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MOLECULAR, CLINICAL AND ENVIRONMENTAL TOXICOLOGY

VOLUME 3: ENVIRONMENTAL TOXICOLOGY

Springer Environmental Toxicology is the third volume of a three-volume set on molecular, clinical and environmental toxicology that offers a comprehensive and in-depth response to the increasing importance and abundance of chemicals of daily life. By providing intriguing insights far down to the molecular level, this three-volume work covers the entire range of modern toxicology with special emphasis on recent developments and achievements. It is written for students and professionals in medicine, science, public health or engineering who are demanding reliable information on toxic or potentially harmful agents and their adverse effects on the human body.

MOLECULAR, CLINICAL AND ENVIRONMENTAL TOXICOLOGY

VOLUME 3: ENVIRONMENTAL TOXICOLOGY

Springer Science & Business Media Environmental Toxicology is the third volume of a three-volume set on molecular, clinical and environmental toxicology that offers a comprehensive and in-depth response to the increasing importance and abundance of chemicals of daily life. By providing intriguing insights far down to the molecular level, this three-volume work covers the entire range of modern toxicology with special emphasis on recent developments and achievements. It is written for students and professionals in medicine, science, public health or engineering who are demanding reliable information on toxic or potentially harmful agents and their adverse effects on the human body.

MOLECULAR, CLINICAL AND ENVIRONMENTAL TOXICOLOGY

VOLUME 2: CLINICAL TOXICOLOGY

Springer Science & Business Media Clinical Toxicology is the second volume of a three-volume set on molecular, clinical and environmental toxicology that offers a comprehensive and in-depth response to the increasing importance and abundance of chemicals of daily life. By providing intriguing insights far down to the molecular level, this three-volume work covers the entire range of modern toxicology with special emphasis on recent developments and achievements. It is written for students and professionals in medicine, science, public health or engineering who are demanding reliable information on toxic or potentially harmful agents and their adverse effects on the human body.

ENVIRONMENTAL AND BIOCHEMICAL TOXICOLOGY

CONCEPTS, CASE STUDIES AND CHALLENGES

Walter de Gruyter GmbH & Co KG This text coherently links biochemical fundamentals and mechanism with economic and societal problems of environmental pollution. It addresses interdisciplinary topics such as regulatory problems, sampling and quantification, model organisms as well as a philosophical perspectives on the Anthropocene. Case studies from industry and exercises illustrate current issues and discuss future aspects.

TOXICOLOGICAL EFFECTS OF PERFLUOROALKYL AND POLYFLUOROALKYL SUBSTANCES

Humana Press This book serves as a timely and comprehensive overview of the latest science for perfluoroalkyl and polyfluoroalkyl substances (PFASs), covering the development of methods for assessing PFASs in biological fluids and

tissues as well as the current knowledge regarding their toxicity to vertebrate organisms. This book includes chapters on human and wildlife exposure/body burdens, reviews of metabolism and toxicological effects by organ system/developmental stage and aspects of PFAS toxicity that are driving PFAS research and regulatory oversight. Toxicological Effects of Perfluoroalkyl and Polyfluoroalkyl Substances provide critical assessments of the most controversial topics surrounding toxicological evaluation of PFASs to give readers an expert perspective on the issues. Emphasis is placed on the integration of modes and mechanisms of action with functional endpoints that are relevant to human and wildlife health. This book will be a useful resource for toxicologists, environmental chemists, risk assessors and researchers with an interest in the class of compounds known as perfluoroalkyl and polyfluoroalkyl substances.

NANOSCIENCE VOLUME 7

Royal Society of Chemistry Nanoscience Volume 7 provides a critical and comprehensive assessment of the most recent research and opinion from across the globe for anyone practising in any nano-allied field, or wishing to enter the nano-world.

