

Biotransformation Of Waste Biomass Into High Value Biochemicals

This edited book discusses various processes of feedstocks bioconversion such as bioconversion of food waste, human manure, industrial waste, beverage waste, kitchen waste, organic waste, fruit and vegetable, poultry waste, solid waste, agro-industrial waste, cow dung, steroid, lignocellulosic residue, biomass, natural gas etc. Nowadays, the industrial revolution and urbanization have made human life comfortable. However, this requires excess usage of natural resources starting from food and food products, to energy resources, materials as well as chemicals. The excess use of natural resources for human comfort is expected to high fuel prices, decline natural resources as well as cause a huge hike in the cost of raw materials. These factors are pushing researchers to grow environmentally friendly processes and techniques based on inexpensive and sustainable feedstock to accomplish such worldwide targets. Bioconversion, otherwise called biotransformation, is the change of natural materials, for example, plant or animal waste, into usable items or energy sources by microorganisms. Bioconversion is an environmentally friendly benevolent choice to supplant the well-established chemical procedures utilized these days for the production of chemicals and fuels. A variety of alternatives advancements are being considered and are directly accessible to acquire diverse valuable end-products through bioprocesses. This book discusses in detail the process and techniques of bioconversion by focusing on the organic feedstock of animal and plant origin. It brings solutions to the bioconversion of various feedstock into value-added products.

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This updated edition presents topical knowledge and technologies for the thermal, chemo- and enzymatic-catalytic conversion of biomass into chemicals, materials and fuels. International experts from academia and industry cover the complete value chain from raw materials into final products. A new focus discusses feedstock, processes and products in potential concepts of future biorefining.

This volume takes an eco-friendly approach to examining the advantages of using plant food by-products as food additives and nutraceuticals, turning solid wastes into value-added items. The chapters, written by researchers and professionals working in the plant food industry, look at ways to make effective use of plant by-products by harnessing the power of the antimicrobial and nutraceutical power of plant and herb extracts. The measures and techniques discussed here will also help to improve the economics of processing crops. The chapter authors cover a range of issues, including the economic and environmental benefits of utilizing plant food by-products, extraction technologies, plant tissues as a source of nutraceutical compounds, and more.

This book focuses on the fungi found in one of the most pristine regions on Earth: Antarctica. It discusses the fungal occurrence in all substrates of the region, including soil, seawater, lake and marine sediments, rocks, ice, and snow. It also addresses the impact of climate changes on these organisms, the genomic techniques developed to study them, and how a number of compounds, such as antibiotics and enzymes, produced by the Antarctic fungi can be used in medicine, agriculture and the chemical industry.

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Application of Nano/Microencapsulated Ingredients in Food Products, a volume in the Nanoencapsulation in the Food Industry series, presents applications of nano/micro-encapsulated ingredients such as vitamins, minerals, flavors, colorants, enzymes, probiotics antioxidants and many other bioactive components in different groups of food products. Each chapter explores nano/microencapsulated ingredients in food products, including beverages, cereal flours and bakery products, meat, oils and fats, salt, spices and seasonings, functional supplements, and in chewing gum. In addition, the book explores active food packaging and edible coatings with nano/microencapsulated ingredients. Authored by a team of global experts in the fields of nano and microencapsulation of food, nutraceutical and pharmaceutical ingredients, this title is of great value to those engaged in the various fields of nanoencapsulation. Clarifies which nanoencapsulated ingredients can be applied for different food products Thoroughly explores the influence of nanoencapsulated ingredients on the qualitative properties of different food products

This book is dedicated to the reuse of waste and residues from the agricultural sector. Plant residues, as well as animal manure and residues from animal breeding, contain useful elements that can be processed for production of fertilizers, compost for soil recultivation, and biofuels. The emerging energy and resources crisis calls for development of sustainable reuse of waste and residues. This book contains eight chapters divided into four sections. The first section contains the introductory chapter from the editor. The second section is related to the preparation of fertilizers and compost for soil amelioration from agricultural residues and waste water. The third section considers the use of agricultural waste for solid biofuels and biogas. The fourth section discusses sustainability and risk assessment related to the use of agricultural waste and residues.

This book provides a comprehensive review of biosynthetic approaches to the production of industrially important chemicals and the environmental challenges involved. Its 19 chapters discuss different aspects of biosynthetic technology from the perspective of leading experts in the field. It covers various biorefinery approaches, including the use of microbes, metabolically engineered plants, biomass-based and green technology methods. Further, it examines important research in the areas of organic and hazardous waste composting, management and recovery of nutraceuticals from agro-industrial waste, biosynthesis and technological advancements of biosurfactants and waste water bioremediation. This book contributes to the scientific literature on biosynthetic technologies and the related environmental challenges for researchers and academics working in this area around the globe.

