

BIOTECHNOLOGY
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Bioremediation
*Principles and
Applications*

EDITED BY

Ronald L. Crawford and
Don L. Crawford



Bioremediation Principles

**Inderjeet Tyagi, Vikas Kumar, Rama
Rao Karri**



Bioremediation Principles:

Bioremediation Ronald L. Crawford, 1996-11-21 Increased industrial and agricultural activity this century has led to vast quantities of the earth's soil and groundwater resources becoming contaminated with hazardous chemicals. Bioremediation provides a technology based on the use of living organisms usually bacteria and fungi to remove pollutants from soil and water preferably in situ. This approach which is potentially more cost effective than traditional techniques such as incineration of soils and carbon filtration of water requires an understanding of how organisms transform chemicals, how they survive in polluted environments and how they should be employed in the field. This book examines these issues for many of the most serious and common environmental contaminants resulting in a volume which presents the most recent position on the application of bioremediation to the cleanup of polluted soil and water. Bioremediation Principles, 1998

The focus of this new text is the use of biological methods and processes for the remediation of contaminated soils and aquifers. Bioremediation is a rapidly changing and expanding area of environmental engineering and this text emphasizes the characteristics of organic compounds and factors which make organics amenable to biological treatment. Engineers working in soil and groundwater remediation in general and bioremediation in particular must deal with exacting regulations, serious public health issues and a great deal of uncertainty related to knowledge of actual conditions in subsurface systems. Professional judgement and integrity are the most important tools in solving most remediation problems. Bioremediation Principles will provide a technical foundation for understanding and applying bioremediation concepts rather than serve as a comprehensive handbook for system design.

Biodegradation, Pollutants and Bioremediation Principles Ederio Dino Bidoia, Renato Nallin Montagnolli, 2021-04-19 This book presents a broad compendium of biodegradation research and discussions on the most up to date bioremediation strategies. The most relevant microbiological, biochemical and genetic concepts are presented alongside the fundamentals of bioremediation. The topics include a wide variety of contaminant impacts, evaluation, key methodologies required to measure biodegradation and propose new bioremediation protocols as well as the handling of microbial communities related to such processes. The selected collaborating authors are renowned for their microbiology expertise and will provide an in depth reference for students and specialists. The contents provide a valuable source of information for researchers, professionals and policy makers alike. *Fundamentals and Applications of Bioremediation*

Robert L. Irvine, Subhas K. Sikdar, 2017-11-22 FROM THE INTRODUCTION This three volume set Bioremediation Principles and Practice provides state of the art description of advances in pollution treatment and reduction using biological means, identify and address at a fundamental level broad scientific and technological areas that are unique to the subject or theme and that must be understood if advances are to be made and provide a comprehensive overview of new developments at the regulatory, desk top, bench scale, pilot scale and full scale levels. The set covers all media, air, water and soil, sediment and blends the talents, knowledge and know how of academic, industrial, governmental and international

contributors The set addresses the removal of both hazardous and nonhazardous contaminants from the liquid solid and gas phase using biological processes This includes the biological treatment of wastes of municipal and industrial origin bioremediation of leachates soils and sediments and biofiltration for contaminated gases

Fundamentals and Applications of Bioremediation Robert L. Irvine, Subhas K. Sikdar, 1997-09-30 FROM THE INTRODUCTION This three volume set Bioremediation Principles and Practice provides state of the art description of advances in pollution treatment and reduction using biological means identify and address at a fundamental level broad scientific and technological areas that are unique to the subject or theme and that must be understood if advances are to be made and provide a comprehensive overview of new developments at the regulatory desk top bench scale pilot scale and full scale levels The set covers all media air water and soil sediment and blends the talents knowledge and know how of academic industrial governmental and international contributors The set addresses the removal of both hazardous and nonhazardous contaminants from the liquid solid and gas phase using biological processes This includes the biological treatment of wastes of municipal and industrial origin bioremediation of leachates soils and sediments and biofiltration for contaminated gases

Bioremediation Ronald L. Crawford, Don L. Crawford, 2005-09-08 Industrial and agricultural activity throughout this century has led to considerable contamination of soil and groundwater resources by hazardous chemicals The technique of bioremediation uses living organisms usually bacteria and fungi to remove pollutants from soil and water with minimal disturbance to these environments This approach which is potentially more cost effective than traditional techniques such as incineration of soils and carbon filtration of water requires an understanding of how organisms transform chemicals how they survive in polluted environments and how they can be used in the field This book examines these issues for many of the most serious and common environmental contaminants presenting the most recent position on the application of bioremediation to polluted soil and water

