

BIOTECHNOLOGY

# Bioremediation SERIES Principles and Applications

EDITED BY Ronald L. Crawford and Don L. Crawford

## **Bioremediation Principles And Applications**

**Robert Blauvelt, Alexander Gates** 

## **Bioremediation Principles And Applications:**

**Bioremediation** Ronald L. Crawford, Don L. Crawford, 1996-11-21 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 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 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 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 **Biotechnology Applications** C. S. K. Mishra, 2013-12-30 The book is an excellent compilation of chapters on fruitful applications of Biotechnology The chapters have been authored by eminent scholars from India and abroad working on diverse disciplines related to Biotechnology The book is an invaluable source of information on biosensors microbial surfactants enzyme immobilization disease diagnosis probiotics protein biotechnology bioleaching photonic applications and other biotechnology applications. The book will be very useful for Undergraduate and Postgraduate students research scholars and faculties in biotechnology microbiology medical sciences and life sciences Biotechnologies for Wastewater Treatment and Resource Recovery Arun Lal Srivastay, 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 treatment and resource recovery through bioremediation techniques Abundant real world applications and case studies empower readers to make well informed decisions ensuring the efficient utilization of energy and efforts in addressing this critical issue Covers a thorough analysis of various bioremediation approaches such as phytoremediation myco remediation bio stimulation bio augmentation rhizoremediation etc Offers the most up to date information on integrated wastewater treatment using biological and physicochemical methods Includes case studies on bioremediation of domestic industrial wastewater for the elimination of heavy metals emerging water contaminants pesticides microplastics amongst others Physiology, Genomics, and Biotechnological Applications of Extremophiles Gunjal, Aparna B., Thombre, Rebecca, Parray, Javid A., 2021-12-10 Extremophiles are organisms that are able to live in extreme conditions due to their unique physiological and genetic adaptations Extremophiles are harnessed for their extremozymes that have wide applications in biotechnology pharmaceutics and industry Recent developments in genomics and proteomics have helped unravel the mechanism of survival physiological adaptation and genomics structure of extremophiles Physiology Genomics and Biotechnological Applications of Extremophiles covers innovative developments in understanding the physiology and biochemistry of extremophiles using the omics perspective focuses on the advancement in mechanisms of the extremophiles that makes them able to survive under extreme conditions and discusses the applications of extremophiles in astrobiology Covering topics such as genomics and the history and identification of extremophiles it is ideal

for students professors researchers academicians microbiologists agricultural scientists and biotechnologists 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 and Sustainability Paulo Ricardo Franco Marcelino, Silvio Silverio da Silva, Antonio Ortiz Lopez, 2023-05-08 Biosurfactants and Sustainability A timely and authoritative collection of resources on the sustainable production of biosurfactants In Biosurfactants and Sustainability a team of distinguished researchers presents emerging themes in the rapidly evolving field of biosurfactants The editors have chosen work that focuses on biosurfactants as eco friendly and versatile compounds of interest in societies seeking sustainable forms of development The book examines biosurfactants in the context of biorefineries and in the exploration of extremophilic microorganisms for biosurfactant production The included works discuss biosurfactant production from different lignocellulosic and amylaceous raw materials as well as oilseeds and other agro industrial byproducts Readers will also find A thorough introduction to microorganisms producing biosurfactants as well as sustainable biosurfactant production in biorefineries Comprehensive explorations of the challenges of biosurfactant production in fermentation processes Practical discussions of bioreactors and metabolic engineering used in biosurfactant production Fulsome treatments of biosurfactant production using enzyme and novel biosurfactant applications in nanotechnology health agriculture and environmental cleanup Perfect for researchers and professionals with an interest in biosurfactant application and biotechnology processes Biosurfactants and Sustainability will also benefit academic researchers industry scientists and engineers in biotechnology microbiology biomass conversion environmental science and **Emerging Contaminants** Arpna Kumari, Vishnu D. Rajput, Saglara S. Mandzhieva, Tatiana Minkina, Eric D. engineering 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