CHEMICAL NATURE OF GROUNDWATER AND ITS BIOREMEDIATION

Google Book Publishers Water and land are precious natural resources for the agricultural activities, which are prerequisite for any civilization. Rapid industrialization and urbanization exploit and severely pollute these resources. The organic and inorganic pollutants generate an unfavourable environment for the survival of aquatic flora and fauna by affecting the aquatic ecosystems. The increasing urbanization, industrial revolution, advancement of technologies, etc. are the reasons for increased pollution level. Pollution is the discharge of the contaminating substances that have adverse effects on the environment. It reduces the quality of the environment by contaminating it with impurities. Smoke and dust particles pollute the air, solid waste pollutes the land, and in the same way industrial discharge, municipal sewage, and domestic wastewater pollute the water resources (streams, lakes, oceans, groundwater). Pollutants, thereby, present in wastewater, take the entry into food chain and food web. Heavy metals are outlined as substances with comparatively high density, high atomic weights, and high atomic numbers. They naturally occur within the earth’s crust but presently due to several manmade activities, they pool-up at certain places and hamper the natural constitution and function of natural resources they invade. The natural sources of heavy metal intrusion are weathering of minerals, volcanic eruptions, overexploitation of underground resources, etc., which cause heavy metals of underlying rocks to leach into the groundwater, whereas man-made sources are smelting, mining, industries, sludge selling, agricultural use of serious metals in fertilizers and pesticides and many more. Some of the heavy metals like Lead, Mercury, Arsenic, and Chromium are one of the culprits for global warming and destroying the atmospheric ozone with atmospheric methane, nitrous oxide, and sulphur dioxide. Environmental contamination by heavy metals is a serious problem throughout the world. The addition of toxic heavy metals in the ecosystem may lead to its bioaccumulation, geo-accumulation, and biomagnification. The heavy metals can be removed by using some common conventional treatment processes. Physicochemical removal processes such as adsorption, ion exchange, membrane filtration, reverse osmosis etc. are used to remove heavy metals. Biological treatments using microorganisms include methods such as activated sludge, trickling filters, stabilization ponds etc. Biosorption and phytoremediation are promising, low cost, eco-friendly best solution for removal of heavy metals. The phytoremediation applications can be classified based on contaminant fate: degradation, extraction, containment or combination of these. Phytoremediation applications can be classified based on mechanisms involved. Such mechanisms include extraction of contaminant from soil or groundwater; concentration of contaminants in plant tissue, degradation of contaminants by various biotic and abiotic processes; volatilization or transpiration of volatile contaminants from plants into air, immobilization of contaminants in root zone etc. The present book Chemical Nature of Groundwater and its Bioremediation focuses on preliminary screening of aquatic macrophytes having phytoremediation potential, selection of two specific hyperaccumulator species for phytoremediation, screening of heavy metals accumulation potential and biochemical constituents of selected plant species involving heavy metal treatment, assessing heavy metal accumulation potential, physio-chemical and phytochemical parameters with a treatment of electroplating industry effluent, measuring the phytoremediation efficiency of two selected plant species by in situ experiments, assessing the physico-chemical characteristics of contaminated water treated with two selected plant species, and heavy metal accumulation in biomass by both the species.

MICROBIAL BIOTECHNOLOGY IN ENVIRONMENTAL MONITORING AND CLEANUP

IGI Global Pollutants are increasing day by day in the environment due to human interference. Thus, it has become necessary to find solutions to clean up these hazardous pollutants to improve human, animal, and plant health. Microbial Biotechnology in Environmental Monitoring and Cleanup is a critical scholarly resource that examines the toxic hazardous substances and their impact on the environment. Featuring coverage on a broad range of topics such as pollution of microorganisms, phytoremediation, and bioremediation, this book is geared towards academics, professionals, graduate students, and practitioners interested in emerging techniques for environmental decontamination.

MOLECULAR COMPUTING AND BIOINFORMATICS

MDPI This text will provide the most recent knowledge and advances in the area of molecular computing and bioinformatics. Molecular computing and bioinformatics have a close relationship, paying attention to the same object

but working towards different orientations. The articles will range from topics such as DNA computing and membrane computing to specific biomedical applications, including drug R&D and disease analysis.

CELLULAR AND MOLECULAR PHYTOTOXICITY OF HEAVY METALS

Springer Nature Plant growth and development is closely dependent on the plant environment, including the wide-spread presence of organic and inorganic xenobiotics and pollutants. Currently, heavy metals are the most common inorganic environmental pollutants and they have pronounced effects and consequences not only for plants, but also for the ecosystem in which the plants form an integral component. It has been suggested that these contaminants accumulate in agricultural crops, thus entering the food chain and posing a significant health risk. Plants growing in polluted sites exhibit altered metabolism, reduced growth, and decreased biomass production. These pollutants adhere to plant roots and exert physical or chemical toxicity and subsequently cell death in plants. Yet, plants have developed various defence mechanisms to counteract the toxicity induced by heavy metals. Only detailed study of the processes and mechanisms would allow researchers and students to understand the interactions, responses, and adaptations of plants to these pollutants; however, there are several unresolved issues and challenges regarding the interaction and biological effects of heavy metals. Therefore, this volume provides relevant, state-of-the-art findings on environmental phytotoxicity and the mechanisms of such interactions at the cellular and molecular levels. This volume consists of chapters on relevant topics contributed by different experts or group of experts so as to make available a comprehensive treatise designed to provide an in-depth analysis of heavy metals phytotoxicity. This book may serve as a reference to scientists, researchers and students in the fields of toxicology, environmental toxicology, phytotoxicology, plant biology, plant physiology, plant biochemistry and plant molecular biology, and especially those interested in heavy metals toxicology.

NANOSENSORS FOR ENVIRONMENTAL APPLICATIONS

Springer Nature This book provides a comprehensive overview on the most important types of nanosensor platforms explored and developed in the recent years for efficient detection of environmental/clinical analytes. The chapters cover basic aspects of functioning principles and describe the technologies and challenges of present and future pesticide, metal ions, toxic gases analytical sensing approaches and environmental sensors. Nanosensors are nanoscale miniature devices used for sensing of analyte in ultra-low range. These have gained considerable interest in environmental applications such as environmental chemistry and functionalization approaches, environmental engineering, sustainability, green technology for sensing, environmental health monitoring, pesticide detection, metal and ions detection using electrochemical and wireless sensor.

