



# **Soil Pollution**

## **Origin, Monitoring and Remediation**

**Sebastian Brown**

# Soil Pollution Origin Monitoring And Remediation

**Marcel van der Perk**



## **Soil Pollution Origin Monitoring And Remediation:**

**Soil Pollution** Ibrahim Mirsal, 2008-10-26 Despite having been published about two years ago for the first time the continuous demand for this book encouraged me to prepare this revised and enlarged edition Many parts of the text have been rewritten type errors traced and corrected and the bibliography largely modified to include many of the references published about the subject of soil pollution in the previous ten years I should like to express my thanks to the staff of Springer Verlag Heidelberg for their cooperative efforts in preparing this edition I also would like to thank Mr Michael Sidwell B A for the extreme but characteristic care with which he read and revised the proofs I hope that in this new edition the book may continue to serve the needs of students and professionals alike interested in the subject of soil pollution

Ibrahim A Mirsal Preface to the First Edition Whoever has enjoyed following the legendary duel between the Egyptian Pharaoh and his magicians Alchemists on one side and Moses and his brother Aaron on the other as is vividly narrated in the Bible must have realised that people at least those living at or near the eternal battlefields of the Middle East have always had knowledge about the terrible consequences of soil pollution by chemicals This knowledge must have existed long before Moses and his Pharaoh Nobody knows when people became aware of this yet it must have been born in very early times reaching back to the dawn of human conscious

**Soil Pollution: Origin, Monitoring and Remediation** Sebastian Brown, 2021-11-16 The degradation of soil by an alteration in the natural soil environment or through the presence of xenobiotic chemicals is known as soil pollution It is usually caused by improper disposal of waste agricultural chemicals and industrial activity Some of the prominent chemicals which cause soil pollution are petroleum hydrocarbons naphthalene solvents pesticides and heavy metals such as lead The process of removing pollutants and contaminants from the soil is known as environmental remediation There are various strategies which are used in remediation Some of these are aeration of soils bioremediation extracting groundwater and then filtering the contaminants phytoremediation and surfactant leaching The topics covered in this extensive book deal with the core aspects of soil pollution as well as its monitoring and remediation It will serve as a reference to a broad spectrum of readers Coherent flow of topics student friendly language and extensive use of examples make this book an invaluable source of knowledge

Soil Pollution Ibrahim Mirsal, 2013-04-17 Who ever has enjoyed following the legendary duel between the Egyptian Pharaoh and his magicians Alchemists on one side and Moses and his brother Aaron on the other as it is vividly narrated by the Bible must have realised that people at least those living at or near the eternal battle fields of the middle East have always had knowledge about the terrible consequences of soil pollution by chemicals This knowledge must have existed long before Moses and his Pharaoh Nobody knows when did it start yet it must have been born at very early times reaching back to the dawn of human conscious As history teaches human knowledge explodes in logarithmic dimensions and times have come when pollution attained alarming levels with pollutants from industrial and military sources becoming a threat to life wherever it exists on this Earth At the end of the 20th century

