Review of bioremediation for polynuclear aromatic hydrocarbon-contaminated sites

A Review On Bioremediation Of Petroleum Hydrocarbon | c01ce31954a69c60b9abc77f1617d947


Review of bioremediation for polynuclear aromatic hydrocarbon-contaminated sites

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 of Ground Water and Geological Material

This book focuses on the toxicity of various organic and inorganic pollutants, their eco-toxicalogical effects and eco-friendly approaches for remediation of environmental pollutants. Extensive focus has been relied on the recent advances in ecofriendly approaches such as bioremediation and phytoremediation technologies, including the use of various group of microbes for remediation of environmental pollutants, etc. Researchers working in the field of bioremediation, phytoremediation, waste management and related fields will find this compilation most useful for further study to learn about the subject matter.

Preliminary Review of Bioremediation Experience of Hazardous Wastes

This review focuses on the in-situ bioremediation of chlorinated organic solvents. This group of compounds is one of the most widespread contaminant classes and one of the most troublesome to remediate. They are found nationwide in municipal and industrial waste waters, landfills and landfill leachates, industrial sludges, waste disposal sites, and groundwaters. Chlorinated alkanes and alkenes, such as trichloroethene (TCA) and trichloroethylene (TCE), are used as dry cleaning fluids, refrigerants, degreasing agents, solvents, and in the the production of decaffeinated coffee. The review will include a discussion of laboratory-scale research, some field application considerations, and a review of a full-scale remediation study.

Bioremediation

Bioremediation of Hazardous Waste Sites

In-situ Bioremediation of Chlorinated Solvents - A Review

Bioremediation for Environmental Sustainability

Recent Advances in Environmental Management

This chapter discusses the use of bioremediation and phytoremediation coupled with electromicros and presents the elements contributing to the success of the remediation process. A deep discussion and an overview of the current advancement in the biotechnologies are outlined in details. Innovative solutions for challenges facing the field application of the new technology are presented and new directions are proposed. A careful review for contaminated site conditions including pH, temperature, and other factors influencing the behavior of microbial community are presented. Great deal of discussion is around overcoming the adverse effect of electrolysis reactions, which is a by-product of electromicros. The discussion includes prolonging the survival of the indigenous bacteria, increase of microbial enzyme secretion, improvement of the indigenous bacteria metabolism, and exploration of metagenomics resources from soil biota. The challenges facing the field application of bioremediation and phytoremediation including the delivery of the electron donors and/or acceptors and nutrients to microorganisms involved in the biodegradation, particularly in clay soils, which has very low hydraulic conductivity, is discussed. The use of electromicros in biostimulation application to enhanced degradation of organic pollutant is reviewed. The implementation of bioaugmentation in bioremediation coupled with electromicros to enhance the outcome of bioremediation is presented.

Trace Metals in the Environment
Pseudomonas Aeruginosa

Waste to Energy: Prospects and Applications
Numerous industries utilize hydrazine on a daily basis. The highly toxic hydrazine fuels are utilized by the US Air Force as a rocket propellant and as an emergency power source on the F-16. Civilian industry requires hydrazine in the manufacture of agricultural chemicals and pharmaceuticals, in photography, and as a corrosion inhibitor (oxygen scavenger) in boiler rooms. This literature review was performed as our first step in addressing an USAF Environmental Safety and Occupational Health (ESOH) concerning hydrazine remediation. Large volumes of the fuels are shipped across the highways of the United States annually, increasing the probability of an accidental spill. Such inadvertent releases of hydrazines to the environment are extremely hazardous due to their mutagenic natures. Laboratory bench-scale research has been proposed to develop a more effective and predictable treatment technique. The treatment process needs to be developed to replace existing disposal options, and address the environmental contamination caused by hydrazine spills. Research conducted over the last 20 years has had little success in providing a hydrazine tolerant microbe. Although the use of biological mechanisms has been successfully applied to numerous chemical contaminants, the concentrations of hydrazine at a spill would prove toxic to conventional microbes.

