
An Overview Of Mmg 445 Basic Biotechnology

Industrial Engineering, Management Science and Applications 2015
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Sustainable Development in Chemical Engineering
Commentary on Homer's Odyssey

ENGLISH RAIDEN

Industrial Engineering, Management Science and Applications 2015 Elsevier

Abiotic and biotic stress factors, including drought, salinity, waterlog, temperature extremes, mineral nutrients, heavy metals, plant diseases, nematodes, viruses, and diseases, adversely affect growth as well as yield of crop plants worldwide. Plant growth-promoting microorganisms (PGPM) are receiving increasing attention from agronomists and environmentalists as candidates to develop an effective, eco-friendly, and sustainable alternative to conventional agricultural (e.g., chemical fertilizers and pesticide) and remediation (e.g., chelators-enhanced phytoremediation) methods employed to deal with climate change-induced stresses. Recent studies have shown that plant growth-promoting bacteria (PGPB), rhizobia, arbuscular mycorrhizal fungi (AMF), cyanobacteria have great potentials in the management of various agricultural and environmental problems. This book provides current research of biofertilizers and the role of microorganisms in plant health, with specific emphasis on the mitigating strategies to combat plant stresses.

Ant Colony Optimization CRC Press

The microbial engineering technologies have been identified as an essential and important subject area of engineering and applied biological sciences. A microbial engineer works on the biological, chemical and engineering aspects of biotechnology, manipulating microbes and developing new uses for microbes. In agriculture, bioprocess engineering, in *Bulletin of the Department of Geography, University of Tokyo* Springer

Industrial wastewater contains a large variety of compounds, such as hazardous organic pollutants, heavy metals, salts and nutrients, which makes its treatment challenging. On the other hand, the sewage treatment with existing technologies is not cost-effective due to high energy demand and contributes to greenhouse gas emission. Thus, the use of conventional water

treatment methods is neither sustainable nor always effective. In this sense, BESs has emerged as a promising technology to treat complex industrial wastewater with a sustainable manner.

Development in Wastewater Treatment Research and Processes: Bioelectrochemical Systems for Wastewater Management analyses and discusses the potential of microbial and electrochemical based hybrid processes for the treatment of complex industrial wastewater along with the recovery of valuable compounds and water reutilization. The most significant advantages of BES are high effectiveness, low toxicity, gentle operation conditions, environmentally friendly treatment without sludge accumulation and energy conservation. Bioelectrochemical systems (BES) are emerging as an exciting platform to convert chemical energy of organic wastes into electricity or hydrogen or value-added chemical commodities. In addition, recent and future trends in BES are highlighted. Discusses the fundamentals of biological wastewater treatment and bio-electrochemical systems, advantages, limitations and promising solutions of different types of energy recovery options from wastewater Presents the recent trends and developments in BES for achieving the sustainable wastewater treatment Covers the applications of BES and BES-based hybrid treatment technologies for wastewater treatment Includes carbon capture and resource recovery other than energy from wastewater using BES systems Addresses the challenges in the full-scale implementation of BES in existing and new wastewater treatment plants

Waste to Sustainable Energy CRC Press

This book is a rich resource of important information on coldwater fish farming and coldwater fisheries management, including new research and recent technological advances. It aims to provide an understanding of the underlying mechanisms of coldwater physiology of fishes, which is essential for effective fishery management and for taking advantage of their vast potential application in aquaculture. *Coldwater Fisheries and Aquaculture Management: Technology for Sustainable Food Production* elaborates on key aspects associated with reproductive biology and endocrinology of coldwater fishes, such as gonadal development and maturation, vitellogenesis, steroidogenesis,

whole genome information of fishes, transcriptomics, proteomics, and more. It also looks at genetic modification of coldwater fishes, phytobiotic-based feed to attain profitability in aquaculture, and the nutritional requirements of coldwater fishes, such as plant-based proteins in fish diets and feeding carbohydrates to fish. It also describes the beneficial dietary nutrition of fish consumption by humans. Several chapters address the various challenges to coldwater fish and fishery management, such as fish bacterial diseases (along with their immune components and defense mechanisms), unpredictable nature of climate change on fish, water pollution, etc. The volume also offers strategies on the sustainable management of fish that include looking at pollution in freshwater ecosystems, biotechnological interventions, predicting threats to fish from climate change, and other factors. This volume will be of value to those in fishery management and fish science as well as to marine researchers, faculty and students, and other involved with aquaculture science and management.