states started projects for pollution control and remediation major Universities changed their programs to accommodate environmental studies at central positions in their curricula and nations forgot their differences and came together to sign the Chemical Weapons Convention CWC and other treaties allowing pollution control on world wide scale      Soil pollution: a hidden reality Food and Agriculture Organization of the United Nations,2018-04-30 This document presents key messages and the state of the art of soil pollution its implications on food safety and human health It aims to set the basis for further discussion during the forthcoming Global Symposium on Soil Pollution GSOP18 to be held at FAO HQ from May 2nd to 4th 2018 The publication has been reviewed by the Intergovernmental Technical Panel on Soil ITPS and contributing authors It addresses scientific evidences on soil pollution and highlights the need to assess the extent of soil pollution globally in order to achieve food safety and sustainable development This is linked to FAO s strategic objectives especially SO1 SO2 SO4 and SO5 because of the crucial role of soils to ensure effective nutrient cycling to produce nutritious and safe food reduce atmospheric CO<sub>2</sub> and N<sub>2</sub>O concentrations and thus mitigate climate change develop sustainable soil management practices that enhance agricultural resilience to extreme climate events by reducing soil degradation processes This document will be a reference material for those interested in learning more about sources and effects of soil pollution      **Soil Remediation and Rehabilitation** Helmut Meuser,2012-12-11 This book provides a comprehensive overview of remediation and rehabilitation techniques and strategies for contaminated and anthropogenically disturbed land Rehabilitation approaches in the urban environment such as brownfield redevelopment and urban mining are discussed In relation to contaminated land techniques for soil containment and decontamination of soil soil vapour and groundwater are comprehensively and systematically presented Complicated treatment techniques are schematically depicted and can be readily understood Agricultural silvicultural and environmentally sustainable rehabilitation strategies for reclaiming disturbed land terrain in former mining or natural resource extraction areas such as open cast mines quarries harvested peatlands and subsided mining terrain sinkholes are introduced This book will be a useful tool for students researchers private consultants and public authorities engaged in the treatment of contaminated or disturbed land      **Soil and Water Contamination** Marcel van der Perk,2017-10-09 Soil and Water Contamination Second Edition gives a structured overview of transport and fate processes of environmental contaminants Providing a structured overview of transport and fate processes of environmental contaminants this textbook approaches the environmental issues of soil and water contamination from a spatial and earth science point of view The new edition contains new material on pesticides and pharmaceutical contaminants and a greater number of exercises case studies and examples It covers topics essential to understanding and predicting contaminant patterns in soil groundwater and surface water and contributes to the formation of a solid basis for adequate management and control of soil and water pollution and integrated catchment      Mycoremediation and Environmental Sustainability Ram Prasad,S. Chandra Nayak,Ravindra Nath 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 cytochrome P450 monooxygenases 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

**Environmental Pollution and Remediation** Ram Prasad, 2021-04-16 This book presents state of the art environmental remediation processes Environmental protection and management is a global concern especially in the context of industrial regions Over the years several conventional engineering based physicochemical decontamination methods have been used in the remediation of polluted sites However these methods are expensive and have limited efficiency Drawing on research and examples from around the world this book offers a comprehensive review of and insights into green technologies and sustainable remediation alternatives It discusses the emerging importance of nanotechnology chemo and biosensors indicator species microbe based remediation of organic compounds and ex situ remediation methods Addressing the growing global need for a holistic overview of the environmental remediation of polluted sites it will appeal to teachers researchers scientists capacity builders and policymakers It also serves as additional reading material for undergraduate and graduate students of biotechnology and environmental sciences **A**

**Comprehensive Textbook of ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT** Preety Singh, Vishal Rai, Ajay Yadav, Akancha Tiwari, 2024-09-12 This section examines the critical relationship between environmental studies and disaster management exploring how natural and human induced disasters impact ecosystems and communities It covers the types of environmental disasters their causes and consequences while emphasizing the importance of risk assessment preparedness and sustainable recovery strategies The text delves into the role of climate change in exacerbating disasters and discusses innovative approaches to building resilience through policy technology and community engagement By

integrating case studies and emerging challenges this section provides a comprehensive understanding of how environmental knowledge informs effective disaster management practices ultimately aiming to reduce vulnerability and enhance global sustainability

**Handbook of Chemical Technology and Pollution Control** Martin B. B. Hocking, 2006-01-18 The Handbook of Chemical Technology and Pollution Control Third Edition provides a detailed review of the chemistry and operating conditions of many of the present large scale chemical processes important to our economy and high standards of living The processes that could lead to emissions affecting our air soil and water are considered together with ways in which it may be possible to reduce or eliminate these pollutants Focusing on cleaner production concepts without neglecting end of pipe measures With an increase in the awareness of corporate and social responsibility among business and industry leaders the pressure to reduce harmful emissions and the desire to increase efficiencies and energy utilization this book provides an essential resource Suitable for researchers practitioners and postgraduate students in the fields of chemical and biochemical engineering and environmental science as well as government monitoring and regulatory agencies and industry leaders who want to stay one step ahead this book will be a valuable addition to any library Integrated treatment of chemical technology with emission control chemistry Introductory outline of the causes and effects of air and water pollution chemistry Outline of the operating features and efficiency of basic emission control devices Historical background of developments in industrial chemistry to 2004 in a single volume Organized for easy access to chemical technology new developments or emission control details Referenced to current additional sources of information in each area covered Review questions provide working experience with the material provided

