

Ajay Singh  
Ramesh C. Kuhad  
Owen P. Ward  
*Editors*

SOIL BIOLOGY

# Advances in Applied Bioremediation

 Springer

# Advances In Applied Bioremediation Soil Biology

**Peter J. Gregory, Stephen Nortcliff**



## **Advances In Applied Bioremediation Soil Biology:**

*Advances in Applied Bioremediation* Ajay Singh, Ramesh C. Kuhad, Owen P. Ward, 2009-07-30 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.

**Hazardous Waste Management** Zarook Shareefdeen, 2022-04-22 This book provides readers with the most current knowledge on hazardous waste management practices. It addresses the rapidly changing advances in waste stream characterization and the discovery of new chemicals which have led to new hazardous wastes, technological innovation, stringent environmental regulations, changes in transport and dispersion, modelling of hazardous pollutants and new waste management techniques. *Hazardous Waste Management: Advances in Chemical and Industrial Waste Treatment and Technologies* is an invaluable reference for waste management and treatment professionals, chemical engineers and technicians, medical professionals and environmental regulators as well as students taking courses on hazardous waste management, environmental engineering and environmental science.

*Bioaugmentation, Biostimulation and Biocontrol* Ajay Singh, Nagina Parmar, Ramesh C. Kuhad, 2011-06-17 Bioaugmentation, biostimulation and biocontrol approaches using microbial inoculants, biofertilizers, biochemicals and organic amendments improve soil biology, fertility and crop productivity by providing plant growth promoting nutrients and suppressing soil-borne diseases and plant parasitic nematodes. Our knowledge of microbial diversity and its function in soils has been increased tremendously due to the availability of a wealth of data gained through recent advances in the development of molecular methods and metagenomics for the evaluation of microbial diversity and functions in the rhizosphere environment of soil. Chapters dealing with the application of biofertilizers and organic amendments are contributed by experts/authorities in the area of soil science including microbiology and molecular biology from academic institutions and the industry.

**Biophysico-Chemical Processes of Anthropogenic Organic Compounds in Environmental Systems** Baoshan Xing, Nicola Senesi, Pan Ming Huang, 2011-05-16 In contrast to the classical books which largely focus on separate individual physicochemical and biological aspects, this book aims to integrate the frontiers of knowledge on the fundamentals and the impact of physicochemical and biological interactions and processes of AOCs in soil, sediment, water and air. The specific objectives of this book are to address: 1) fundamental biophysico-chemical processes of AOCs in the environment; 2) occurrence and distribution of AOCs in air, water and soil and their global cycling; 3) the state of the art.

analytical techniques of AOCs and 4 restoration of natural environments contaminated by AOCs The book also identifies the gaps in knowledge on the subject matter and as such provides future directions to stimulate scientific research to advance the chemical science on biophysico chemical interfacial reactions in natural habitats By virtue of complex nature of the interactions of AOCs with different environmental components and matrixes no single available technique and instrument is satisfactory yet for determining their fate transport availability and risk in the environment In order to fully understand the biophysico chemical interactions and processes of AOCs in the environment it is critical to know chemical physical and biological properties of AOCs and their analytical techniques The book is unique because of its multidisciplinary approach as it provides a comprehensive and integrated coverage of biophysico chemical reactions and processes of AOCs in various environments associated analytical techniques and restoration of natural environments contaminated by AOCs **Bio-Geo**

**Interactions in Metal-Contaminated Soils** Erika Kothe,Ajit Varma,2012-01-05 Metal contamination is an increasing ecological and eco toxicological risk Understanding the processes involved in metal mobilization sorption and mineralization in soils are key features for soil bioremediation Following an introduction to the physical chemical and biological components of contaminated soils various chapters address the interactions of soil microorganisms plants and the water phase necessary to transfer metals into biological systems These include topics such as potential hazards at mining sites rare earth elements in biotic and abiotic acidic systems manganese redox reactions biomineralisation uranium in seepage water metal resistant streptomycetes mycorrhiza in re forestation metal hyper accumulation in plants microbial metal uptake and their potential for bioremediation This book will be of interest to soil biologists geologists and chemists researchers and graduate students as well as consulting companies and small enterprises involved in bioremediation *Geomicrobiology and Biogeochemistry*