**Encyclopedia of Pollution, Revised Edition** Robert Blauvelt, Alexander Gates, 2020-06-01 Praise for the previous edition Editors Choice Reference Source Booklist Best Reference Source Library Journal Runner up General Nonfiction category Green Book Festival Top 40 Reference Titles Pennsylvania School Librarians Association A worthwhile reference for high school students and the general public Library Journal interesting and helpful will help readers gain an understanding of major concepts terms and events in modern pollution studies Recommended Choice Definitive yet accessible notable for reliable information on a topic of interest to both undergraduate and lay audiences merits high recommendation for high school public and academic libraries Booklist starred review fascinating Library Journal an excellent addition for all academic libraries and large public libraries American Reference Books Annual This accessible and attractive encyclopedia provides depth variety and currency and would be valuable for most high school collections Pennsylvania School Librarians Association recommended an excellent source of background reading Reference Reviews Newly updated the Encyclopedia of Pollution Revised Edition is a comprehensive reference designed to address all aspects of pollution and the global impact on the environment in a single source Containing more than 300 entries and essays interspersed throughout it uses the most current scientific data to explain the different types of pollutants including properties production uses environmental release and fate adverse health response to exposure and environmental regulations on human exposure It provides the scientific background on the water soil and air of environments where the pollutants are released Coverage also includes pollution regulation the function of federal regulatory agencies and environmental advocacy groups and the technology and methods to reduce pollution and to remediate existing pollution problems Numerous case studies explore the most infamous of pollution events such as the Exxon Valdez oil spill the Gulf War oil well fires the Chernobyl disaster Hurricane Katrina the World Trade Center disaster and the Love Canal in New York among many others including those that had great impact on legislation or that were used in popular media such as the films Erin Brockovich and A Civil Action Biographies are provided of some of the leaders and pioneers of pollution study and activism Other useful features include a detailed glossary a timeline and tables Encyclopedia of Environmental Health ,2019-08-22 Encyclopedia of Environmental Health Second Edition Six Volume Set presents the newest release in this fundamental reference that updates and broadens the umbrella of environmental health especially social and environmental health for its readers There is ongoing revolution in governance policies and intervention strategies aimed at evolving changes in health disparities disease burden trans boundary transport and health hazards This new edition reflects these realities mapping new directions in the field that include how to minimize threats and develop new scientific paradigms that address emerging local national and global environmental concerns Represents a one stop resource for scientifically reliable information on environmental health Fills a critical gap with information on one of the most rapidly growing scientific fields of our time Provides comparative approaches to environmental health practice and research in different countries and regions of the world Covers issues behind specific

