ideal for use by environmental scientists, biologists, policy makers, graduate students, and scholars in the fields of environmental science, chemistry, and biology.

Bioremediation and Sustainability Nov 13 2020  
Bioremediation and Sustainability is an up-to-date and comprehensive treatment of research and applications for some of the most important low-cost, "green," emerging technologies in chemical and environmental engineering.

*Soil Bioremediation* Dec 15 2020  
This book will discuss the effective and sustainable technological approaches for remediation of contaminants via eco-friendly usage of microbes. The primary focus will be on the role of microbes, particularly bacteria and fungi,

for the degradation and removal of various xenobiotic substances in the environment. The book will also emphasize molecular approaches and biosynthetic pathways of microbes, and present gene and protein expression studies for bio-deterioration techniques. New innovative and sophisticated green technologies for waste minimization and waste control will be presented, as well as the potential of microbes for various techniques of bioremediation, including bio-sorption, bio-augmentation, bio-stimulation, to clean contaminated environments.

**Microbes in Applied Research** Aug 30 2019 "This book offers the latest scientific research on applied microbiology ... The topics covered in this single volume include biodegradation of pollutants, water, soil and plant microorganisms, biosurfactants, antimicrobial natural products, antimicrobial susceptibility, antimicrobial resistance, human pathogens, food microorganisms,

fermentation, biotechnologically relevant enzymes and proteins, microbial physiology, metabolism and gene expression ..."--Page 4 of cover.

**Advances in Applied Bioremediation** Oct 05 2022 Bioremediation is a rapidly advancing field and the technology has been applied successfully to remediate many contaminated sites. The goal of every soil remediation method is to enhance the degradation, transformation, or detoxification of pollutants and to protect, maintain and sustain environmental quality. Advances in our understanding of the ecology of microbial communities capable of breaking down various pollutants and the molecular and biochemical mechanisms by which biodegradation occurs have helped us in developing practical soil bioremediation strategies. Chapters dealing with the application of biological methods to soil remediation are contributed from experts - authorities in the area of



environmental science including microbiology and molecular biology – from academic institutions and industry.

### **Integrative Strategies for Bioremediation of Environmental**

**Contaminants, Vol. 2** Jan 28 2022 Synergistic Approaches for Bioremediation: Integrative Strategies for Bioremediation of Environmental Contaminants focuses on the exploitation of various biological treatment technologies and their use to treat toxic contaminants present in industrial effluent to restore contaminated sites. It includes coverage of combined treatment of microbes for reuse of wastewater and contaminated soil to successfully achieve eco-restoration, environment protection, and sustainable development. In 14 chapters this reference compiles current and advanced biotechnologies as well as future directions for research. This book is a valuable resource for researchers in microbiology, biotechnology, environmental

engineering and environmental science, and all those who wish to broaden their knowledge in the field of applied microbiology to develop sustainable waste management.

### **Applied Environmental Biotechnology: Present Scenario and Future Trends**

Dec 27 2021 Applied Environmental Biotechnology: Present Scenario and Future Trends is designed to serve as a reference book for students and researchers working in the area of applied environmental science. It presents various applications of environmental studies that involve the use of living organisms, bioprocesses engineering technology, and other fields in solving environmental problems like waste and waste waters. It includes not only the pure biological sciences such as genetics, microbiology, biochemistry and chemistry but also from outside the sphere of biology such as chemical engineering, bioprocess engineering, information technology, and biophysics.

Starting with the fundamentals of bioremediation, the book introduces various environmental applications such as bioremediation, phytoremediation, microbial diversity in conservation and exploration, in-silico approach to study the regulatory mechanisms and pathways of industrially important microorganisms biological phosphorous removal, ameliorative approaches for management of chromium phytotoxicity, sustainable production of biofuels from microalgae using a biorefinery approach, bioelectrochemical systems (BES) for microbial electroremediation and oil spill remediation. The book has been designed to serve as comprehensive environmental biotechnology textbooks as well as wide-ranging reference books. Environmental remediation, pollution control, detection and monitoring are evaluated considering the achievement as well as the perspectives in the development of environmental biotechnology. Various relevant

articles are chosen up to illustrate the main areas of environmental biotechnology: industrial waste water treatment, soil treatment, oil remediation, phytoremediation, microbial electro remediation and development of biofuels dealing with microbial and process engineering aspects. The distinct role of environmental biotechnology in future is emphasized considering the opportunities to contribute with new approached and directions in remediation of contaminated environment, minimising waste releases and development pollution prevention alternatives at before and end of pipe.

Fungi as Bioremediators Apr 06 2020 Biological remediation methods have been successfully used to treat polluted soils. While bacteria have produced good results in bioremediation for quite some time now, the use of fungi to decontaminate soils has only recently been established. This volume of Soil Biology discusses the potentials of

filamentous fungi in bioremediation. Fungi suitable for degradation, as well as genetically modified organisms, their biochemistry, enzymology, and practical applications are described. Chapters include topics such as pesticide removal, fungal wood decay processes, remediation of soils contaminated with heavy and radioactive metals, of paper and cardboard industrial wastes, and of petroleum pollutants.

### **Rhizomicrobiome Dynamics**

**in Bioremediation** Jan 04 2020 Intensified agrarian and industrial activity has led to earth's soil and groundwater resources becoming polluted with hazardous materials. Bioremediation delivers a green technology using dynamics of living organisms, typically bacteria, fungi, microalgae and also plants to eliminate contaminants from ecosystem. This biological

know-how is not only cost-effective compared to conventional physico-chemical approaches, but also very successful and is being employed in the field. This book focuses on important issues for several critical and common environmental pollutants, resulting in a compilation having recent updates on the bioremediation applications towards green and clean environment. This volume also describes updates on various novel approaches of bioremediation including nanotechnology, rhizomicrobiome technology, composting, metagenomics, and biosurfactants-based bioremediation. This volume is a resource for researchers, environmentalists, professionals and policy makers.

Current Advances in Applied Microbiology & Biotechnology  
Oct 13 2020