Approaches in Bioremediation

A Critical Review of Bioremediation Techniques Applied to Heavy Metal and Radioactively Contaminated Media

Bioremediation of Marine Oil Spills

Methods for Bioremediation of Water and Wastewater Pollution

Advances in Biodegradation and Bioremediation of Industrial Waste
Bioremediation for Environmental Sustainability: Approaches to Tackle Pollution for Cleaner and Greener Society discusses many recently developed and successfully applied bio/phytoremediation technologies for pollution control and minimization, which are lacking more comprehensive coverage in previous books. This book describes the scope and applications of bio/phytoremediation technologies and especially focuses on the associated eco-environmental concerns, field studies, sustainability issues, and future prospects. The book also examines the feasibility of environmentally friendly and sustainable bio/phytoremediation technologies to remediate contaminated sites, as well as future directions in the field of bioremediation for environmental sustainability. Illustrates the importance of microbes and plants in bio/phytoremediation and wastewater treatment includes chapters on original research outcomes pertaining to pollution, pollution abatement, and associated bioremediation technologies Covers emerging bioremediation technologies, including electro-bioremediation, microbial fuel cell, nano-bioremediation, constructed wetlands, and more Highlights key developments and challenges in bioremediation and phytoremediation technologies Describes the roles of relatively new approaches in bio/phytoremediation, including molecular engineering and omics technologies, microbial enzymes, biosurfactants, plant-microbe interactions, genetically engineered organisms, and more

Recent Advances in Microbial Degradation

Bioremediation of Olive Mill Wastewater by Yeasts - A Review of the Criteria for the Selection of Promising Strains
Recent advances in the understanding of how bacteria biodegrade dinitrotoluenes (DNT) under aerobic conditions has led to the development of remediation systems that can dramatically reduce clean up costs of DNT-contaminated soil and groundwater. This document summarizes the latest information on bioremediation technologies that exploit the ability of aerobic bacteria to mineralize 2,4- and 2,6-dinitrotoluene (2,4-DNT, 2,6-DNT) to yield energy, harmless minerals and biomass (1). It is based on a recent review of the relevant literature (8). Sources for further information are provided below.

Literature review on the use of bioremediation agents for cleanup of oil-contaminated estuarine environments
This book addresses waste generation problems from various sectors, including industries, agriculture, and household. It focuses on how modern biotechnological approaches could help manage waste in an eco-friendly manner and generate precious bioenergy. It discusses the inadequate waste management systems damaging the environment and its adverse impacts on climate change-related problems. This book covers all the essential information regarding various types of waste and their management. It is a comprehensive compilation for understanding the efficient generation of bioenergy. It is a relevant reading material (resource) for anyone who wishes to study waste management as Chemist, Biologist, Biotechnologist, Industrialist, Ecologist, Microbiologist, Economist, and all disciplines related to the environment.

Bioremediation of Inorganics

Contamination of the environment is of enormous economic and environmental significance. This book reviews the latest research on the harnessing of biotechnology to decontaminate the environment. Internationally acclaimed authors from diverse fields present comprehensive reviews of the most important and well-established solutions to environmental contamination. The limitations as well as the future potential of these practices are critically highlighted. The book also includes stimulating reviews of selected practices which are either novel or the subject of some debate in bioremediation research and practice. This is essential reading for bioremediation researchers and practitioners who wish to look beyond current practice and explore new avenues that may ultimately change the way in which bioremediation is conducted, monitored and studied.

Review of Potential for Bioremediation of Petroleum Contaminated Soils with Special Reference to Landspreading

Enhancement of Bioremediation and Phytoremediation Using Electrokinetics
Bioremediation of Soils Contaminated with Manufactured Gas Plant Residues - A Literature Review

Bioremediation of Olive Mill Wastewater by Yeasts - A Review of the Criteria for the Selection of Promising Strains

In Situ Bioremediation

Bioremediological technologies, whether applied exclusively or in conjunctive with other physical or chemical approaches for the clean-up of organic contamination, constitute powerful tools in the control, management, and diminution of petroleum products in soil and groundwater. This report evaluates the rapidly expanding list of bioremediation techniques developed over the past years and provides a comparison between the feasibility and relative effectiveness of these techniques and conventional physical and/or chemical treatment technologies.