Naghina Parmar,Ajay Singh,2013-12-09 Over the past 4 billion years microorganisms have contributed to shaping the earth and making it more habitable for higher forms of life They are remarkable in their metabolic diversity and their ability to harvest energy from oxidation and reduction reactions Research on these microbiological processes has led to the newly evolving fields of geomicrobiology and biogeochemistry linking the geosphere and the biosphere This volume of the Soil Biology series provides an overview of the biogeochemical processes and the microorganisms involved with an emphasis on the industrial applications Topics treated include aspects such as bioremediation of contaminated environments biomineralization biotechnological applications of extremophiles subsurface petroleum microbiology enhanced oil recovery using microbes and their products metal extraction from soil soil elemental cycling and plant nutrition *Extremophiles* Om V.

Singh,2012-10-16 Explores the utility and potential of extremophiles in sustainability and biotechnology Many extremophilic bio products are already used as life saving drugs Until recently however the difficulty of working with these microbes has discouraged efforts to develop extremophilic microbes as potential drug reservoirs of the future Recent technological advances have opened the door to exploring these organisms anew as sources of products that might prove useful in clinical

and environmental biotechnology and drug development Extremophiles features outstanding articles by expert scientists who shed light on broad ranging areas of progress in the development of smart therapeutics for multiple disease types and products for industrial use It bridges technological gaps focusing on critical aspects of extremolytes and the mechanisms regulating their biosynthesis that are relevant to human health and bioenergy including value added products of commercial significance as well as other potentially viable products This groundbreaking guide Introduces the variety of extremophiles and their extremolytes including extremozymes Provides an overview of the methodologies used to acquire extremophiles Reviews the literature on the diversity of extremophiles Offers tools and criteria for data interpretation of various extremolytes extremozymes Discusses experimental design problems associated with extremophiles and their therapeutic implications Explores the challenges and possibilities of developing extremolytes for commercial purposes Explains the FDA s regulations on certain microbial bio products that will be of interest to potential industrialists Extremophiles is an immensely useful resource for graduate students and researchers in biotechnology clinical biotechnology microbiology and applied microbiology

**Iron Ores Bioprocessing** Mingming Zhang,2022-10-19 This book describes leading research in bioengineering for development of novel technologies for ferrous metal extraction The author includes new developments in molecular biology biochemistry microbiology cell metabolism and engineering principles and applies them to the conventional iron ore industry proposing innovative solutions to various industry challenges The book focuses on applied approaches and describes emerging and established industrial processes as well as the underlying theory of the process and the biology of the microorganisms involved Elaborates on bioprocessing technologies applicable for extraction of ferrous metals using cross pollination of microbiology and extractive metallurgy Presents a systematic overview of bioprocessing technologies encompassing laboratory research pilot scale studies and industrial process flowsheet design Provides comprehensive coverage of the engineering principles behind bioprocesses of iron ores including material and energy balances transport processes reactions and reactor engineering

**Fungi as Bioremediators** Ebrahim Mohammadi Goltapeh,Younes Rezaee Danesh,Ajit Varma,2013-02-06 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

*Agricultural Waste* Rouf Ahmad Bhat,Khalid Rehman Hakeem,Humaira Qadri,Moonisa Aslam Dervash,2021-07-04 This volume focuses on tackling the harmful impact of agricultural waste with the use of sustainable practices bio techniques and new technologies that either make use of the waste as a raw material or convert the waste into

a useful resource that can help achieve environmental sustainability The agriculture sector is one of the major producers of waste around the world These wastes are produced at various stages of the various processes in the agricultural industry Agricultural practices such as mechanical tillage mono cropping application of agro chemicals irrigation with waste and industrial waters affect soil health and productivity The resulting agricultural wastes can have a deleterious impact on the different components of the environment resulting in harmful problems that pose a huge risk to ecological stability The book investigates the sources and impacts of agri waste on the environment and goes on to offer effective techniques processes and sustainable practices that can be implemented for effective agricultural waste management Chapters also discuss a selection of innovative engineering based technologies The volume includes discussions of many remediation techniques such as the use of biofertilizers biocontrol agents vermicomposting green chemistry microbial interventions and more The book explores the various uses of agri waste with special emphasis on their applications in the plant soil system This book is a valuable reference source for academicians professionals researchers students and policymakers who are interested in the innovative management of the agricultural waste