CHIRAL ENVIRONMENTAL POLLUTANTS

ANALYTICAL METHODS, ENVIRONMENTAL IMPLICATIONS AND TOXICOLOGY

Springer Nature This monograph contains a survey on the role of chirality in ecotoxicological processes. The focus is on environmental trace analysis. Areas such as toxicology, ecotoxicology, synthetic chemistry, biology, and physics are also covered in detail in order to explain the different properties of enantiomers in environmental samples. This monograph delivers a comprehensive survey for environmental trace analysts, analytical chemists, ecotoxicologists, food scientists and experienced lab workers.

SOIL BIOREMEDIATION

AN APPROACH TOWARDS SUSTAINABLE TECHNOLOGY

John Wiley & Sons This book will discuss the effective and sustainable technological approaches for remediation of contaminates via eco-friendly usage of microbes. The primary focus will be on the role of microbes, particularly bacteria and fungi, for the degradation and removal of various xenobiotic substances in the environment. The book will also emphasize molecular approaches and biosynthetic pathways of microbes, and present gene and protein expression studies for bio-deterioration techniques. New innovative and sophisticated green technologies for waste minimization and waste control will be presented, as well as the potential of microbes for various techniques of bioremediation, including bio-sorption, bio-augmentation, bio-stimulation, to clean contaminated environments.

METALS IN SOIL

CONTAMINATION AND REMEDIATION

BoD – Books on Demand The anthropogenic input of metals into the atmosphere is estimated to be one-to-three orders of magnitude higher than natural fluxes. Soil acts as the primary sink for anthropogenic metals among the environmental spheres. Most metals show indefinite persistence in the ecosphere due to resistance against microbial or chemical-assisted degradation. This edited book is an attempt to compile reviews and case studies from different researchers focusing on different aspects of soil contamination by metals and its subsequent remediation. The book's contents will be useful for researchers and strategists interested in the environmental aspects of soil contamination.

PETS AS SENTINELS, FORECASTERS AND PROMOTERS OF HUMAN HEALTH

Springer Nature This book provides an up-to-date overview of the current knowledge and research concerning

domestic pets as sentinels, forecasters and promoters of human health. Written by leading specialists in the fields of medicine, veterinary, environment, analytical chemistry, sociology and behavioral science, this volume provides a comprehensive understanding of the capabilities of pets in what regards to human health. The first seven chapters are devoted to the use of pets as sentinels for their human companions, in terms of exposure to different classes of environmental chemicals. The following five chapters address the use of pets as models for human diseases and promoters of human health. The final two chapters highlight the psycho-social and psychophysiological aspects of human-animal interactions. The book offers an integrated approach to the One Health concept, providing, in a truly holistic manner, tools to assess the equilibrium between the environment, men and animals. This exercise will highlight and reshape our position towards the planet that despite being “a microscopic dot on a microscopic dot lost in the unimaginable infinity of the Universe” is still our own. At the end of the day, pets will always be there to help us.

EMERGING NANOTECHNOLOGIES FOR WATER TREATMENT

Royal Society of Chemistry Rapid population growth, urbanisation and industrialisation have caused serious problems in terms of water pollution and the supply of safe water. Solutions for monitoring pollutants in water and for removing them are urgently needed and they must be both efficient and sustainable. Recent advances in emerging environmental nanotechnologies provide promising solutions for these issues. The physical and chemical properties of nanomaterials can be tailored by controlling attributes such as their size, shape, composition, and surface, so that they can be both highly specific and highly efficient. This makes them perfect platforms for a variety of environmental applications including sensing, treatment and remediation. Providing an array of cutting-edge nanotechnology research in water applications, including sensing, treatment, and remediation, as well as a discussion of progress in the rational design and engineering of nanomaterials for environmental applications, this book is a valuable reference for researchers working in applications for nanotechnology, environmental chemistry and environmental engineering as well as those working in the water treatment industry.

CHEMISTRY AND FOOD SAFETY IN THE EU

THE RAPID ALERT SYSTEM FOR FOOD AND FEED (RASFF)

Springer This Brief provides a general description of the European Rapid Alert System for Food and Feed (RASFF). It describes the RASFF approach on the legal level and with reference to notification procedures, including also new tools, which were launched in 2014: iRASFF and the RASFF Consumer Portal. In an introduction, the present status of the RASFF, which had originally been introduced in 1979, is briefly reviewed. It is described as the main basis of modern food policy in Europe, enabling member countries to take rapid corrective actions on the one hand, and to perform statistically reliable analyses of food-related hazards on the other hand. One chapter contains a statistical evaluation of RASFF notifications in general, and specifically with regard to chemical contaminants, including also allergens. In another chapter, reasons for rejections of food and feed at the European borders are analyzed in selected case studies. The Brief provides an easy description for the chemical dangers and contaminants it is referring to, outlining the names, properties, uses and importance in the food and feed industry, toxicological effects, and contamination sources. The last chapter offers an outlook on the future of the RASFF and possible expectations.

