Biosystems Engineering Biofactories For Food Production In The Century Xxi Advances In Biochemical Engineering Biotechnology

"This book investiges machine learning (ML), one of the most fruitful fields of current research, both in the proposal of new techniques and theoretic algorithms and in their application to real-life problems"--Provided by publisher.

This book focuses on recent advances in our understanding of wild edible mycorrhizal fungi, truffle and mushrooms and their cultivation. In addition to providing fresh insights into various topics, e.g. taxonomy, ecology, cultivation and environmental impact, it also demonstrates the clear but fragile link between wild edible mushrooms and human societies. Comprising 17 chapters written by 41 experts from 13 countries on four continents, it enables readers to grasp the importance of protecting this unique, invaluable, renewable resource in the context of climate change and unprecedented biodiversity loss. The book inspires professionals and encourages young researchers to enter this field to develop the sustainable use of wild edible mushrooms using modern tools and approaches. It also highlights the importance of protecting forested environments, saving species from extinction and generating a significant income for local populations, while keeping alive and renewing the link between humans and wild edible mushrooms so that in the future, the sustainable farming and use of edible mycorrhizal mushrooms will play a predominant role in the management and preservation of forested lands.

This book presents new food production systems (for plants and animals) involving agrochemicals that increase in a controlled manner the bioactives content, under greenhouse conditions. Moreover, conception and design of new instrumentation for precision agriculture and aquiculture contributing in food production is also highlighted in this book.

Recent changes in the pattern of agricultural practices from use of hazardous pesticides to natural (organic) cultivation has brought into focus the use of agriculturally important microorganisms for carrying out analogous functions. The reputation of plant growth promoting rhizomicroorganisms (PGPRs) is due to their antagonistic mechanisms against most of the fungal and bacterial phytopathogens. The biocontrol potential of agriculturally important microorganisms is mostly attributed to their bioactive secondary metabolites. However, low shelf life of many potential agriculturally important microorganisms impairs their use in agriculture and adoption by farmers. The focal theme of this book is to highlight the potential of employing biosynthesized secondary metabolites (SMs) from agriculturally important microorganisms for management of notorious phytopathogens, as a substitute of the currently available whole organism formulations and also as alternatives to hazardous synthetic pesticides. Accordingly, we have incorporated a comprehensive rundown of sections which particularly examine the SMs synthesized, secreted and induced by various agriculturally important microorganisms and their applications in agriculture. Section 1 includes discussion on biosynthesized antimicrobial secondary metabolites from fungal biocontrol agents. This section will cover the various issues such as development of formulation of secondary metabolites, genomic basis of metabolic diversity, metabolomic profiling of fungal biocontrol agents, novel classes of antimicrobial peptides. The section 1 will also cover the role of these secondary metabolites in antagonist-host interaction and application of biosynthesized antimicrobial secondary metabolites for management of plant diseases. Section 2 will discuss the biosynthesized secondary metabolites from bacterial PGPRs, strain dependent effects on plant metabolome profile, bio-prospecting various isolates of bacterial PGPRs for potential secondary metabolites and non-target effects of PGPR on microbial community structure and functions. Section 3 encompasses synthesis of antimicrobial secondary metabolites from beneficial endophytes, bio-prospecting medicinal and aromatic hosts and effect of endophytic SMs on plants under biotic and biotic stress conditions. With contributions by numerous experts

The use of fossil fuels results in rising CO2 and other greenhouse gas (GHG) emissions, causing global temperature rise and climate change that will negatively impact human health, the food supply, and eventually worsen hunger and misery. Presently, fossil fuels meet 88% of the energy demand, resulting in rising CO2/GHG emissions at alarming rates. The increased use of biofuels would help to mitigate climate change. Efficiently designing methods for the production of biofuels and plant-derived high-value products requires a deeper understanding of photosynthetic processes as a prerequisite for applying novel biotechnologies. Accordingly, this book provides ample information and a wealth of illustrative examples. The book's eighteen richly illustrated chapters are divided into three thematic parts. I: Photosynthesis and Biomass Production under Changing Conditions, II: Microalgae and Engineered Crops for Production of Biofuels and High-value Products, and III: Genetic Resources and Engineering Methods to Improve Crop Plants. Readers will find the latest information on the molecular basis of photosynthetic processes in plants (including the regulatory principles that allow plants to maintain homeostasis under changing conditions), stress resistance and synthetic pathways. In addition, the basic principles of important biotechnologies, as well as examples of specially designed crops capable of growing under stress conditions with improved productivity, are presented. The book sets the course for future research in the field of biofuel development and production and provides both general and specific information for students, teachers, academic researchers, industrial teams, and general readers who are interested in new developments concerning the production of biofuels with value-added properties.