**Environmental Biotechnology** Sibi G, 2022-11-30 This book approaches the topic of environmental biotechnology in a clear integrated and meaningful way covering both the fundamentals and biochemical processes involved as well as the technologies themselves within different areas of application As part of the framework it also provides a thorough description of the pollution and its control and the role of microorganisms in a wide range of ecosystems and deterioration processes Features Focuses on the role of microorganisms in a wide range of ecosystems and deterioration processes Explains underlying concepts of environment interlinks them from an ecological point of view and describes the approaches for waste treatment Describes the concepts and fate processes of environmental contaminants contaminant patterns in soil groundwater and surface water Includes novel research findings and applications of biosurfactants Discusses biodegradation as a key process in the bioremediation of recalcitrant compounds This book is aimed at Primarily Senior Undergraduates including Graduate Students and Researchers in Biotechnology Environmental Science Engineering Conservation Biology Microbiology Waste Management and Ecology

*Sustainable Remediation for Pollution and Climate Resilience* Arafat Abdel Hamed Abdel Latef, Ehab M. Zayed, Ahmad Alsayed Omar, 2025-06-29 This book offers a comprehensive exploration of strategies to combat pressing environmental challenges focusing on pollution remediation and climate change mitigation It presents innovative recycling models and advanced tertiary water treatment

methods as viable solutions to these global issues As humanity faces the consequences of pollution from plastic waste to industrial contamination this book highlights the need for sustainable practices that ensure environmental and biological continuity It addresses the critical question of how to remediate plastic pollution a major environmental crisis affecting marine life terrestrial ecosystems and human health The chapters cover a wide range of topics including the comparison of bioremediation and nanomaterials phytoremediation of domestic wastewater and the integration of mine rehabilitation practices in the context of climate change Readers will discover the ecological importance of bacteria and fungi in bioremediation the role of microbes in environmental restoration and the potential of phycoremediation algae in mitigating climate change The book also examines the impact of viral and fungal remediation in creating a healthy environment and the role of biofertilizers in soil remediation This volume is essential for researchers environmental scientists and policymakers seeking to understand and implement effective pollution remediation strategies It offers valuable insights into the intersection of technology and ecology making it a must read for anyone committed to preserving our planet for future generations

**The General Genetic Catastrophe** Nils K. Oeijord, 2011-02-24 Nils K Oeijords research since 1999 shows that we have a worldwide general genetic catastrophe GGC due to general local and global manmade mutagenic pollution The GGC began in the 1700s increased in the 1800s and exploded in the 1900s The HIGH and INCREASING prevalence and the HIGH and INCREASING incidence of gene damage and genetic diseases all over the world logically prove the existence of the GGC Nils K Oeijord is a science writer a former researcher plant production a former assistant professor mathematics and a former science and mathematics lecturer high school He is the discoverer of the general genetic catastrophe and has earned a place in Whos Who in the World 28th Edition in Great Minds of the 21st Century 5th Edition and in 2000

Outstanding Intellectuals of the 21st Century 2011 Edition Advances in Bioremediation and Phytoremediation for Sustainable Soil Management Junaid Ahmad Malik, 2022-01-31 This edited volume deals with the understanding of the issues concerned with the pollution caused by toxic elements and heavy metals and their impacts on the different agro ecosystems as well as the techniques involved in sustainable remediation and amelioration of polluted soils Furthermore the book is a detailed comprehensive account for the treatment technologies from unsustainable to sustainable which includes chapters prepared by professionals with expertise in environmental microbiology biotechnology bioremediation and environmental engineering It focuses on the characterization reclamation bioremediation and phytoremediation of polluted soils The research presented also highlights some of the significantly important plant and microbial species involved in remediation the physiology biochemistry and the mechanisms of remediation by various plants and microbes and suggestions for future improvement of bioremediation technology It offers insights into the current focus and recent advances in bioremediation and green technology applications for sustainable soil management