FOOD SAFETY IN CHINA

SCIENCE, TECHNOLOGY, MANAGEMENT AND REGULATION

John Wiley & Sons From contaminated infant formula to a spate of all-too-familiar headlines in recent years, food safety has emerged as one of the harsher realities behind China's economic miracle. Tainted beef, horse meat and dioxin outbreaks in the Western world have also put food safety in the global spotlight. Food Safety in China: Science, Technology, Management and Regulation presents a comprehensive overview of the history and current state of food safety in China, along with emerging regulatory trends and the likely future needs of the country. Although the focus is on China, global perspectives are presented in the chapters and 33 of the 99 authors are from outside China. Introductory chapters address such issues as the shared responsibility for food safety, the development of China's food industry, the current status of China's food safety, and educational and training courses designed to ensure food safety in China. The scientific aspects of food safety are explored next, with seven chapters on food microbiology, five on food chemistry and four chapters on risk assessment. A series of six chapters then addresses China's relatively new food laws and regulations, inspection methods and international trade. This is followed by a focus on six major commodity groups: meat, dairy, fruits and vegetables, fats and oils, cereals and seafood. Four concluding chapters discuss the application of innovative technologies to food safety. Timely and illuminating, Food Safety in China offers invaluable insights into our understanding of a critical link in the increasingly globalized complex food supply chain of today's world.

MICROBIAL BIOTECHNOLOGY: BASIC RESEARCH AND APPLICATIONS

Springer Nature Microbial biotechnology is an important area that promotes advanced research into using microbes for value-added products, human nutrition, and the overall wellbeing of society. This book presents the latest information on the use of microbes for sustainable development, and highlights state-of-the-art biotechnological techniques used to harness microbial biotechnological traits on a commercial scale. Gathering contributions from authoritative researchers in the field, it addresses recent advances in microbial biotechnological approaches that offer sustainable

options for future generations. Exploring a broad range of microbial products and their uses, the book specifically places emphasis on the application of microorganisms in healthcare, the environment and industry. It also discusses various compound classes derived from microbial metabolites. Pursuing a holistic approach to recent advances in the utilization of various microbes as biotechnological tools, the book also covers traditional uses, and explores emerging strategies to harness their full potential. Accordingly, it offers a valuable resource for researchers and graduate students alike.

A NEW GENERATION MATERIAL GRAPHENE: APPLICATIONS IN WATER TECHNOLOGY

Springer This book presents a unique collection of up-to-date applications of graphene for water science. Because water is an invaluable resource and the intelligent use and maintenance of water supplies is one of the most important and crucial challenges that stand before mankind, new technologies are constantly being sought to lower the cost and footprint of processes that make use of water resources as potable water as well as water for agriculture and industry, which are always in desperate demand. Much research is focused on graphene for different water treatment uses. Graphene, whose discovery won the 2010 Nobel Prize in physics, has been a shining star in the material science in the past few years. Owing to its interesting electrical, optical, mechanical and chemical properties, graphene has found potential applications in a wide range of areas, including water purification technology. A new type of graphene-based filter could be the key to managing the global water crisis. According to the World Economic Forum's Global Risks Report, lack of access to safe, clean water is the biggest risk to society over the coming decade. Yet some of these risks could be mitigated by the development of this filter, which is so strong and stable that it can be used for extended periods in the harshest corrosive environments, and with less maintenance than other filters on the market. The graphene-based filter could be used to filter chemicals, viruses, or bacteria from a range of liquids. It could be used to purify water, dairy products or wine, or in the production of pharmaceuticals. This book provides practical information to all those who are involved in this field.

MOLECULAR, CLINICAL AND ENVIRONMENTAL TOXICOLOGY

VOLUME 1: MOLECULAR TOXICOLOGY

Springer Science & Business Media Molecular Toxicology is the first volume of a three-volume set Molecular, Clinical and Environmental Toxicology that offers a comprehensive and in-depth response to the increasing importance and abundance of chemicals in daily life. By providing intriguing insights far down to the molecular level, this work covers the entire range of modern toxicology with special emphasis on recent developments and achievements. It is written for students and professionals in medicine, science, public health and engineering who are demanding reliable information on toxic or potentially harmful agents and their adverse effects on the human body.