Systems Metabolic Engineering: The Creation of Microbial Cell Factories by Rational Metabolic Design and Evolution, by Chikara Furusawa, Takaaki Horinouchi, Takashi Hirasawa, Hiroshi Shimizu Impacts of Quorum Sensing on Microbial Metabolism and Human Health, by Yang-Chun Yong, Jian-Jiang Zhong CHO Glycosylation Mutants as Potential Host Cells to Produce Therapeutic Proteins with Enhanced Efficacy, by Peiqing Zhang, Kah Fai Chan, Ryan Haryadi, Muriel Bardor, Zhiwei Song Cell-Free Biosystems for Biomanufacturing, by Chun You, Y.-H. Percival Zhang Lipid Bilayer Membrane Arrays: Fabrication and Applications, by Xiaojun Han, Guodong Qi, Xingtao Xu, Lei Wang RNA Aptamers: A Review of Recent Trends and Applications, by Kyung-Nam Kang, Yoon-Sik Lee

This book provides up-to-date and comprehensive coverage of the research and application of Integrated Pest Management (IPM) in tropical regions. The first section explores the agro-ecological framework that represents the foundations of IPM, in addition to emerging technologies in chemical and biological methods that are core to pest control in tropical crops. The second section follows a crop-based approach and provides details of current IPM applications in the main tropical food crops (such as cereals, legumes, root and tuber crops, sugarcane, vegetables, banana and plantain, citrus, oil palm, tea, cocoa and coffee) and also fibre crops (such as cotton) and tropical forests.

A complete guide to the evolving methods by which we may recover by-products and significantly reduce food waste Across the globe, one third of cereals and almost half of all fruits and vegetables go to waste. The cost of such waste –

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both to economies and to the environment – is a serious and increasing concern within the food industry. If we are to overcome this crisis and move towards a sustainable future, we must do everything possible to utilize innovative new methods of extracting and processing valuable by-products of all kinds. Food Wastes and By-products represents a complete primer to this important and complex process. Edited and written by leading researchers, the text provides essential information on the supply of waste and its composition, identifies foods rich in valuable bioactive compounds, and explores revolutionary methods for creating by-products from fruit, vegetable, and seed waste. Other chapters discuss the nutraceutical properties of value-added by-products and their uses in the manufacturing of dietary fibers, food flavors, supplements, pectin, and more. This book: Explains how reconstituted by-products can best be used to radically reduce food waste Discusses the potential nutraceutical assets of recovered food waste Covers a broad range of by-product sources, such as mangos, cacao, flaxseed, and spent coffee grounds Describes novel extraction processes and the emerging use of nanotechnology A significant contribution to the field, Food Wastes and By-products is a timely and essential resource for food industry professionals, government agencies and NGOs involved in nutrition, agriculture, and food production, and university instructors and students in related areas.