Emerging Technologies and Management of Crop Stress Tolerance Springer Nature

With contributions from a broad range of experts in the field, this volume, *Microbiology for Sustainable Agriculture, Soil Health, and Environmental Protection*, focuses on important areas of microbiology related to soil and environmental microbiology associated with agricultural importance. The information and research on soil and environmental microbiology presented here seeks to act as a gateway to sustaining and improving agriculture and environmental security. Part I focuses on soil microbiology, dealing extensively with studies on the isolation, culture, and use of *Rhizobium* spp. and mycorrhizae to improve soil fertility, plant growth, and yield. This includes research progress on biogeochemical cycles, plant growth promoting rhizobacteria (PGPR), microbial interactions in soil and other soil activities, microbial diversity in soil, biological control and bioremediation, and improvement of beneficial microorganisms (N₂ fixers, phosphate solubilizers, etc.). Part 2 goes on to focus on microbiology for crop disease management and pathogenic control in sustainable environment, with chapters on disease

management of agricultural and horticultural crop plants through microbial control and how microbial control may be a potential solution for a sustainability in agriculture. Part 3, Microbiology for Soil Health and Crop Productivity Improvement, features a chapter on the activity and mechanism of nitrogenase enzyme in soil, which is very important for soil health and crop production and productivity. Part 4 presents two chapters entirely devoted to the environmental pollution and its control, looking at the interaction of microbes in aqueous environments and eco-friendly approaches. There is an urgent need to explore and investigate the current shortcomings and challenges of the current innovations and challenges in agricultural microbiology. This book helps to fill that need. This volume will be valuable to those involved with agricultural microbiology, including students, instructors, and researchers.

Chitosan in Biomedical Applications CRC Press

This book encompasses the current knowledge of plant microbiomes and their potential biotechnological application for plant growth, crop yield and soil health for sustainable agriculture. The plant microbiomes (rhizospheric, endophytic and epiphytic) play an important role in plant growth, development, and soil health. Plant and rhizospheric soil are a valuable natural resource harbouring hotspots of microbes, and it plays critical roles in the maintenance of global nutrient balance and ecosystem function. The diverse group of microbes is key components of soil-plant systems, where they are engaged in an intense network of interactions in the rhizosphere/endophytic/phyllospheric. The rhizospheric microbial diversity present in rhizospheric zones has a sufficient amount of nutrients release by plant root systems in form of root exudates for growth, development and activities of microbes. The endophytic microbes are referred to those microorganisms, which colonize in the interior of the plant parts, viz root, stem or seeds without causing any harmful effect on host plant. Endophytic microbes enter in host plants mainly through wounds, naturally occurring as a result of plant growth, or through root hairs and at epidermal junctions. Endophytes may be transmitted either vertically (directly from parent to offspring) or horizontally (among individuals). The phyllosphere is a common niche for synergism between microbes and plant. The leaf surface has been termed as phyllosphere and zone of leaves inhabited by