BIOMARKERS IN TOXICOLOGY

Academic Press Biomarkers in Toxicology is a timely and comprehensive reference dedicated to all aspects of biomarkers that relate to chemical exposure and their effects on biological systems. This book includes both vertebrate and non-vertebrate species models for toxicological testing and development of biomarkers. Divided into several key sections, this reference volume contains chapters devoted to topics in molecular-cellular toxicology, as well as a look at the latest cutting-edge technologies used to detect biomarkers of exposure and effects. Each chapter also contains several references to the current literature and important resources for further reading. Given this comprehensive treatment, Biomarkers in Toxicology is an essential reference for all those interested in biomarkers across several scientific and biomedical fields. Written by international experts who have evaluated the expansive literature to provide you with one resource covering all aspects of toxicology biomarkers Identifies and discusses the most sensitive, accurate, unique and validated biomarkers used as indicators of exposure and effect of chemicals of different classes Covers special topics and applications of biomarkers, including chapters on molecular toxicology biomarkers, biomarker analysis for nanotoxicology, development of biomarkers for drug efficacy evaluation and much more

CONTAMINANTS OF EMERGING CONCERNS AND REIGNING REMOVAL TECHNOLOGIES

CRC Press With an increased demand for wastewater reuse, groundwater recharge with treated wastewater has been practiced across the globe. As a result, groundwater quality deteriorates by emerging micropollutants from various anthropogenic origins, including untreated wastewater, seepage of landfill leachate, and runoff from agricultural lands. The fate of such emerging and geogenic contaminants in subsurface systems, especially in the groundwater, depends on several factors. Physicochemical properties of contaminants such as octanol-water partition coefficient, dissociation constant, water solubility, susceptibility to biodegradation under anaerobic conditions, and environmental persistence under diverse geological and pH conditions play a critical role during subsurface mass flow. Thus, advanced wastewater treatment techniques, followed by implementing stricter guidelines, are some of the measures that can safeguard water resources. This book, in general, gives an understanding of the fate and mitigation strategies for emerging and geogenic contaminants in the groundwater. The first and second sections provide a detailed insight into various removal techniques and mitigation approaches. Possible treatment strategies, including bioremediation and natural attenuation, are also covered in those sections. Environmental assessment, groundwater vulnerability, health effects, and regulations pertaining to various contaminants are systematically presented in the third section.

PLANT RESPONSES TO SOIL POLLUTION

Springer Nature Soil is a vital support system for all life forms, and is directly or indirectly exposed to various pollutants and harmful chemicals. Any pollutant entering the soil system not only affects the quality of the soil, but also the plants and crops growing in it. Further, soil pollution has far-reaching impacts, since harmful chemicals can become biomagnified and enter the food chain, causing severe health concerns. Degraded soils can adversely affect various plant systems by creating biotic and abiotic stress, which increases the chances of biochemical and physiological disorders. Chronic diseases and lower yield have been reported as consequences of soil pollution. Drawing on decades of soil-related research, this book focuses on soil pollution, types of soil pollutants, and their impacts on plant physiological and biochemical systems, along with crop productivity. The book begins with a brief introduction to soil pollution and continues with a discussion of the different types and their effects, together with remediation methods. It highlights various sources of soil pollution such as herbicides, acidification, chemical fertilizers, sewage sludge, heavy metals, and radioactive pollutants. It also covers plant responses to combinations of pollutants, effects of pollutants on plant ultrastructure, interactions between pollutants and plant diseases, and interactions between pollutants and agricultural practices. In closing, it addresses the challenges involved in the restoration of degraded land, side effects of agricultural practices in the form of greenhouse gases, and strategies for mitigating these effects. Plant Responses to Soil Pollution offers an essential guide for students, environmental consultants, researchers and other professionals involved in soil and plant-related research.

BIOMARKERS OF EXPOSURE, EFFECT AND SUSCEPTIBILITY TO ENVIRONMENTAL AND OCCUPATIONAL CHEMICALS

Frontiers Media SA

NETWORKING OF MUTAGENS IN ENVIRONMENTAL TOXICOLOGY

Springer This book covers the latest environmental issues based on current research objectives. All chapters are fundamentally interlinked and focus on deciphering the networking of mutagens in environmental toxicity and human health. Our changing environment, climate, and lifestyle factors are growing concerns in the 21st century. The existing mutagens, either physical or chemical, are responsible for environmental toxicity. These toxicants are carcinogenic and not limited to naturally occurring chemicals or biologicals, but can also be man-made, such as 'radiation'. The networking of mutagens can have a broad range of effects on both the environment and human health. Accordingly, the respective chapters explore the networking of mutagens in connection with environmental toxicity, and address: 1. Extant types of man-made radiation and their effects on the environment and biological systems2. Heavy metal contaminations: Effects on environmental health3. Networking of environmental pollutants in the air, dust, soil, water, and natural toxins in the environment: Exposure and health4. The molecular interaction of environmental carcinogens with DNA: An oncoinformatics approach5. Fundamentals of nonotoxicity, carcinogenicity, mutagenic and neurotoxicity in environmental health6. The role of antioxidants and medicinal plants in reducing the impacts of disease-causing pollutants A sequel to Perspectives in Environmental Toxicology, this book highlights the latest developments in the field of environmental toxicology. It offers a valuable resource for researchers, scholars and graduate students alike.