Bioremediation for Environmental Sustainability

Environmental Biotechnology Vol. 3

Review of Bioremediation for Polynuclear Aromatic Hydrocarbon-contaminated Sites

Provides a detailed background of the technologies available for the bioremediation of contaminated soil & ground water. Prepared for scientists, consultants, regulatory personnel, & others who are associated in some way with the restoration of soil & ground water at hazardous waste sites. Also provides insights to emerging technologies which are at the research level of formation, ranging from theoretical concepts, through bench scale inquiries, to limited field-scale investigations. 95 tables & figures.

Bioremediation of Hydrazine: A Literature Review

In-Situ Bioremediation of Ground Water and Geological Material

One of a set presenting selected papers from the Third International In Situ and On-Site Bioreclamation Symposium, San Diego, April 1995. The 17 papers on inorganics include discussions of metal removal and sulfate reduction in sulfide mine drainage, removing toxic elements with aquatic plants and algae, the volatilization of arsenic compounds by microorganisms, and considerations in deciding to treat contaminated soils in situ. The entire 11 volume, $75 paper set (1-57477-001-2), including an index volume, is available for $449.50. Annotation copyright by Book News, Inc., Portland, OR.

Literature Review and Assessment of Various Approaches to Bioremediation of Oil and Associated Hydrocarbons in Soil and Groundwater, Vol. I

Bioremediation of Petroleum Contaminated Aquifers

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 environmental 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.

Microorganisms and Bioremediation

Bioremediation refers to the clean-up of pollution in soil, groundwater, surface water, and air using typically microbiological processes. It uses naturally occurring bacteria and fungi or plants to degrade, transform or detoxify hazardous substances to human health or the environment. For bioremediation to be effective, microorganisms must enzymatically attack the pollutants and convert them to harmless products. As bioremediation can be effective only where environmental conditions permit microbial growth and action, its application often involves the management of ecological factors to allow microbial growth and degradation to continue at a faster rate. Like other technologies, bioremediation has its limitations. Some contaminants, such as chlorinated organic or high aromatic hydrocarbons, are resistant to microbial processes. They are degraded either gradually or not at all. Hence, it is not easy to envisage the rates of clean-up for bioremediation implementation. Bioremediation represents a field of great expansion due to the important development of new technologies. Among them, several decades on metagenomics expansion has led to the detection of autochthonous microbiota that plays a key role during transformation. Transcriptomic guides us to know the expression of key genes and proteomics allow the characterization of proteins that conduct specific reactions. In this book we show specific technologies applied in bioremediation of main interest for research in the field, with special attention on fungi, which have been poorly studied microorganisms. Finally, new approaches in the field, such as CRISPR-CAS9, are also discussed. Lastly, it introduces management strategies, such as bioremediation application for managing affected environment and bioremediation approaches. Examples of successful bioremediation applications are illustrated in radioactive entrainment and retardation, soil stabilization and remediation of polycyclic aromatic hydrocarbons, phenols, plastics or fluorinated compounds. Other emerging bioremediation methods include electro bioremediation, microbe-availed phytoremediation, genetic recombinant technologies in enhancing plants in accumulation of inorganic metals, and metalloids as well as degradation of organic pollutants, protein-metabolic engineering to increase bioremediation efficiency, including nanotechnology applications are also discussed.

Technology Status Review: Bioremediation of Dinitrotoluene (DNT).

This volume is a collection of informative chapters on various subjects. It provides information on the effects of pesticides on avian fauna, the impact of microbial ecosystems to solve environmental problems, a detailed review on issues in
membrane distillations process, microbial sensor for detection of pollutants, microbial biosurfactants, biotechnological applications of immobilised microalgae as well as a review on Biochar production. Most importantly, this book contains a critical review on microbial degradation of plastic wastes and highlights the Biodegradation and Bioremediation of Herbicides.