*Management of Microbial Resources in the Environment* Abdul Malik, Elisabeth Grohmann, Madalena Alves, 2013-02-26 This volume details the exploration collection characterization evaluation and conservation of microbes for sustainable utilization in the development of the global as well as national economies e g in agriculture ecosystems environments industry and medicine Many research institutes and universities all over the world carry out microbiological and biotechnological research which generates substantial genomic resources such as cDNA libraries gene constructs promoter regions transgenes and more valuable assets for gene discovery and transgenic product development This work provides up to date information on the management of microbial resources in the environment It also covers the ecology of microorganisms in natural and engineered environments In trying to understand microbial interactions it further focuses on genomic metagenomic and molecular advances as well as on microbial diversity and phylogeny ecological studies of human animal and plant microbiology and disease microbial processes and interactions in the environment and key technological advances Though not intended to serve as an encyclopedic review of the subject the various chapters investigate both theoretical and practical aspects and provide essential basic information for future research to support continued development

**Endophytes: Novel Microorganisms for Plant Growth Promotion** Ms. Sonali Priyadarshini, Dr. S. Panigrahi, Dr. C. C. Rath, 2022-03-19 This book chapters covers with various Microbiology fields like Bacteriology Mycology Protozoology Phycology Parasitology Immunology Virology Nematology Microbial Biotechnology etc

**Soil Conditions and Plant Growth** Peter J. Gregory, Stephen Nortcliff, 2013-03-04 Building on the extremely successful and popular Russell s Soil Conditions and Plant Growth Wiley Blackwell is pleased to publish this completely revised and updated edition of the soil science classic Covering all aspects of the interactions between plant and soil Peter Gregory and Stephen Nortcliff along with their team of internationally known and respected authors provide essential

reading for all students and professionals studying and working in agriculture and soil science Subject areas covered range from crop science and genetics soil fertility and organic matter nitrogen and phosphorus cycles and their management properties and management of plant nutrients water and the soil physical environment and its management plants and change processes in soils management of the soil plant system and new challenges including food energy and water security in a changing environment Providing a very timely account on how better to understand and manage the many interactions that occur between soils and plants Soil Conditions and Plant Growth is sure to become the book of choice as a recommended text for students and as an invaluable reference for those working or entering into the industry An essential purchase for all universities and research establishments where agricultural soil and environmental sciences are studied and taught

**Bacteria in Agrobiolgy: Crop Productivity** Dinesh K. Maheshwari, Meenu Saraf, Abhinav Aeron, 2013-06-28 The future of agriculture greatly depends on our ability to enhance productivity without sacrificing long term production potential The application of microorganisms such as the diverse bacterial species of plant growth promoting rhizobacteria PGPR represents an ecologically and economically sustainable strategy The use of these bio resources for the enhancement of crop productivity is gaining importance worldwide Bacteria in Agrobiolgy Crop Productivity focus on the role of beneficial bacteria in crop growth increased nutrient uptake and mobilization and defense against phytopathogens Diverse group of agricultural crops and medicinal plants are described as well as PGPR mediated bioremediation leading to food security

**Bioavailability of Organic Chemicals in Soil and Sediment** Jose Julio Ortega-Calvo, John Robert Parsons, 2020-10-15 This book discusses bioavailability concepts and methods summarizing the current knowledge on bioavailability science as well as possible pathways for integrating bioavailability into risk assessment and the regulation of organic chemicals Divided into 5 parts it begins with an overview of chemical distribution in soil and sediment as well as the bioavailability and bioaccumulation of chemicals in plants soil invertebrates and vertebrates including humans It then focuses on the impact of sorption processes and reviews bioavailability measurement methods The closing chapters discuss the impact of bioavailability studies on chemical risk assessment and highlights further research needs Written by a multi disciplinary team of authors it is an essential resource for scientists in academia and industry students as well as for authorities

**Microbial Mediation of Crop Abiotic Stress Tolerance** Alvaro Sanz-Saez, Mariangela Hungria, Maite Lacuesta, Juan Manuel Ruiz-Lozano, 2021-11-30