BIOREMEDIATION AND BIOTECHNOLOGY, VOL 3

PERSISTENT AND RECALCITRANT TOXIC SUBSTANCES

Springer Nature Healthy environment is important for any kind of biota on earth. It provides the basic elements of life such as clean water, fresh air, fertile soil and supports ecosystem of the food chain. Pollution drastically alters quality of the environment by changing the physico-chemical and biological aspects of these components. Accordingly, toxic metals, combustible and putrescible substances, hazardous wastes, explosives and petroleum products are all examples of inorganic and organic compounds that cause contaminations. Specifically, pollution of toxic and heavy metal in the environment is a growing problem worldwide, currently at an alarming rate. Toxic metals threaten the aquatic ecosystems, agriculture and ultimately human health. Traditional treatment techniques offer certain advantages such as rapid processing, ease of operation and control and flexibility. But, they could not maintain the quality of the environment due to the high operational costs of chemicals used, high energy consumption and handling costs for sludge disposal and overburden of chemical substances which irreversibly affect and destroy biodiversity, which ultimately render the soil useless as a medium for plant growth. Therefore, bioremediation and biotechnology, carried out by living assets to clean up, stabilize and restore contaminated ecosystems, have emerged as promising, environmental friendly and affordable approaches. Furthermore, the use of microbes, algae, transgenic plants and weeds adapted to stressful environments could be employed to enhance accumulation efficiency. Hence, sustainable and inexpensive processes are fast emerging as a viable alternative to conventional remediation methods, and will be most suitable for developing countries. In the current volume, we discuss pollution remediation challenges and how living organisms and the latest biotechnological techniques could be helpful in remediating the pollution in ecofriendly and sustainable ways.

SUSTAINABLE CROP PRODUCTION

BoD – Books on Demand This book includes twenty-one comprehensive chapters addressing various soil and crop management issues, including modern techniques in enhancing crop production in the era of climate change. There are

a few case studies and experimental evidence about these production systems in specific locations. Particular focus is provided on the state-of-the-art of biotechnology, nanotechnology, and precision agriculture, as well as many other recent approaches in ensuring sustainable crop production. This book is useful for undergraduate and graduate students, teachers, and researchers, particularly in the fields of crop science, soil science, and agronomy.

TOOLS, TECHNIQUES AND PROTOCOLS FOR MONITORING ENVIRONMENTAL CONTAMINANTS

Elsevier Tools, Techniques and Protocols for Monitoring Environmental Contaminants describes information on the strategic integration of available monitoring methods with molecular techniques, with a focus on omics (DNA, RNA and protein based) and molecular imprinted polymer and nanomaterial based advanced biosensors for environmental applications. It discusses the most commonly practiced analytic techniques, such as HPLC, MS, GCMS and traditional biosensors, giving an overview of the benefits of advanced biosensors over commonly practiced methods in the rapid and reliable assessment of environmental contaminants. As environmental contaminants have become one of the serious concerns in terms of their rapid growth and monitoring in the environment, which is often limited due to costly and laborious methods, this book provides a comprehensive update on their removal, the challenges they create for environmental regulatory agencies, and their diverse effects on terrestrial and aquatic environments. Provides methods for assessing and monitoring environmental contaminants Includes recent advancement in molecular techniques Outlines rapid environmental monitoring methods Explains the use of biosensors for environmental monitoring Reviews monitoring methods beyond conventional analytic techniques

CLINICAL HANDBOOK OF AIR POLLUTION-RELATED DISEASES

Springer This book examines in detail the clinical implications of those diseases that either are primarily triggered by air pollution or represent direct consequences of air pollutants. The aim is to provide medical practitioners with practical solutions to issues in diagnosis and treatment while simultaneously furnishing other interested parties with crucial information on the field. The book introduces the concept that air pollution-related diseases constitute a new class of pathologies. A wide range of conditions mainly attributable to air pollution are discussed, covering different body systems and pollution impacts in subsets of the population. In addition to presenting state of the art overviews of clinical aspects, the book carefully examines the implications of current knowledge for social and public health strategies aimed at disease prevention and prophylaxis. The Clinical Handbook of Air Pollution-Related Diseases will greatly assist doctors and healthcare workers when dealing with the consequences of air pollution in their everyday practice and will provide researchers, industry, and policymakers with valuable facts and insights.

CONTAMINATION OF WATER

HEALTH RISK ASSESSMENT AND TREATMENT STRATEGIES

Elsevier Contamination of Water: Health Risk Assessment and Treatment Strategies takes an interconnected look at various pollutants, sources of contamination, the effects of contamination on aquatic ecosystems and human health, and potential mitigation strategies. The book begins by examining the sources of potential contamination, including the current scenario of dyes, heavy metals, pesticides and oils contamination as well as regions impacted due to industrialization, mining or urbanization. It then analyzes various methods of water contamination, assesses health risk and adverse effects on those impacted, and concludes with an exploration of efficient, low-cost treatment technologies that remove toxic pollutants from the water. This book incorporates both theoretical and practical information that will be useful for researchers, professors, graduate students and professionals working on water contamination, environmental and health impacts, and the management and treatment of water resources. Provides practical case studies of various types of contamination and sources in different regions Offers an overview of inorganic and organic contaminants and their impact on human health Evaluates several low-cost, efficient and effective water treatment technologies to remove toxins from water and minimize risk