microorganisms as phyllosphere. The plant part, especially leaves, is exposed to dust and air currents resulting in the establishments of typical flora on their surface aided by the cuticles, waxes and appendages, which help in the anchorage of microorganisms. The phyllospheric microbes may survive or proliferate on leaves depending on extent of influences of material in leaf diffuseness or exudates. The leaf diffuseness contains the principal nutrients factors (amino acids, glucose, fructose and sucrose), and such specialized habitats may provide niche for nitrogen fixation and secretions of substances capable of promoting the growth of plants. The microbes associated with plant as rhizospheric, endophytic and epiphytic with plant growth promoting (PGP) attributes have emerged as an important and promising tool for sustainable agriculture. PGP microbes promote plant growth directly or indirectly, either by releasing plant growth regulators; solubilization of phosphorus, potassium and zinc; biological nitrogen fixation or by producing siderophore, ammonia, HCN and other secondary metabolites which are antagonistic against pathogenic microbes. The PGP microbes belong to different phylum of archaea (Euryarchaeota); bacteria (Acidobacteria, Actinobacteria, Bacteroidetes, Deinococcus-Thermus, Firmicutes and Proteobacteria) and fungi (Ascomycota and Basidiomycota), which include different genera namely *Achromobacter*, *Arthrobacter*, *Aspergillus*, *Azospirillum*, *Azotobacter*, *Bacillus*, *Beijerinckia*, *Burkholderia*, *Enterobacter*, *Erwinia*, *Flavobacterium*, *Gluconoacetobacter*, *Haloarcula*, *Herbaspirillum*, *Methylobacterium*, *Paenibacillus*, *Pantoea*, *Penicillium*, *Piriformospora*, *Planomonospora*, *Pseudomonas*, *Rhizobium*, *Serratia* and *Streptomyces*. These PGP microbes could be used as biofertilizers/bioinoculants at place of chemical fertilizers for sustainable agriculture. The aim of "Plant Microbiomes for Sustainable Agriculture" is to provide the current developments in the understanding of microbial diversity associated with plant systems in the form of rhizospheric, endophytic and epiphytic. The book is useful to scientist, research and students related to microbiology, biotechnology, agriculture, molecular biology, environmental biology and related subjects.

Job Patterns for Minorities and Women in Private Industry CRC Press

Role of Plant Growth Promoting Microorganisms in Sustainable Agriculture and Nanotechnology explores PGPMs (actinomycetes,

bacteria, fungi and cyanobacteria) and their multidimensional roles in agriculture, including their increasing applications in sustainable agriculture. In addition to their traditional understanding and applications in agriculture, PGPMs are increasingly known as a source of nano-particles production that are gaining significant interest in their ability to provide more economically, environmentally friendly and safe technologies to crop growers. The book considers new concepts and current developments in plant growth, thus promoting microorganisms research and evaluating its implications for sustainable productivity. Users will find this to be an invaluable resource for researchers in applied microbial biotechnology, soil science, nano-technology of microbial strains, and industry personnel in these areas. Presents basic and applied aspects of sustainable agriculture, including nano-technology in sustainable agriculture. Identifies molecular tools/omics approaches for enhancing plant growth promoting microorganisms. Discusses plant growth promoting microorganisms in bioactive compounds production, and as a source of nano-particles

Dioxin Bloomsbury Publishing USA

An overview of the rapidly growing field of ant colony optimization that describes theoretical findings, the major algorithms, and current applications. The complex social behaviors of ants have been much studied by science, and computer scientists are now finding that these behavior patterns can provide models for solving difficult combinatorial optimization problems. The attempt to develop algorithms inspired by one aspect of ant behavior, the ability to find what computer scientists would call shortest paths, has become the field of ant colony optimization (ACO), the most successful and widely recognized algorithmic technique based on ant behavior. This book presents an overview of this rapidly growing field, from its theoretical inception to practical applications, including descriptions of many available ACO algorithms and their uses. The book first describes the translation of observed ant behavior into working optimization algorithms. The ant colony metaheuristic is then introduced and viewed in the general context of combinatorial optimization. This is followed by a detailed description and guide to all major ACO algorithms and a report on current theoretical findings. The book surveys ACO applications now in use, including routing, assignment, scheduling, subset, machine learning, and bioinformatics

problems. AntNet, an ACO algorithm designed for the network routing problem, is described in detail. The authors conclude by summarizing the progress in the field and outlining future research directions. Each chapter ends with bibliographic material, bullet points setting out important ideas covered in the chapter, and exercises. Ant Colony Optimization will be of interest to academic and industry researchers, graduate students, and practitioners who wish to learn how to implement ACO algorithms.

Microarray Image and Data Analysis CRC Press

Considering the ever-increasing global population and finite arable land, technology and sustainable agricultural practices are required to improve crop yield. This book examines the interaction between plants and microbes and considers the use of advanced techniques such as genetic engineering, revolutionary gene editing technologies, and their applications to understand how plants and microbes help or harm each other at the molecular level. Understanding plant-microbe interactions and related gene editing technologies will provide new possibilities for sustainable agriculture. The book will be extremely useful for researchers working in the fields of plant science, molecular plant biology, plant-microbe interactions, plant engineering technology, agricultural microbiology, and related fields. It will be useful for upper-level students and instructors specifically in the field of biotechnology, microbiology, biochemistry, and agricultural science. Features: Examines the most advanced approaches for genetic engineering of agriculture (CRISPR, TALAN, ZFN, etc.). Discusses the microbiological control of various plant diseases. Explores future perspectives for research in microbiological plant science. Plant-Microbial Interactions and Smart Agricultural Biotechnology will serve as a useful source of cutting-edge information for researchers and innovative professionals, as well as upper-level undergraduate and graduate students taking related agriculture and environmental science courses.