Biodegradation of Hydrocarbons as a Remediation Method for Petroleum Contaminants in the Environment Or as a Treatment Method for Petroleum Wastes

Transportation, Water and Environmental Geotechnics

Bioremediation for Environmental Sustainability: Toxicity, Mechanisms of Contaminants Degradation, Detoxification and Challenges introduces pollution and toxicity profiles of various organic and inorganic contaminants, including mechanisms of toxicity, degradation, and detoxification by microbes and plants, and their bioremediation approaches for environmental sustainability. The book also covers many advanced technologies in the field of bioremediation and phytoremediation, including electro-bioremediation, microbial fuel cells, nano-bioremediation, constructed wetlands, phytotechnologies, and many more, which are lacking in other competitive titles existing in the market. The book includes updated information, as well as future directions for research, in the field of bioremediation of industrial wastes. This book is a reference for students, researchers, scientists, and professionals in the fields of microbiology, biotechnology, environmental sciences, ecotoxicology, environmental remediation, and waste management, especially those who aspire to work on the biodegradation and bioremediation of industrial wastes and environmental pollutants for environmental sustainability. Environmental safety and sustainability with rapid industrialization is one of the major challenges worldwide. Industries are the key drivers in the world economy, but these are also the major polluters due to discharge of potentially toxic and hazardous wastes containing various organic and inorganic pollutants, which cause environmental pollution and severe toxic effects in living beings. Introduces pollution and toxicity profiles of environmental contaminants and industrial wastes, including oil refinery wastewater, distillery wastewater, tannery wastewater, textile wastewater, mine tailing wastes, plastic wastes, and more. Describes underlying mechanisms of degradation and detoxification of emerging organic and inorganic contaminants with enzymatic roles.

Focuses on recent advances and challenges in bioremediation and phytoremediation, including microbial enzymes, biosurfactants, microalgae, biofilm, archaea, genetically engineered organisms, and more. Describes how microbes and plants can be successfully applied for the remediation of potentially toxic industrial wastes and chemical pollutants to protect the environment and public health.

In-situ Bioremediation of Ground Water and Geological Material

Review of Six Technologies for in Situ Bioremediation of Dissolved BTEx in Groundwater

Bioremediation of Soil Contaminated with Polynuclear Aromatic Hydrocarbons (PAHs)

Pseudomonas aeruginosa, though unfamiliar as an aggressive invader, has gained importance in the scientific community due to its association with cystic fibrosis (CF) and its ability to construct biofilms resilient to host defense. The chronic nature of CF allows this bacterium to colonize, adapt, and evolve at its own pace, thereby causing further complications in CF patients. With its huge genetic repertoire and plasticity of the genome, P. aeruginosa has been able to alter its contents by way of deletions, insertions, inversions, and so on. Therefore, scientists and researchers are eager to study this bacterium in diverse and unusual niches. Written by experts from around the world, this book describes and discusses the various mechanisms of adaptation and evolution displayed by P. aeruginosa.

Advances in Biodegradation and Bioremediation of Industrial Waste

This critical review of the status of in situ bioremediation, which is used to clean up contaminated groundwater aquifers and surface soils, has been organized according to possibilities and restrictions. Possibilities are based on present knowledge and indicate that in situ bioremediation can achieve decontamination of aquifers and soils. Restrictions encompass the scientific, engineering, legal, and other questions that stand in the way of successful development and application of in situ bioremediation. Although much has been written about bioremediation, this critical review is unique because it is comprehensive, critical, and integrated. This situation was no accident; the organization of the authorship team and the report's contents were designed to achieve each of the three attributes. Combining a good plan, outstanding individuals contributing, and an incredible amount of work, they created a critical review that defines the technical and non-technical issues that will determine how much of an impact in situ bioremediation makes on solving the world's challenges for cleanup of our legacy of improperly disposed of materials. Readers of this review will find the issues identified and connected. They will have a solid foundation for research, application, or evaluation of in situ bioremediation in the future.

Literature Review and Assessment of Various Approaches to Bioremediation of Oil and Associated Hydrocarbons in Soil and Groundwater