ADVANCES IN MOLECULAR TOXICOLOGY

Academic Press Advances in Molecular Toxicology features the latest advances in the subspecialties of the broad area of molecular toxicology. This series details the study of the molecular basis of toxicology by which a vast array of agents encountered in the human environment and produced by the human body manifest themselves as toxins. The book is not strictly limited to documenting these examples, but also covers the complex web of chemical and biological events that give rise to toxin-induced symptoms and disease. The new technologies that are being harnessed to analyze and understand these events will also be reviewed by leading workers in the field. Provides cutting-edge reviews by leading workers in the discipline Includes in-depth dissection of the molecular aspects of interest to a broad range of scientists, physicians and any student in the allied disciplines Presents leading-edge applications of technological innovations in chemistry, biochemistry, and molecular medicine

ENVIRONMENTAL PROTECTION: CRITICAL PERSPECTIVES IN SCIENCE AND LITERATURE

tredition The present book investigates various dimensions of environmental protection and degradation. It contain original and review research articles from science as well as literature fields. Broadly speaking it covers the areas like environmental degradation, issues of pollution, geo-environmental predicament, Eco criticism and environmental consciousness in English literature. The main purpose of the book is to investigate present predicament of environmental degradation and to discuss the possible solutions in a scientific way for the protection of environment.

At present the books available on the topic of environmental protection does not cover all the dimensions and most of them are particular path oriented like resources on biodiversity, pollution, etc. the present book fulfils this lacuna and explores environment from various perspectives in a scientific way. The book also discusses reflection of environmental consciousness in literature. Since environmental degradation and protection is a multi-layered phenomenon, this book will be helpful to the teachers, students and researchers who wish to understand various dimensions of the environmental issues with possible scientific solutions.

AN INTRODUCTION TO INTERDISCIPLINARY TOXICOLOGY

FROM MOLECULES TO MAN

Academic Press An Introduction to Interdisciplinary Toxicology: From Molecules to Man integrates the various aspects of toxicology, from "simple" molecular systems, to complex human communities, with expertise from a spectrum of interacting disciplines. Chapters are written by specialists within a given subject, such as a chemical engineer, nutritional scientist, or a microbiologist, so subjects are clearly explained and discussed within the toxicology context. Many chapters are comparative across species so that students in ecotoxicology learn mammalian toxicology and vice versa. Specific citations, further reading, study questions, and other learning features are also included. The book allows students to concurrently learn concepts in both biomedical and environmental toxicology fields, thus better equipping them for the many career opportunities toxicology provides. This book will also be useful to those wishing to reference how disciplines interact within the broad field of toxicology.

BIOSORPTION

BoD – Books on Demand Municipal and industrial wastewaters contain a wide spectrum of pollutants. Their effective removal presents a challenge for water treatment technology. Biosorption of nutrients and pollutants has been used in sewage treatment since the discovery of the activated sludge process. It is a passive uptake process by which pollutants are adsorbed on the surface of cell walls and/or dissolved in structures of microorganism cells that are present in sludge. Sorbed pollutants remain in the sludge and can be potentially released back into the environment depending on their condition and the reversibility of the pollutant-sludge interaction. An overview of typical biosorption applications for the removal of nutrients, organic pollutants, and metals in wastewater treatment is provided in different areas of their use for the protection of aquatic ecosystems and human health. This book will be of interest to operators of wastewater treatment plants and sludge treatment and disposal facilities as well as to researchers and university students in the field of environmental engineering.

MICROBIAL BIOREMEDIATION & BIODEGRADATION

Springer Nature Microbial or biological degradation has long been the subject of active concern, and the rapid expansion and growing sophistication of various industries in the last century has significantly increased the volume and complexity of toxic residues of wastes. These can be remediated by plants and microbes, either natural origin or adapted for a specific purpose, in a process known as bioremediation. The interest in microbial biodegradation of pollutants has intensified in recent years in an attempt to find sustainable ways to clean contaminated environments. These bioremediation and biotransformation methods take advantage of the tremendous microbial catabolic diversity to degrade, transform or accumulate a variety of compounds, such as hydrocarbons, polychlorinated biphenyls, polaromatic hydrocarbons pharmaceutical substances, radionuclides and metals. Unlike conventional methods, bioremediation does not physically disturb the site. This book describes the basic principles of biodegradation and shows how these principles are related to bioremediation. Authored by leading, international environmental microbiologists, it discusses topics such as aerobic biodegradation, microbial degradation of pollutants, and microbial community dynamics. It provides valuable insights into how biodegration processes work and can be utilised for pollution abatement, and as such appeals to researchers and postgraduate students as well as experts in the field of bioremediation.

