

PETROLEUM BIOVENTING



AN INTRODUCTION

J. VAN EYK



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Petroleum Bioventing

**Inamuddin, Charles Oluwaseun
Adetunji, Mohd Imran Ahamed, Tariq
Altalhi**

Petroleum Bioventing:

Petroleum Bioventing J. van Eyk, 2022-05-04 Petroleum bioventing is a new technique for the biological in situ removal of petroleum hydrocarbons from soil. This book investigates the composition and the behaviour of petroleum in soil, soil properties and soil processes, their interaction with bacterial processes, possibilities for optimizing the removal of petroleum hydrocarbons from soil by bacteria, and it explains the phenomenon of recalcitrance. This interdisciplinary approach forms the basis for both modelling and design principles of bioventing. Key features: Background knowledge on the physical, chemical, biogeochemical properties of soil and soil processes with respect to petroleum bioventing; Background knowledge on petroleum biodegradation and novel approaches to stimulate petroleum biodegradation to stimulate petroleum biodegradation in soil and biofilters; Modelling efforts showing the effect of diffusion and soil porosity on bioventing design and the effect of ventilation quotients on the aeration; New insights into biological removal of priority pollutants from petroleum hydrocarbons; the problem of residual concentrations of petroleum hydrocarbons in soil; the requirements by the Law on Soil Protection. *Manual, bioventing principles and practices*, **Soil Bioventing** Robert E. Hinchey, Andrea Leeson, 1996-12-09 Soil bioventing is one of the most popular modern techniques for removing contaminants from soil. It has recently emerged as one of the most cost effective and efficient technologies available for vadose zone remediation of petroleum contaminated sites. This book explains in practical terms how to carry out a bioventing program. It is an interdisciplinary treatment of the subject covering everything from basic physical and chemical properties of soils to site evaluation, project design and post bioventing monitoring. The wide breadth of coverage makes Soil Bioventing useful to a large audience including consulting firms, students, contractors, environmental managers and anyone who is responsible for supervision of soil cleanup for regulatory reasons. *Handbook of Bioremediation (1993)* Robert D. Norris, 2017-11-22 Written by leading soil and ground water remediation scientists, Handbook of Bioremediation presents information regarding the processes, application and limitations of using remediation technologies to restore contaminated soil and ground water. It covers field tested technologies, site characterization requirements for each remediation technology and the costs associated with their implementation. In addition to discussions and examples of developed technologies, the book provides insights into technologies ranging from theoretical concepts to limited field scale investigations. In situ remediation systems, air sparging and bioventing, the use of electron acceptors other than oxygen, natural bioremediation and the introduction of organisms into the subsurface are among the specific topics covered in this invaluable handbook. *Soil vapor extraction (SVE) treatment technology resource guide*, **Bioprocess Technology** Mr. Rohit Manglik, 2024-01-12 EduGorilla Publication is a trusted name in the education sector committed to empowering learners with high quality study materials and resources. Specializing in competitive exams and academic support, EduGorilla provides comprehensive and well structured content tailored to meet the needs of students across various streams and levels. Cyanobacteria Arun Kumar Mishra, Satya Shila Singh, 2023-11-24

Cyanobacteria the ancient photoautotrophs on the Earth have always been regarded as the most important organism to sustain life in the planet. They are among the first pioneering communities on various harsh habitat hydrarch or xerarch which finally facilitate the emergence of vast communities including higher plants. Being the progenitor of chloroplast the cyanobacterial metabolisms has always fascinated microbiologist. Additionally the ability of these prokaryotes to produce valuable and prolific sources of natural products signified their role in array of industrial sectors. Further the attempts to engineer the cyanobacterial metabolisms in way to enhance production of these metabolites are gradually increasing. Therefore in this book we proposed to accumulate the knowledge of cyanobacterial metabolisms and molecules as an asset for students researchers and biotechnologists. **Cyanobacteria Metabolisms to Molecules** will cover diversity fundamental metabolisms crucial metabolites and their synthesis and bioinformatics. Casts light on cyanobacterial assistance and their potential role in sustainable developments. Provides significant insights into the fundamentals of cyanobacterial metabolism as well as lesser known topics. Determines the role of cyanobacteria in public health. Geomicrobiology and Biogeochemistry Nagina 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 biomineral 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. **Biotechnologies and Biomimetics for Civil Engineering** Fernando Pacheco Torgal, J. A. Labrincha, M. V. Diamanti, C.-P. Yu, H. K. Lee, 2014-08-16 Putting forward an innovative approach to solving current technological problems faced by human society this book encompasses a holistic way of perceiving the potential of natural systems. Nature has developed several materials and processes which both maintain an optimal performance and are also totally biodegradable properties which can be used in civil engineering. Delivering the latest research findings to building industry professionals and other practitioners as well as containing information useful to the public. **Biotechnologies and Biomimetics for Civil Engineering** serves as an important tool to tackle the challenges of a more sustainable construction industry and the future of buildings. **Microbial Rejuvenation of Polluted Environment** Deepak G. Panpatte, Yogeshvari K. Jhala, 2021-01-15 Pollution is one of the most serious issues facing mankind and other life forms on earth. Environmental pollution leads to the degradation of ecosystems loss of services economic losses and various other problems. The eco friendliest approach to rejuvenating polluted ecosystems is with the help of microorganism based bioremediation. Microorganisms are characterized by great biodiversity genetic and metabolic