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Bioremediation Subhas K. Sikdar, Robert L. Irvine, 1998 FROM THE INTRODUCTION This three volume set *Bioremediation Principles and Practice* provides state of the art description of advances in pollution treatment and reduction using biological means identify and address at a fundamental level broad scientific and technological areas that are unique to the subject or theme and that must be understood if advances are to be made and provide a comprehensive overview of new developments at the regulatory desk top bench scale pilot scale and full scale levels The set covers all media air water and soil sediment and blends the talents knowledge and know how of academic industrial governmental and international contributors The set addresses the removal of both hazardous and nonhazardous contaminants from the liquid solid and gas phase using biological processes This includes the biological treatment of wastes of municipal and industrial origin bioremediation of leachates soils and sediments and biofiltration for contaminated gases

Provided by publisher [Green Solutions for Degradation of Pollutants](#) Neha Agarwal, Vijendra Singh Solanki, Sreekantha B. Jonnalagadda, 2024-08-01 *Green Solutions for Degradation of Pollutants* is a compilation of reviews on environmental remediation by sustainable techniques The book helps readers understand the potential of such techniques in resolving the growing problem of environmental pollutants The editors have compiled 13 comprehensive reviews on green remediation techniques such as microbial bioremediation nano bioremediation phytoremediation and green nanoremediation for the remediation of a variety of pollutants including wastewater microplastics metals and other contaminants Materials highlighted in the chapters include carbon quantum dots plant extracts metallic and organic nanoparticles *Green Solutions for Degradation of Pollutants* is a reference book for readers who need to comprehend the practical application of green remediation techniques

[Biotechnologies for Wastewater Treatment and Resource Recovery](#) Arun Lal Srivastav, Inga Zinicovscaia, Liliana Cepoi, 2024-11-07 *Biotechnologies for Wastewater Treatment and Resource Recovery* Current Trends and Future Scope presents up to date insights on the water crisis stemming from wastewater production Edited by experts in the field the book s chapters are structured around different types of bioremediation approaches phytoremediation myco remediation bio stimulation bio augmentation rhizoremediation etc all applied in the context of wastewater treatment This comprehensive resource equips students research scholars and policymakers with a holistic understanding of wastewater

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Handbook of Solvents George Wypych, 2001 A comprehensive extensive textual analysis of the principles of solvent selection and use the handbook is intended to help formulators select ideal solvents safety coordinators to protect workers and legislators and inspectors to define and implement technically correct public safeguards for use handling and disposal

Emerging Contaminants Arpna Kumari, Vishnu D. Rajput, Saglara S. Mandzhieva, Tatiana Minkina, Eric D. van Hullebusch, 2024-03-26 Emerging Contaminants Sustainable Agriculture and the Environment provides a thorough comprehensive and interdisciplinary overview of the many categories of emerging pollutants including pharmaceuticals insecticides personal care items and industrial chemicals that are currently impacting the environment With insights into the exposure associated consequences on crops and edible plants the book is designed to enable foundational understanding as the basis for future research as well as practical application in current environments Following an introduction to environmental contaminants the book goes on to discuss their fate in soils the most up to date analytical methods for detecting them in different environmental matrices and current regulatory restrictions Finally the book comes to a close with the last chapter dedicated to conclusions and future perspectives Emerging Contaminants is an ideal resource for researchers and professionals from a variety of sciences Focuses on the extensive emission of ECs raising concerns of toxicity in crop plants in the environment and also to human beings via the food chain Includes examples and real world insights Highlights interaction of different categories of ECs with crop plants their toxicity and fate in the environment **Practical**