**Environmental Soil Biology** M. Wood, 2013-03-07 Environmental considerations are playing an increasingly important role in determining management strategies for soil and land Many important environmental issues involve aspects of the biology of soil and these issues cannot be considered satisfactorily in isolation from a general understanding of soil biology as a whole This is the second edition of a book first published in 1989 and now thoroughly rewritten to focus on soil ecology and environmental issues The first part of the book provides an introduction to soils its inhabitants and their activities The second part covers the influence of man on the natural cycles of soil Topics such as acid

rain and nitrogen fertilizers are considered alongside pesticides and genetically modified organisms A new final chapter has been added which considers how as we move towards the next millennium we can apply the concept of sustainability to issues such as global climate change and farming systems The book is directed at advanced undergraduate and immediate postgraduate students in environmental science and soil ecology with students of physical geography and earth sciences as an important secondary market

*A Handbook of Environmental Toxicology* J.P.F. D'Mello, 2019-12-04 Written by an international team of authors from a range of educational medical and research establishments this book is an essential reference for advanced students and researchers in the areas of environmental sciences ecology agriculture environmental health and medicine in addition to industry and government personnel responsible for environmental regulations and directives A Handbook of Environmental Toxicology focuses on two key aspects human disorders and ecotoxicology as affected by major toxins originating from biological sources and pollutants as well as radiation generated spontaneously or as a result of anthropogenic activity A diverse array of these potentially harmful agents regularly appear in the atmosphere soil water and food compromising both human health and biodiversity in natural and managed ecosystems

*Recent Advancements in Bioremediation of Metal Contaminants* Dey, Satarupa, Acharya, Biswaranjan, 2020-07-10 Pollution and ways to combat it have become topics of great concern for researchers One of the most important dimensions of this global crisis is wastewater which can often become contaminated with heavy metals such as lead mercury and arsenic which are released from different industrial wastes mines and agricultural runoff Bioremediation of such heavy metals has been extensively studied using different groups of bacteria fungi and algae and has been considered as a safer eco friendly and cost effective option for mitigation of contaminated wasteland The toxicity of water impacts all of society and so it is of great importance that we understand the better cleaner and more efficient ways of treating water Recent Advancements in Bioremediation of Metal Contaminants is a pivotal reference source that explores bioremediation of pollutants from industrial wastes and examines the role of diverse forms of microbes in bioremediation of wastewater Covering a broad range of topics including microorganism tolerance phytoremediation and fungi the role of different extremophiles and biofilms in bioremediation are also discussed This book is ideally designed for environmentalists engineers policymakers academicians researchers and students in the fields of microbiology toxicology environmental chemistry and soil and water science

*Advanced Microbial Technology for Sustainable Agriculture and Environment* Saurabh Gangola, Saurabh Kumar, Samiksha Joshi, Pankaj Bhatt, 2023-05-18 Advanced Microbial Technology for Sustainable Agriculture and Environment focuses on plant microbe interactions in respect to bioremediation and plant growth promotion providing insights on diverse approaches such as genomics metagenomics proteomics bioinformatics and other high throughput analyses of environmentally relevant microorganisms The impact of frequent applications of potentially toxic chemicals pesticides and fertilizers and increased industrialization processes on microbial diversity emphasizes the potential threat to microbial biodiversity in ecosystems This



is an ideal resource on current trends and the future of PGPR developments with bioremediation potential Moreover it gives a deep understanding of the genetics of microbial biodegradation and different remediation mechanisms that help to re establish the natural environment Helps readers find sustainable ways for environmental clean up and increased agricultural productivity Gives a systematic overview of the role of PGPR in bioremediation selection and preparation of potential PGPR microbial inoculum for bioremediation biodegradation and plant growth promotion Illustrates the importance of PGPR in the bioremediation of potentially hazardous and relatively novel compounds with the maintenance of sustainable agricultural productivity Addresses emerging novel approaches of PGPR based biodegradation of toxic compounds and highlights key developments and challenges associated with the processes

Uncover the mysteries within Crafted by is enigmatic creation, **Advances In Applied Bioremediation Soil Biology** . This downloadable ebook, shrouded in suspense, is available in a PDF format ( \*). Dive into a world of uncertainty and anticipation. Download now to unravel the secrets hidden within the pages.

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