**Integrative Strategies for Bioremediation of Environmental Contaminants, Volume 2** Riti Thapar Kapoor, Maulin P. Shah, 2023-07-29 Integrative Strategies for

Bioremediation of Environmental Contaminants Volume Two Avenues to a Cleaner Society focuses on the exploitation of various biological treatment technologies and their use to treat toxic contaminants present in industrial effluent to restore contaminated sites The book includes coverage of combined treatments of microbes for reuse of wastewater and contaminated soil to successfully achieve eco restoration environment protection and sustainable development In 14 chapters this reference compiles current and advanced biotechnologies as well as future directions for research This is a valuable resource for researchers in microbiology biotechnology environmental engineering and environmental science and all those who wish to broaden their knowledge in the field of applied microbiology to develop sustainable waste management Provides comprehensive information on state of art applications of biochar microbes and their synergistic use for wastewater industrial effluent treatment and environment protection Summarizes current uses of biochar microbes and dead biomass for dye decolorization degradation and removal of heavy metals which may play a key role in achieving a more productive and sustainable environment Explores various aspects of biological methods for contaminant removal for better insights into basic and advanced biotechnological applications

**Advances in Bioremediation and Phytoremediation** Naofumi Shiomi, 2018-04-04 The pollution of soil and groundwater by harmful chemical compounds and heavy metals is becoming very serious in many countries Although remediation is necessary as soon as possible the performance of conventional bioremediation processes is not sufficient This book deals with advances in bioremediation and phytoremediation processes by using excellent strains and a combination of processes In the chapters of this book the researchers have introduced the overall status of contamination the characteristics of bioremediation using halobacteria Candida yeast and autochthonous bacteria and phytoremediation using macrophytes Moreover other researchers introduced a process using biochar and electric currents and this combination of processes and phytoremediation enhances the overall process

**Handbook of Research on Advancements in Environmental Engineering** Gaurina-Medjimurec, Nediljka, 2014-11-30 The protection of clean water air and land for the habitation of humans and other organisms has become a pressing concern amid the intensification of industrial activities and the rapidly growing world population The integration of environmental science with engineering principles has been introduced as a means of long term sustainable development The Handbook of Research on Advancements in Environmental Engineering creates awareness of the role engineering plays in protecting and improving the natural environment Providing the latest empirical research findings this book is an essential reference source for executives educators and other experts who seek to improve their project s environmental costs

**Trace Elements in Soils and Plants** Alina Kabata-Pendias, 2010-10-18 Still the Gold Standard Resource on Trace Elements and Metals in Soils This highly anticipated fourth edition of the bestselling Trace Elements in Soils and Plants reflects the explosion of research during the past decade regarding the presence and actions of trace elements in the soil plant environment The book provides information on the biogeochemical processes of trace elements in the soil

**Bioremediation of Agricultural Soils** Juan C. Sanchez-Hernandez, 2019-03-14



The quality of agricultural soils are always under threat from chemical contaminants which ultimately affect the productivity and safety of crops Besides agrochemicals a new generation of substances invades the soil through irrigation with reclaimed wastewater and pollutants of organic origin such as sewage sludge or cattle manure Emerging pollutants such as pharmaceuticals nanomaterials and microplastics are now present in agricultural soils but the understanding of their impact on soil quality is still limited With focus on in situ bioremediation this book provides an exhaustive analysis of the current biological methodologies for recovering polluted agricultural soils as well as monitoring the effectiveness of bioremediation

**Drainage Systems** Muhammad Salik Javaid, 2012-03-07 The subject of drainage draining the water off is as important as irrigation application of water if not more Drainage has a deep impact on food security agricultural activity hygiene and sanitation municipal usage land reclamation and usage flood and debris flow control hydrological disaster management ecological and environmental balance and water resource management Drainage Systems provides the reader with a three dimensional expose of drainage in terms of sustainable systems surface drainage and subsurface drainage Ten eminent authors and their colleagues with varied technical backgrounds and experiences from around the world have dealt with extensive range of issues concerning the drainage phenomenon Field engineers hydrologists academics and graduate students will find this book equally benefitting

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