ENDOCRINE DISRUPTORS IN THE ENVIRONMENT

John Wiley & Sons A concise and engaging overview of endocrine disruption phenomena that brings complex concepts within the reach of non-specialists For most of the last decade, the science of endocrine disruption has evolved with more definitive evidence of its damaging potential to health and environment. This book lists the major environmental chemicals of concern and their mechanism of endocrine disruption including remedial measures for them. Divided into three parts, Endocrine Disruptors in the Environment begins with an overview of the endocrine system and endocrine disruptors, discussing their salient features and presenting a historical perspective of endocrine disruption phenomena. It then goes on to cover hormone-signaling mechanisms, followed by various broad classes of putative endocrine disruptors, before introducing readers to environmental epigenetic modifications. Part two of the book focuses on removal processes of various EDCs by biotic and abiotic transformation/degradation. The last section consists of four chapters embracing themes on finding solutions to environmental EDCs—including their detection, regulation, replacement, and remediation. Endocrine Disruptors in the Environment is the first book to detail the endocrine effects of several known environmental contaminants and their mechanism of endocrine disruption. Additionally, it: Covers both the chemistry and biology of endocrine disruption and compiles almost all the known endocrine disrupting environmental chemicals and their mechanisms of toxicity Addresses policy and regulatory issues relevant to EDCs including scientific uncertainty and precautionary policy Brings forth the use of Green Chemistry

principles in avoiding endocrine disruption in the designing and screening for safer chemicals and remediation of the EDCs in aquatic environment Includes a useful glossary of technical terms, a list of acronyms, topical references, and a subject index Endocrine Disruptors in the Environment is an ideal book for environmental chemists and endocrine toxicologists, developmental biologists, endocrinologists, epidemiologists, environmental health scientists and advocates, and regulatory officials tasked with risk assessment in environment and health areas.

HERBAL MEDICINES

DEVELOPMENT AND VALIDATION OF PLANT-DERIVED MEDICINES FOR HUMAN HEALTH

CRC Press The deregulation of dietary supplements and natural products marketing by the FDA has widened the natural products market in Europe and worldwide. Whilst the discussion about the validity of the plant approach to nutrition and diseases treatment continues, the explosion of the use of whatever is considered "natural" has generated concern about effectiveness and danger. Incorporating information ranging from regulatory aspects to clinical trial and vigilance, Herbal Medicines for Human Health: Development and Evaluation of Plant-Derived Medicines: Provides a reference model for those who would like to start the R&D process for a natural product Discusses fundamental issues in the development of traditional medicines for the benefit of human health Takes a sequential rational approach to the subject matter Brings awareness to the many problems facing the development of medicinal herbal products, such as quality control, pharmacokinetic, and pharmacodynamic issues This book takes readers on a rational path for development of efficacious medicinal herbal products. It points out the many problems facing the development of these products, such as quality control, pharmacokinetic, and pharmacodynamic issues. It suggests areas where future developments should occur given healthcare needs and public health considerations.

MARINE PROTISTS

DIVERSITY AND DYNAMICS

Springer This comprehensive book provides a unique overview of advances in the biology and ecology of marine protists. Nowadays marine protistology is a hot spot in science to disclose life phenomena using the latest techniques. Although many protistological textbooks deal with the cytology, genetics, ecology, and pathology of specific organisms, none keeps up with the quick pace of new discoveries on the diversity and dynamics of marine protists in general. The bookMarine Protists: Diversity and Dynamics gives an overview of current research on the phylogeny, cytology, genomics, biology, ecology, fisheries, applied sciences, geology and pathology of marine free-living and symbiotic protists. Poorly known but ecologically important protists such as labyrinthulids and apostome ciliates are also presented in detail. Special attention is paid to complex interactions between marine protists and other organisms including human beings. An understanding of the ecological roles of marine protists is essential for conservation of nature and human welfare. This book will be of great interest not only to scientists and students but also to a larger audience, to give a better understanding of protists' diverse roles in marine ecosystems.

ADVANCED NANOMATERIALS FOR POLLUTANT SENSING AND ENVIRONMENTAL CATALYSIS

Elsevier Advanced Nanomaterials for Pollutant Sensing and Environmental Catalysis presents the most recent advances and scientific discoveries in the fields of environmental protection and sensing with nanotechnology. The book's authors highlight recent advancements in how nanotechnology is being used to create more efficient pollution controls, with particular attention given to noble metal nanosensors, novel hollow micro-/nanostructures with innovative functions, and advanced nanocatalysts based on carbon materials for water splitting. Each chapter demonstrates the fundamentals of the technology, illustrating key concepts and highlighting the latest developments and challenges in these multi-disciplinary fields. This book is a valuable resource for academic researchers, graduate students and R&D professionals in the fields of material science, chemistry, environmental science and nanotechnology. Presents the current state-of-the-art and covers the fundamentals and related technologies from a strong chemical, material and environmental engineering background Covers current trends and issues, including nontoxicity, efficiency of decomposition, and the sensitivity of nanomaterials used for sensing and environmental remediation Highlights the benefits and challenges of using nanomaterials to control pollution