The Year-book of Wireless Telegraphy & Telephony CRC Press

An in-depth treatment of cutting-edge work being done internationally to develop new techniques in crop nutritional quality improvement. Phytonutritional Improvement of Crops explores recent advances in biotechnological methods for the nutritional enrichment of food crops. Featuring contributions from an international group of experts in the field, it provides cutting-edge information on techniques of immense importance to

academic, professional and commercial operations. World population is now estimated to be 7.5 billion people, with an annual growth rate of nearly 1.5%. Clearly, the need to enhance not only the quantity of food produced but its quality has never been greater, especially among less developed nations. Genetic manipulation offers the best prospect for achieving that goal. As many fruit crops provide proven health benefits, research efforts need to be focused on improving the nutritional qualities of fruits and vegetables through increased synthesis of lycopene and beta carotene, anthocyanins and some phenolics known to be strong antioxidants. Despite tremendous growth in the area occurring over the past several decades, the work has only just begun. This book represents an effort to address the urgent need to promote those efforts and to mobilise the tools of biotechnical and genetic engineering of the major food crops. Topics covered include: New applications of RNA-interference and virus induced gene silencing (VIGS) for nutritional genomics in crop plants. Biotechnological techniques for enhancing carotenoid in crops and their implications for both human health and sustainable development. Progress being made in the enrichment and metabolic profiling of diverse carotenoids in a range of fruit crops, including tomatoes, sweet potatoes and tropical fruits. Biotechnologies for boosting the phytonutritional values of key crops, including grapes and sweet potatoes. Recent progress in the development of transgenic rice engineered to massively accumulate flavonoids in-seed. Phytonutritional Improvement of Crops is an important text/reference that belongs in all universities and research establishments where agriculture, horticulture, biological sciences, and food science and technology are studied, taught and applied.

Therapeutic Use of Medicinal Plants and their Extracts: Volume 2 Academic Press

Sustainable development is an area that has world-wide appeal, from developed industrialized countries to the developing world. Development of innovative technologies to achieve sustainability is being addressed by many European countries, the USA and also China and India. The need for chemical processes to be safe, compact, flexible, energy efficient, and environmentally benign and conducive to the rapid commercialization of new products poses new challenges for chemical engineers. This book examines the newest technologies for sustainable development in chemical

engineering, through careful analysis of the technical aspects, and discussion of the possible fields of industrial development. The book is broad in its coverage, and is divided into four sections: Energy Production, covering renewable energies, innovative solar technologies, cogeneration plants, and smart grids. Process Intensification, describing why it is important in the chemical and petrochemical industry, the engineering approach, and nanoparticles as a smart technology for bioremediation. Bio-based Platform Chemicals, including the production of bioethanol and biodiesel, bioplastics production and biodegradability, and biosurfactants. Soil and Water Remediation, covering water management and re-use, and soil remediation technologies. Throughout the book there are case studies and examples of industrial processes in practice.

Negro with a Hat John Wiley & Sons

Chitosan in Biomedical Applications provides a thorough insight into the complete chitosan chemistry, collection, chemical modifications, characterization and applications of chitosan in biomedical applications and healthcare fields. Chitosan, a biopolymer of natural origin, has been explored for its variety of applications in biomedical research, medical diagnostic aids and material science. It is the second most abundant natural biopolymer after cellulose, and considered as an excellent excipient because of its non-toxic, stable, biodegradable properties. Several research innovations have been made on applications of chitosan in biomedical applications. The book explores key topics, such as molecular weight, degree of deacetylation, and molecular geometry, along with an emphasis on recent advances in the field written by academic, industry, and clinical researchers. Chitosan in Biomedical Applications will be of interest to those in biomedical fields including the biomaterials and tissue engineering community investigating and developing biomaterials for biomedical applications, particularly graduate students, young faculty and others exploring chitosan-based materials. Provides methodology for the design, development and selection of chitosan in biomedical applications for particular therapeutic applications. Includes illustrations demonstrating the mechanism of biological interaction of chitosan. Discusses the regulatory aspects and demonstrates the clinical efficacy of chitosan.