This book represents a new, completely updated, version of a book edited by two of the current editors, published with Springer in 1999. It covers pest and disease management of greenhouse crops, providing readers the basic strategies and tactics of integrated control together with its implementation in practice, with case studies with selected crops. The diversity of editors and authors provides readers a complete picture of the world situation of IPM in greenhouse crops. The 'bioeconomy' is the idea of an economy based on the sustainable exploitation of biological resources. Within this concept, there is increasing emphasis on issues such as climate change, depletion of natural resources and growing world food needs. The bioeconomy builds on the recognition of advances in technology, particularly in the life sciences. but at the same time covers issues such as innovation management, ecosystem services, development and governance. This book explores the development of the bioeconomy across the world from an economic and policy perspective, as well as identifying potential future pathways and issues. It uses a broad definition, covering all sectors using biological resources except health, and rather than focusing on individual sectors, it explores the breadth of interconnections that make the bioeconomy a new and challenging subject. Divided into two parts, the book initially outlines the current definitions, strategies, policy and economic information related to the world's bioeconomy. The second part describes current economic analysis and research efforts in qualifying and understanding the economics of the bioeconomy. This includes the contributions of technology, research and innovation; driving forces and demand-side economics; supplyside economics, and the role of markets and public policy in matching demand and supply. The political economy, regulation and transitions are considered, as well as the contribution of the bioeconomy to society, including growth, development and sustainability. Key features include: - An analysis of varied international approaches to the bioeconomy. - A joint consideration of biotechnology, agriculture, food energy and bio-materials. - An assessment of sustainability in the bioeconomy. - A comprehensive view of the issues from an economic and policy perspective. This book will be of interest to students and researchers in agricultural and natural resource economics, agricultural and environmental policy, as well as policy-makers, practitioners and economists.

Current Developments in Biotechnology and Bioengineering: Bioprocesses, Bioreactors and Controls provides extensive coverage of new developments, state-of-the-art technologies, and potential future trends, reviewing industrial biotechnology and bioengineering practices that facilitate and enhance the transition of processes from lab to plant scale, which is becoming increasingly important as such transitions continue to grow in frequency. Focusing on industrial bioprocesses, bioreactors for bioprocesses, and controls for bioprocesses, this title reviews industrial practice to identify bottlenecks and propose solutions, highlighting that the optimal control of a bioprocess involves not only maximization of product yield, but also taking into account parameters such as quality assurance and environmental aspects. Describes industrial bioprocesses based on the reaction media Lists the type of bioreactors used for a specific bioprocess/application Outlines the principles of control systems in various bioprocesses

Campus activities for sustainable development are an effective way of learning and implementing sustainability in surrounding communities and industry. A college campus is an ideal place to practice and test new ideas and to learn valuable lessons from the results and mistakes. Sustainability Practice and Education on University Campuses and Beyond showcases many ideas and endeavors pursued on college campuses in the form of case studies. These case studies include past, current and projected activities to green college campuses. Specific topics covered in this book include student-driven and college-driven environmental sustainability programs in undergraduate and graduate classes, issues in teaching environmental sustainability, the LEED certification of universities, issues of shrinking cities, and a comparison of sustainable military bases with college campuses. Readers will be able to clearly understand the concept of sustainable development through a textbook approach to 'crazy' ideas presented in the book. In addition, the pedagogical challenges in sustainability education mentioned in the book address key issues arising due to the multidisciplinary nature of sustainability curricula. Sustainability Practice and Education on University Campuses and Beyond is a good resource on sustainability in environmental science courses for college students, faculty and sustainability-related researchers. Decision makers in government and industry positions looking for ideas for promoting sustainable development can also benefit from the contents of this book.

Showcases the recent advances in microbial functional food applications across food science, microbiology, biotechnology, and chemical engineering Microbial technology plays a key role in the improvement of biotechnology, cosmeceuticals, and biopharmaceutical applications. It has turned into a subject of expanding significance because new microbes and their related biomolecules are distinguished for their biological activity and health benefits. Encompassing both biotechnology and chemical engineering, Microbial Functional Foods and Nutraceuticals brings together microbiology, bacteria, and food processing/mechanization, which have applications for a variety of audiences. Pharmaceuticals, diagnostics, and medical device development all employ microbial food technology. The book addresses the recent advances in microbial functional foods and associated applications, providing an important reference work for graduates and researchers. It also provides up-to-date information on novel nutraceutical compounds and their mechanisms of action—catering to the needs of researchers and academics in food science and technology, microbiology, chemical engineering, and other disciplines who are dealing with microbial functional foods and related areas. Microbial Functional Foods and Nutraceuticals is: Ground-breaking: Includes the latest developments and research in the area of microbial functional foods and nutraceuticals Multidisciplinary: Applicable across food science and technology, microbiology, biotechnology, chemical engineering, and other important research fields Practical and academic: An important area of both

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academic research and new product development in the food and pharmaceutical industries Microbial Functional Foods and Nutraceuticals is an ideal resource of information for biologists, microbiologists, bioengineers, biochemists, biotechnologists, food technologists, enzymologists, and nutritionists.