questions and describes the best available scientific methods for environmental risk assessment *Organic Pollutants* M. Vasanthy, V. Sivasankar, T. G. Sunitha, 2021-10-23 This volume describes the identification of emerging organic pollutants mainly from industrial sources their associated toxicological threats and the latest green methods and biotechnological solutions to abate harmful impacts on people and the environment The chapters present reviews on current applied toxicology research occupational health hazards and green remedial solutions for pollution control in terrestrial and aquatic environments with the aim of raising public awareness of these issues and providing chemists toxicologists and environmental scientists with the knowledge to combat organic pollutants through sustainable means Readers will learn about the multi dimensional applications of materials and processes which harvest energy out of environmental remediation technologies as well as the roles of biotechnology and nanotechnology in addressing high pollutant load Specific attention is paid to technologies that draw energy through wastewater remediation as this covers the primary means by which organic pollutants are introduced into the environment from industry and other sources The book will be of use to pollution control boards industry regulators and students and researchers in the fields of biotechnology biomedical science hydrology and Mycoremediation and Environmental Sustainability Ram Prasad, S. Chandra Nayak, Ravindra Nath water chemistry Kharwar, Nawal Kishor Dubey, 2021-04-30 Volume 3 covers recent research with expanded coverage on this important area of remediation Mycoremediation is the form of bioremediation in which fungi based technology is used to decontaminate the environment Fungi are among the primary saprotrophic organisms in an ecosystem as they are efficient in the decomposition of organic matter Wood decay fungi especially white rot secretes extracellular enzymes and acids that break down lignin and cellulose Fungi have been proven to be a very cost effective and environmentally friendly way for helping to remove a wide array of toxins from damaged environments or wastewater These toxins include heavy metals persistent organic pollutants textile dyes leather tanning industry chemicals and wastewater petroleum fuels polycyclic aromatic hydrocarbon pharmaceuticals and personal care products pesticides and herbicides in land fresh water and marine environments Bioremediation of toxic organics by fungi is the most sustainable and green route for cleanup of contaminated sites and we discuss the multiple modes employed by fungi for detoxification of different toxic and recalcitrant compounds including prominent fungal enzymes viz catalases general lipase laccases peroxidases and sometimes intracellular enzymes especially the cyrochrome P450 monooxygeneses Fungi play an important role in the biogeochemical cycling of manganese and other redox active metals which is related to their ability to survive radiation and other oxidative challenges This book covers recent research with more detail on the various types of fungi and associated fungal processes used to clean up wastes and wastewaters in contaminated environments and discusses their potential for environmental applications

**Biohydrometallurgical Processes** Satarupa Dey,2023-12-13 Extensive industrialization has led to an increased release of toxic metals into the soil and air Industrial waste can include mine overburden bauxite residue and E waste and these can

serve as a source of valuable recoverable metals. There are relatively simple methods to recycle these wastes but they require additional chemicals are expensive and generate secondary waste that causes environmental pollution Biohydrometallurgical processing is a cost effective and ecofriendly alternative where biological processes help conserve dwindling ore resources and extract metals in a nonpolluting way Microbes can be used in metal extraction from primary ores waste minerals and industrial and mining wastes Biohydrometallurgical Processes Metal Recovery and Remediation serves as a useful guide for microbiologists biotechnologists and various industrialists dealing with mining metallurgy chemical engineering and environmental sciences Features Examines advances in biohydrometallurgy biomineralization and bioleaching techniques Discusses the importance of bacteria in biohydrometallurgical processes and microbial interventions for waste cleanup and upgradation of minerals Presents the latest techniques for biosynthesis related to different metals along with recent developments in alternative procedures using extremophiles and leaching bacteria **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 Yeast Antonio Morata, Iris Loira, 2017-11-08 Yeast Industrial Applications is a book that covers applications perspectives and utilities of yeasts in food chemical energy and environmental industries collected in 12 chapters The use of yeasts in the production of metabolites enzymatic applications fermented foods microorganism controls bioethanol production and bioremediation of contaminated environments is covered showing results methodologies and processes and describing the specific role of yeasts in them The traditional yeast Saccharomyces cerevisiae is complemented in many applications with the use of less known non Saccharomyces yeasts that now are being used extensively in industry This book compiles the experience and know how of researchers and professors from international universities and research centers Environmental Microbiology: Fundamentals and Applications Jean-Claude Bertrand, Pierre Caumette, Philippe