Mathematical Modeling of Inland Vessel Maneuverability

Considering Rudder Hydrodynamics Springer

Enzymes play a vital role in the enzymatic hydrolysis of waste for its conversion to useful value-added products. Enzymatic Hydrolysis of Waste for Development of Value-added Products focusses on the role of key enzymes such as cellulase, hemicellulases, amylases, and auxiliary enzymes (LMPOs), used in the hydrolysis step of the biorefinery setup. Further, it discusses the role of enzymes in the generation of reducing sugars and value-added compounds, with major emphasis on recent advances in the field. The mechanism, importance, type, evolution, and role of enzymes in hydrolysis constitute the crux of this volume, which is illustrated with examples and pertinent case studies. Features:

- Explores the role of hydrolyzing enzymes in the breakdown and transformation of biomass hydrolysis.
- Discusses the potential of auxiliary enzymes (LPMOs) for enhancing hydrolysis potential.
- Covers recent developments in the field of enzymatic-assisted hydrolysis of waste for conversion of waste to value-added products.
- Deliberates all possible products that can be generated from enzymatic hydrolysis of waste and their potential utilization.
- Elucidates the limitations and advantages of enzyme-based hydrolysis and possible strategies for moving from the laboratory to large scale industries. This book is aimed at graduate students, researchers and related industry professionals in biochemical engineering, environmental science, wastewater treatment, biotechnology, applied microbiology, biomass-based biorefinery, biochemistry, green chemistry, sustainable development, waste treatment, enzymology, microbial biotechnology, and waste valorization.

An Introduction to Interdisciplinary Toxicology Academic Press
Rhizosphere biology is approaching a century of investigations wherein growth-promoting rhizomicroorganisms (PGPR) have attracted special attention for their ability to enhance productivity, profitability and sustainability at a time when food security and rural livelihood are a key priority. Bio-inputs - either directly in the form of microbes or their by-products - are gaining tremendous momentum and harnessing the potential of agriculturally important microorganisms could help in providing low-cost and environmentally safe technologies to farmers. One approach to such biologically-based strategies is the use of naturally occurring products such as PGPR. Written by an international team of experts, this book considers new concepts

and global issues in biopesticide research and evaluates the implications for sustainable productivity. It is an invaluable resource for researchers in applied agricultural biotechnology, microbiology and soil science, and also for industry personnel in these areas.

Development in Wastewater Treatment Research and Processes CRC Press

This book is intended for students and scientists working in the field of DNA repair, focusing on a number of topics ranging from DNA damaging agents and mechanistic insights to methods in DNA repair and insights into therapeutic strategies. These topics demonstrate how scientific ideas are developed, tested, dialogued, and matured as it is meant to discuss key concepts in DNA repair. The book should serve as a supplementary text in courses and seminars as well as a general reference for biologists with an interest in DNA repair.

Fundamentals of Environmental Site Assessment and Remediation BoD - Books on Demand

This accessibly written book introduces readers to DNA—one of the most important technologies for the manipulation of all forms of life, from simple bacteria to plants and animals. It also addresses the most important social, ethical, political, economic, and other issues raised by this form of technology. The great strides made in our understanding of the structure and function of DNA in recent decades have led to applying this invaluable knowledge to use in serving humanity. For example, recent discoveries in the field of genetic editing have created the potential for the creation of life forms de novo, a possibility that results in profound ethical issues for the human race that are just beginning to be discussed. What other positive—and potentially negative—developments are coming our way with continuing advancements in DNA research? *DNA Technology: A Reference Handbook* provides an up-to-date historical overview and general technical background to the topic as well as a broad introduction to current issues related to the development of DNA technology, such as genetically modified organisms, the use of DNA technology in the forensic sciences, and genetic testing and genetic therapy. Written by David E. Newton, an author and former teacher who has dedicated a lifetime to authoring educational texts on science and technology, this book examines the history of DNA technology from its discovery in the 1950s to

the present day and covers recent advances, such as new methods for gene editing, including CRISPR-Cas9 technology. Readers need to have little or no background knowledge of the technology of genetic engineering to improve their understanding of DNA-based technologies and how DNA research influences many current issues and debates in agriculture, food science, forensics, public health, and other fields. The single-volume work is particularly well-suited to students and young adults because of the range of references included that serve further study, such as a glossary of terms, a chronology, and an extensive annotated bibliography.