Provides insight into biopolymers, their physicochemical properties, and their biomedical and biotechnological applications This comprehensive book is a one-stop reference for the production, modifications, and assessment of biopolymers. It highlights the technical and methodological advancements in introducing biopolymers, their study, and promoted applications. "Biopolymers for Biomedical and Biotechnological Applications" begins with a general overview of biopolymers, properties, and biocompatibility. It then provides in-depth information in three dedicated sections: Biopolymers through Bioengineering and Biotechnology Venues; Polymeric Biomaterials with Wide Applications; and Biopolymers for Specific Applications. Chapters cover: advances in biocompatibility; advanced microbial polysaccharides; microbial cell factories for biomanufacturing of polysaccharides; exploitation of exopolysaccharides from lactic acid bacteria; and the new biopolymer for biomedical application called nanocellulose. Advances in mucin biopolymer research are presented, along with those in the synthesis of fibrous proteins and their applications. The book looks at microbial polyhydroxyalkanoates (PHAs), as well as natural and synthetic biopolymers in drug delivery and tissue engineering. It finishes with a chapter on the current state and applications of, and future trends in, biopolymers in regenerative medicine. * Offers a complete and thorough treatment of biopolymers from synthesis strategies and physiochemical properties to applications in industrial and medical biotechnology * Discusses the most attracted biopolymers with wide and specific applications * Takes a systematic approach to the field which allows readers to grasp and implement strategies for biomedical and biotechnological applications "Biopolymers for Biomedical and Biotechnological Applications" appeals to biotechnologists, bioengineers, and polymer chemists, as well as to those working in the biotechnological industry and institutes.

The Biotechnology Directory provides comprehensive information on over 9,000 organizations involved in the biotechnology industry. All the information contained in this one source will save hours of research and help keep you apprised of the latest developments in the field. We have done the legwork for you. Various indices such as company, country, areas of application and products will help focus your search. Now for the first time there is a state-by-state index. The profiles of over 5,000 organizations and Buyers' Guide to over 4,000 companies' products and services are updated regularly. The information is provided by the organizations themselves via written questionnaire or telephone follow-up. The Biotechnology Directory contains more biotechnology companies than any other publication. Not only will you find information on the companies, universities and research organizations involved in biotechnology you will get an overview of biotechnology industry on a country-by-country basis. Our directory will lead you to sources for grants, funding and financial services, legal services, consultants and more. With nearly 300 biotechnology application areas covered in the Profiles Section and over 250 specialist sectors detailed in the Buyers' Guide, you, are bound to find what you are looking for.

The National Institute of Standards and Technology's (NIST's) Material Measurement Laboratory (MML) is our nation's reference laboratory for measurements in the chemical, biological, and materials sciences and engineering. Staff of the MML develop state-of-the-art measurement techniques and conduct fundamental research related to measuring the composition, structure, and properties of substances. Tools that include reference materials, data, and measurement services are developed to support industries that range from transportation to biotechnology and to address problems such as climate change, environmental sciences, renewable energy, health care, infrastructure, food safety and nutrition, and forensics. This report assesses the scientific and technical work performed by NIST's Material Measurement Laboratory. In particular, the report assesses the organization's technical programs, the portfolio of scientific expertise within the organization, the adequacy of the organization\'s facilities, equipment, and human resources, and the effectiveness by which the organization disseminates its program outputs.

Ranging from biofuels to building materials, and from cosmetics to pharmaceuticals, the list of products that may be manufactured

Christoph Herwig is founder of Exputec GmbH.

natural products.