machinery and by their ability to survive even in extremely polluted environments As such they are and will remain the most important tools for restoring polluted ecosystems habitats This three volume book sheds light on the utilization of microorganisms and the latest technologies for cleaning up polluted sites It also discusses the remediation or degradation of various important pollutants such as pesticides wastewater plastics PAHs oil spills etc The book also explains the latest technologies used for the degradation of pollutants in several niche ecosystems Given its scope the book will be of interest to teachers researchers bioremediation scientists capacity builders and policymakers It also offers valuable additional reading material for undergraduate and graduate students of microbiology ecology soil science and the environmental sciences

Microbial Technologies in Industrial Wastewater Treatment Maulin P. Shah, 2023-06-26 Microbial technology using live naturally occurring microorganisms in industrial wastewater treatment is the most effective and innovative method to degrade environmental pollutants such as heavy metals radionuclides xenobiotic compounds organic waste and pesticides or to prevent their contamination of the environment The technology includes several techniques such as biostimulation biodegradation bioaccumulation and biosorption This book describes the limitations and challenges associated with some generally accepted bioremediation strategies and evaluates the possible applications of these corrective strategies to eliminate toxic pollutants from the environment The environmental contamination by both natural and anthropogenic sources is nowadays an international concern To decontaminate soils sediments and water polluted by anthropogenic activities scientists and technologists have developed various technologies over the years however not only do we have to pay a high cost for physical and chemical environmental technologies but also they sometimes are not ecological or safe Therefore we have realized the necessity to develop viable technologies that use microbes and plants to avoid these issues This book is designed for engineers scientists and other professionals who are seeking introductory and advanced knowledge of the principles of nanotechnology and those who work or are interested in the environmental microbiology or bioremediation field

Bioremediation in the Field ,1994-07 **Hazardous and Industrial Waste Proceedings, 28th Mid-Atlantic Conference** A. Scott Weber, 1996-07-15 This book is a compilation of the papers presented at the Twenty Eighth Mid Atlantic Industrial and Hazardous Waste Conference It aims to provide a forum for those who are interested in the advancement and applications of technologies and methods for managing industrial and hazardous waste

Bioaugmentation Techniques and Applications in Remediation Inamuddin, Charles Oluwaseun Adetunji, Mohd Imran Ahamed, Tariq Altalhi, 2022-06-29 It has been observed that rapid population expansion has raised the amount of anthropogenic activity resulting in high levels of pollution in water air and solid waste as well as an increase in the pressure placed on agricultural lands Bioaugmentation Techniques and Applications in Remediation provides detailed information on bioaugmentation approaches for the remediation of sediments water and soil polluted with organic and inorganic pollutants Practical applications of bioaugmentation techniques performed in restricted systems under controlled conditions laboratory investigations and in the

field are addressed Special emphasis is placed on the applications of nanomaterials in combination with bioaugmentation techniques for enhanced bioremediation efficiency FEATURES Explores abiotic and biotic factors that enhance and facilitate environmental remediation of contaminants Provides a primer on the elementary microbial processes entailed in bioaugmentation Summarizes methods and approaches for executing bioaugmentation technology Details commercially available products and instrumentation This book is an ideal resource for researchers students and engineers working in materials science and bioremediation **Bioremediation of Petroleum and Petroleum Products** James G.