Frontiers in Soil and Environmental Microbiology Springer Nature
This book demonstrates that different rudder configurations have different hydrodynamic characteristics, which are influenced by the profile, the parameters, and the specific configuration. The author proposes new regression formulas to help naval architects quickly estimate the rudder-induced forces and moments in maneuvering. Furthermore, the author proposes and validates an integrated maneuvering model for both seagoing ships and inland vessels. Using the proposed regression formulas and maneuvering model, the specific impacts of rudder configurations on inland vessel maneuverability are studied. In turn, the book demonstrates the application of Reynolds-Averaged Navier-Stokes (RANS) simulations to obtain rudder hydrodynamic characteristics, and the integration of the RANS results into maneuvering models as an accurate estimation of rudder forces and moments needed to quantify the impacts of rudder configurations on ships' maneuvering performance. In addition, the author proposes new criteria for the prediction and evaluation of inland vessel maneuverability. Simulations of ships with various rudder configurations are presented, in order to analyze the impacts of rudder configurations on ship maneuverability in different classic and proposed test maneuvers. Offering essential guidance on the effects of rudders for inland vessel maneuverability, and helping practical engineers make informed design choices, the book is of interest to researchers and academics in the field of naval engineering, as well as students of naval architecture. Industrial practitioners working on ship design may also find it beneficial.

Coldwater Fisheries and Aquaculture Management Elsevier

Dioxin - Environmental Fate and Health/Ecological Consequences

offers a unique, and comprehensive coverage of dioxins and their congeners once they are released to the environment. The book provides readers with a systematic understanding of past and emerging sources of dioxins, current dioxins inventories and historical trends, fate and long-range transboundary atmospheric transport, human health, and ecological risk and regulatory perspective. Providing an excellent analysis of dioxin exposure through the food chain and impact on human health, it also documents the environmental implications of dioxins on ecological flora and fauna. The book offers readers a holistic understanding about dioxins, their atmospheric fate and transport, distribution in various environmental matrices and various routes and exposure pathways through which human beings are exposed to this persistent organic pollutant. It further offers an insight into the toxicological profile and mechanistic analysis of the onset of cancer, remediation technologies, and

existing regulatory framework to deal with the problems associated with dioxins. The book will serve as an excellent resource to environmental professionals, particularly environmental toxicologists, environmental health professionals, remediation engineers, environmental regulatory agencies, policymakers, and environmental law professionals.

Plant Growth-Promoting Microbes for Sustainable Biotic and Abiotic Stress Management Springer

Soil harbours a wide range of microorganisms with biotic potentials which can be explored for social benefits. The book *Frontiers in Soil and Environmental Microbiology* comprises an overview of the complex inter-relationship between beneficial soil microbes and crop plants, and highlights the potential for utilisation to enhance crop productivity, bioremediation and soil health. The book focusses on important areas of research such as

biocide production, pesticide degradation and detoxification, microbial decay processes, remediation of soils contaminated with toxic metals, industrial wastes, and hydrocarbon pollutants. Features Presents the state of the art of microbial research in environmental and soil microbiology Discusses an integrated and systematic compilation of microbes in the soil environment and its role in agriculture and plant growth and productivity Elucidates microbial application in environmental remediation Explores advanced genomics topics for uncultivable microbes of soil *New Microbial Technologies for Advanced Biofuels* CRC Press Stresses the Potential Applications of Biosurfactants in Various Industries Environmental concerns and a demand for sustainable chemical production have become important issues in recent years. As a result, microbial biosurfactant-producing systems are gaining momentum as potential replacements for chemical surfactants. Biosurfactants: Production an

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