Handbook of Soil, Vadose Zone, and Ground-Water Contamination J. Russell Boulding, Jon S. Ginn, 2016-04-19 A synthesis of years of interdisciplinary research and practice the second edition of this bestseller continues to serve as a primary resource for information on the assessment remediation and control of contamination on and below the ground surface Practical Handbook of Soil Vadose Zone and Ground Water Contamination Assessment Prev **Global Perspectives of Toxic Metals in Bio Environs** Mohammad Aneesul Mehmood, Rouf Ahmad Bhat, Gowhar Hamid Dar, 2025-09-26 This volume serves as the solution oriented counterpart to volume 1 s exploration of environmental impact and health implications By examining microbial plant based and technological methods of remediation this volume empowers researchers practitioners and policymakers with actionable insights The final chapters in Volume II call for global collaboration and thus uniting the two volumes in a commitment to holistic sustainable management of toxic metals in the environment Volume II builds on the insights of Volume I by exploring solutions and technological advancements for tackling these toxic metals It covers the biotransformation processes that toxic metals undergo in biological environments which can either exacerbate or mitigate their harmful effects Furthermore it delves into the remediation technologies and biotechnological innovations aimed at detoxifying affected environments and preventing future contamination Together the two volumes provide a holistic view with Volume I offering the problem analysis and Volume II presenting practical solutions making them ideal resources for understanding both the theoretical and applied aspects of managing toxic metals in environmental systems The first volume frames the scope and urgency of the problem while the second volume provides viable solutions and forward looking perspectives **Environmental Microbiology** Glen Bates, 2018-01-08 Environmental Microbiology besides a traditional discipline in Developing fast because of realization of its importance in Industry Agriculture Pharmaceutical concerns Public Health Geological explorations bioenergetics and as a mean to exploit new sources of energy useful for various purposes Environmental Microbiology comprises a crucial element of studies in microbiology Enabling scientists to explore microbes in greater detail it gives an insight into how microorganisms behave under non simulated natural conditions although microbes that exist in artificial environments such as bioreactors are also studies Exploring such processes as microbial ecology microbially mediated nutrient cycling geomicrobiology microbial diversity and bioremediation the subject encompasses a great deal Environmental Microbiology was born at the dawn of the e environmental erae at the beginning of the 1970s Thirty years of maturation have led to an exciting and vibrant field that has attracted countless numbers of productive and enthusiastic scientists and students at universities research centers and government agencies around the world The present text has been designed to outline the basic and fundamental aspects of Environmental Microbiology to be understood in its right perspective The modern techniques and designs employed in microbiological applications are discussed in a comprehensive manner which will update the readers of the commercial aspects of microbiology Environmental Metagenomics, Water Quality and Suggested Remediation Measures of Polluted

Waters: A Combined Approach Inderjeet Tyagi, Vikas Kumar, Rama Rao Karri, 2024-03-26 Environmental Metagenomics Water Quality and Suggested Remediation Measures of Polluted Waters A Combined Approach is a reference handbook for scientists engineers and early career researchers seeking guidance in the areas of water quality and remediation studies The comprehensive book which includes case studies and applications from a range of contributors in the field offers an essential resource in the science of water quality assessment Includes a range of applications and case studies in wetland riverine drinking and groundwater metagenomics along with approaches for the remediation of pollutants from wastewater Offers the latest updates on environmental metagenomics and its correlation with water environments remediation measures and SDGs Provides key contributions from global researchers in the fields of water chemistry environmental science engineering and public health

Bioremediation Essam A. Makky, 2012 Over the last three decades there has been increasing global concern over the public health impacts attributed to environmental pollution in particular the global burden of disease The World Health Organization WHO estimates that about a quarter of the diseases facing mankind today occur due to prolonged exposure to environmental pollution Most of these environment related diseases are however not easily detected and may be acquired during childhood and manifested later in adulthood Improper management of solid waste is one of the main causes of environmental pollution and degradation in many cities especially in developing countries Many of these cities lack solid waste regulations and proper disposal facilities including for harmful waste Such waste may be infectious toxic or radioactive Bioremediation is the use of microorganisms for the degradation of hazardous chemicals in soil sediments water or other contaminated materials Environmental Protection Agency EPA uses many methods to clean up pollution at Superfund and other sites Some like bioremediation are considered new or innovative Such methods can be quicker and cheaper than more common methods

Science of Synthesis: Biocatalysis in Organic Synthesis Vol. 3 Kurt Faber, Wolf-Dieter Fessner, Nicholas J. Turner, 2015-03-11 The three Science of Synthesis volumes on Biocatalysis in Organic Synthesis present a broad contemporary overview on the state of the art in enzymatic methods for asymmetric synthesis suitable for academics and industrial researchers working in the field of organic synthesis The goal is to start a new wave of enthusiasm for biocatalysis in the broader community and to give an overview of the field Biocatalysis in Organic Synthesis offers critical reviews of organic transformations by experts including experimental procedures The organization is based on the type of reaction performed under biocatalysis Volume 3 begins with oxidation A chapter on enzyme catalyzed dihydroxylation is followed by reviews of alkane oxidation Oxidations of alcohols carbonyl compounds and heteroatoms are covered as are halogenations The use of biocatalysts in total synthesis cascade reactions and large scale industrial applications is considered Finally emerging trends are discussed

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