Lebaron, Robert Matheron, Philippe Normand, Télesphore Sime-Ngando, 2015-01-26 This book is a treatise on microbial ecology that covers traditional and cutting edge issues in the ecology of microbes in the biosphere It emphasizes on study tools microbial taxonomy and the fundamentals of microbial activities and interactions within their communities and environment as well as on the related food web dynamics and biogeochemical cycling The work exceeds the traditional domain of microbial ecology by revisiting the evolution of cellular prokaryotes and eukaryotes and stressing the general principles of ecology The overview of the topics authored by more than 80 specialists is one of the broadest in the field of environmental microbiology. The overview of the topics authored by more than 80 specialists is one of the broadest in the field of environmental microbiology Microbes Based Approaches for the Management of Hazardous Contaminants Ajay Kumar, Livleen Shukla, Joginder Singh, Luiz Fernando Romanholo Ferreira, 2024-07-08 Learn the various microbiological aspects one deals with in environment management and the remediation of toxic contaminants in the environment In recent years the accumulation of hazardous contaminants has caused a broad based deterioration in global environmental quality These have had wide ranging negative social impacts affecting climate soil and water ecosystems and more As traditional methods of contaminant mitigation have proven inadequate to the task microbial based remediation offers the clearest most environmentally friendly path forward for this crucial aspect of global environmental stewardship Microbes Based Approaches for the Management of Hazardous Contaminants offers comprehensive coverage of novel and indigenous microbes and their applications in contaminant mitigation Surveying all the major microbial products and methods for degrading and remediating hazardous pollutants it offers a key tool in the fight against global environmental degradation The result is a cutting edge introduction to an essential subject Microbes Based Approaches for the Management of Hazardous Contaminants will also find Current and future approaches to microbial degradation Detailed discussion of biofilms exopolysaccharides enzymes metabolites and many more Coverage of metabolic engineering as an alternative strategy Microbes Based Approaches for the Management of Hazardous Contaminants is ideal for those working in the field for the application of microbes in the remediation of hazardous pollutants and environment management particularly those interested in environmental sciences microbiology and microbial technology environmental biotechnology and molecular biology **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

The Top Books of the Year Bioremediation Principles And Applications The year 2023 has witnessed a remarkable surge in literary brilliance, with numerous compelling novels captivating the hearts of readers worldwide. Lets delve into the realm of top-selling books, exploring the captivating narratives that have charmed audiences this year. The Must-Read: Colleen Hoovers "It Ends with Us" This touching tale of love, loss, and resilience has captivated readers with its raw and emotional exploration of domestic abuse. Hoover masterfully weaves a story of hope and healing, reminding us that even in the darkest of times, the human spirit can prevail. Uncover the Best: Taylor Jenkins Reids "The Seven Husbands of Evelyn Hugo" This spellbinding historical fiction novel unravels the life of Evelyn Hugo, a Hollywood icon who defies expectations and societal norms to pursue her dreams. Reids absorbing storytelling and compelling characters transport readers to a bygone era, immersing them in a world of glamour, ambition, and self-discovery. Discover the Magic: Delia Owens "Where the Crawdads Sing" This evocative coming-of-age story follows Kya Clark, a young woman who grows up alone in the marshes of North Carolina. Owens weaves a tale of resilience, survival, and the transformative power of nature, captivating readers with its evocative prose and mesmerizing setting. These top-selling novels represent just a fraction of the literary treasures that have emerged in 2023. Whether you seek tales of romance, adventure, or personal growth, the world of literature offers an abundance of compelling stories waiting to be discovered. The novel begins with Richard Papen, a bright but troubled young man, arriving at Hampden College. Richard is immediately drawn to the group of students who call themselves the Classics Club. The club is led by Henry Winter, a brilliant and charismatic young man. Henry is obsessed with Greek mythology and philosophy, and he quickly draws Richard into his world. The other members of the Classics Club are equally as fascinating. Bunny Corcoran is a wealthy and spoiled young man who is always looking for a good time. Charles Tavis is a quiet and reserved young man who is deeply in love with Henry. Camilla Macaulay is a beautiful and intelligent young woman who is drawn to the power and danger of the Classics Club. The students are all deeply in love with Morrow, and they are willing to do anything to please him. Morrow is a complex and mysterious figure, and he seems to be manipulating the students for his own purposes. As the students become more involved with Morrow, they begin to commit increasingly dangerous acts. The Secret History is a masterful and thrilling novel that will keep you guessing until the very end. The novel is a warning tale about the dangers of obsession and the power of evil.

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