Speight, Karuna K. Arjoon, 2012-11-07 With petroleum related spills explosions and health issues in the headlines almost every day the issue of remediation of petroleum and petroleum products is taking on increasing importance for the survival of our environment our planet and our future This book is the first of its kind to explore this difficult issue from an engineering and scientific point of view and offer solutions and reasonable courses of action This book will guide the reader through the various methods that are used for the bioremediation of petroleum and petroleum products The text is easy to read and includes many up to date and topical references This book introduces the reader to the science and technology of biodegradation a key process in the bioremediation of petroleum and petroleum based contaminants at spill sites The contaminants of concern in the molecularly variable petroleum and petroleum products can be degraded under appropriate conditions But the success of the process depends on the ability to determine the necessary conditions and establish them in the contaminated environment Although the prime focus of the book is to determine the mechanism extent and efficiency of biodegradation it is necessary to know the composition of the original petroleum or petroleum product The laws of science dictate what can or cannot be done with petroleum and petroleum products to ensure that biodegradation hence bioremediation processes are effective The science of the composition of petroleum and petroleum products is at the core of understanding the chemistry of biodegradation and bioremediation processes Hence inclusion of petroleum analyses and properties along with petroleum product analyses and properties is a necessary part of this text **Bioremediation of Petroleum and Petroleum Products** Summarizes the pros and cons of remediation of petroleum and petroleum based products from an environmental perspective Gives examples of unethical behavior and how they should be corrected Offers arguments and elucidates engineering considerations on all sides of these difficult environmental and economic issues Bioremediation of Industrial Waste for Environmental Safety Gaurav Saxena, Ram Naresh Bharagava, 2019-06-29 Achieving environmental sustainability with rapid industrialization is a major challenge of current scenario worldwide As globally evident industries are the key economic drivers but are also the major polluters as untreated partially treated effluents discharged from the industries is usually thrown into the aquatic resources and also dumped unattended Industrial effluents are considered as the major sources of environmental pollution as these contains highly toxic and hazardous pollutants which reaches far off areas due to the medium of dispersion and thus create ecological nuisance and health hazards in living beings Hence there is an

urgent to find ecofriendly solution to deal with industrial waste and develop sustainable methods for treating detoxifying wastewater before its release into the environment Being a low cost and eco friendly clean technology bioremediation can be a sustainable alternative to conventional remediation technologies for treatment and management of industrial wastes to protect public health and environment Therefore this book Volume I covers the bioremediation of different industrial wastes viz tannery wastewater pulp and paper mill wastewater distillery wastewater acid mine tailing wastes and many more which are lacking in a comprehensive manner in previous literature at one place A separate chapter dedicated to major industries and type of waste produced by them is also included This book will appeal to students researchers scientists industry persons and professionals in field of microbiology biotechnology environmental sciences eco toxicology environmental remediation and waste management and other relevant areas who aspire to work on the biodegradation and bioremediation of industrial wastes for environmental safety

Bioremediation Science Amitava Rakshit, Manoj Parihar, Binoy Sarkar, Harikesh B. Singh, Leonardo Fernandes Fraceto, 2021-05-20 This book provides state of the art description of various approaches techniques and some basic fundamentals of bioremediation to manage a variety of organic and inorganic wastes and pollutants present in our environment A comprehensive overview of recent advances and new development in the field of bioremediation research are provided within relevant theoretical framework to improve our understanding for the cleaning up of polluted water and contaminated land The book is easy to read and language can be readily comprehended by aspiring newcomer students researchers and anyone else interested in this field Renowned scientists around the world working on the above topics have contributed chapters In this edited book we have addressed the scope of the inexpensive and energy neutral bioremediation technologies The scope of the book extends to environmental agricultural scientists students consultants site owners industrial stakeholders regulators and policy makers

Desk Encyclopedia of Microbiology Moselio Schaechter, 2003-12-11 The Desk Encyclopedia of Microbiology aims to provide an affordable and ready access to a large variety of microbiological topics within one set of covers This handy desk top reference brings together an outstanding collection of work by the top scientists in the field Covering topics ranging from the basic science of microbiology to the current hot topics in the field Provides a broad easily accessible perspective on a wide range of microbiological topics A synthesis of the broadest topics from the comprehensive and multi volumed Encyclopedia of Microbiology Second Edition Helpful resource in preparing for lectures writing reports or drafting grant applications

Bioremediation and Sustainability Romeela Mohee, Ackmez Mudhoo, 2012-04-02 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 **Handbook of Oil Spill Science and Technology** Merv Fingas, 2014-12-29 Provides a scientific basis for the cleanup and for the assessment of oil spills Enables Non scientific officers to understand the science they use on a daily basis Multi disciplinary approach covering fields as diverse as biology microbiology chemistry physics oceanography and toxicology Covers the science of oil spills from risk analysis to cleanup and through the effects on the environment Includes case studies examining and analyzing spills such as Tasman Spirit oil spill on the Karachi Coast and provides lessons to prevent these in the future

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