using discards from farming and fishery operations is extensive. Byproducts from Agriculture and Fisheries examines the procedures and technologies involved in this process of reconstitution, taking an environmentally aware approach as it explores the developing role of value-added byproducts in the spheres of food security, waste management, and climate control. An international group of authors contributes engaging and insightful chapters on a wide selection of animal and plant byproducts, discussing the practical business of byproduct recovery within the vital contexts of shifting socio-economic concerns and the emergence of green chemistry. This important text: Covers recent developments, current research, and emerging technologies in the fields of byproduct recovery and utilization Explores potential opportunities for future research and the prospective socioeconomic benefits of green waste management Includes detailed descriptions of procedures for the transformation of the wastes into of value-added food and non-food products With its combination of practical instruction and broader commentary, Byproducts from Agriculture and Fisheries offers essential insight and expertise to all students and professionals working in agriculture, environmental science, food science, and any other field concerned with sustainable resources. Bioactive compounds produced by natural sources, such as plants, microbes, endophytic fungi, etc., can potentially be applied in various fields, including agriculture, biotechnology and biomedicine. Several bioactive compounds have proved to be invaluable in mediating plant-microbe interactions, and promoting plant growth and development. Due to their numerous health-promoting properties, these compounds have been widely used as a source of medication since ancient times. However, there is an unprecedented need to meet the growing demand for natural bioactive compounds in the flavor and fragrance, food, and pharmaceutical industries. Moreover, discovering new lead molecules from natural sources is essential to overcoming the rising number of new diseases. In this regard, natural bioactive compounds hold tremendous potential for new drug discovery. Therefore, this field of research has become a vital area for researchers interested in understanding the chemistry, biosynthetic mechanisms, and pharmacological activities of these bioactive metabolites. This book describes the basics of bioactive plant compounds, their chemical properties, and their pharmacological biotechnological properties with regard to various human diseases and applications in the drug, cosmetics and herbal industries. It offers a valuable asset for all students, educators,

This Encyclopedia of Biotechnology is a component of the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. Biotechnology draws on the pure biological sciences (genetics, animal cell culture, molecular biology, microbiology, biochemistry, embryology, cell biology) and in many instances is also dependent on knowledge and methods from outside the sphere of biology (chemical engineering, bioprocess engineering, information technology, biorobotics). This 15-volume set contains several chapters, each of size 5000-30000 words, with perspectives, applications and extensive illustrations. It carries state-of-the-art knowledge in the field and is aimed, by virtue of the several applications, at the following five major target audiences: University and College Students, Educators, Professional Practitioners,

researchers, and healthcare experts involved in agronomy, ecology, crop science, molecular biology, stress physiology, and

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Research Personnel and Policy Analysts, Managers, and Decision Makers and NGOs. ????????

Biosystems Engineering: Biofactories for Food Production in the Century XXISpringer Science & Business Media Printing Peptide Arrays with a Complementary Metal Oxide Semiconductor Chip, by Felix F. Loeffler, Yun-Chien Cheng, Bastian Muenster, Jakob Striffler, Fanny C. Liu, F. Ralf Bischoff, Edgar Doersam, Frank Breitling, Alexander Nesterov-Mueller. Protein Engineering as a Tool for the Development of Novel Bio production Systems, by Uwe T. Bornscheuer. Compartmentalization and Metabolic Channeling for Multienzymatic Biosynthesis: Practical Strategies and Modeling Approaches, by U. Jandt, C. You, Y. H.-P. Zhang, A.-P. Zeng. Cell-Free Systems: Functional Modules for Synthetic and Chemical Biology, by Marlitt Stech, Andreas K. Brödel, Robert B. Quast, Rita Sachse, Stefan Kubick. New Bio production Systems: From Molecular Circuits to Novel Reactor Concepts in Cell-Free Biotechnology, by Steffen Rupp. Cell-free Biosystems in the Production of Electricity and Bioenergy, by Zhiguang Zhu, Tsz Kin Tam, Y.-H. Percival Zhang. In Vitro Multi enzymatic Reaction Systems for Biosynthesis, by Inés Ardao, Ee Taek Hwang, An-Ping Zeng. Directed Multistep Biocatalysis Using Tailored Permeabilized Cells, by Steffen Krauser, Christian Weyler, Lisa Katharina Blaß, Elmar Heinzle.

This book provides exhaustive information on several recent technologies that are employed for sugarcane improvement through biotechnology and will be of great interest to plant scientists, biotechnologists, molecular biologists and breeders who work on sugarcane crop. Topics discussed in this volume include genomics and transcriptomics, transgenic sugarcane for trait improvement, potential candidate promoters, new strategies for transformation, molecular farming, sugarcane as biofuel, chloroplast transformation, and genome editing.

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