Advanced Technology for the Conversion of Waste into Fuels and Chemicals: Volume 1: Biological Processes presents advanced and combined techniques that can be used to convert waste to energy, including combustion, gasification, paralysis, anaerobic digestion and fermentation. The book focuses on solid waste conversion to fuel and energy and presents the latest advances in the design, manufacture, and application of conversion technologies. Contributors from the fields of physics, chemistry, metallurgy, engineering and manufacturing present a truly trans-disciplinary picture of the field. Chapters cover important aspects surrounding the conversion of solid waste into fuel and chemicals, describing how valuable energy can be recouped from various waste materials. As huge volumes of solid waste are produced globally while huge amounts of energy are produced from fossil fuels, the technologies described in this comprehensive book provide the information necessary to

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pursue clean, sustainable power from waste material. Presents the latest advances in waste to energy techniques for converting solid waste to valuable fuel and energy Brings together contributors from physics, chemistry, metallurgy, engineering and the manufacturing industry Includes advanced techniques such as combustion, gasification, paralysis, anaerobic digestion and fermentation Goes far beyond municipal waste, including discussions on recouping valuable energy from a variety of industrial waste materials Describes how waste to energy technologies present an enormous opportunity for clean, sustainable energy

This book is a printed edition of the Special Issue "Bioconversion Processes" that was published in Fermentation

Waste Biorefinery: Potential and Perspectives offers data-based information on the most cutting-edge processes for the utilisation of biogenic waste to produce biofuels, energy products, and biochemicals – a critical aspect of biorefinery. The book explores recent developments in biochemical and thermo-chemical methods of conversion and the potential generated by different kinds of biomass in more decentralized biorefineries. Additionally, the book discusses the move from 200 years of raw fossil materials to renewable resources and how this shift is accompanied by fundamental changes in industrial manufacturing technologies (from chemistry to biochemistry) and in logistics and manufacturing concepts (from petrochemical refineries to biorefineries). **Waste Biorefinery: Potential and Perspectives** designs concepts that enable modern biorefineries to utilize all types of biogenic wastes, and to integrate processes that convert byproduct streams to high-value products, achieving higher cost benefits. This book is an essential resource for researchers and students studying biomass, biorefineries, and biofuels/products/processes, as well as chemists, biochemical/chemical engineers, microbiologists, and biotechnologists working in industries and government agencies. Details the most advanced and innovative methods for biomass conversion Covers biochemical and thermo-chemical processes as well as product development Discusses the integration of technologies to produce bio-fuels, energy products, and biochemicals Illustrates specific applications in numerous case studies for reference and teaching purposes

Valorization of Agri-Food Wastes and By-Products: Recent Trends, Innovations and Sustainability Challenges addresses the waste and by-product valorization of fruits and vegetables, beverages, nuts and seeds, dairy and seafood. The book focuses its coverage on bioactive recovery, health benefits, biofuel production and environment issues, as well as recent technological developments surrounding state of the art of food waste management and innovation. The book also presents tools for value chain analysis and explores future sustainability challenges. In addition, the book offers theoretical and experimental information used to investigate different aspects of the valorization of agri-food wastes and by-products.

Valorization of Agri-Food Wastes and By-Products: Recent Trends, Innovations and Sustainability Challenges will be a great resource for food researchers, including those working in food loss or waste, agricultural processing, and engineering, food scientists, technologists, agricultural engineers, and students and professionals working on sustainable food production and effective management of food loss, wastes and by-products. Covers recent trends, innovations, and sustainability challenges related to food wastes and by-products valorization Explores various recovery processes, the functionality of targeted bioactive compounds, and green processing technologies Presents emerging technologies for the valorization of agri-food wastes and by-products Highlights potential industrial applications of food wastes and by-products to support circular economy concepts

Energy Global energy demand has more than doubled since 1970. The use of energy is strongly related to almost every conceivable aspect of development: wealth, health, nutrition, water, infrastructure, education and even life expectancy itself are strongly and significantly related to the consumption of energy per capita. Many development indicators are strongly

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related to per-capita energy consumption. Fossil fuel is the most conventional source of energy but also increases greenhouse gas emissions. The economic development of many countries has come at the cost of the environment. However, it should not be presumed that a reconciliation of the two is not possible. The nexus concept is the interconnection between the resource energy, water, food, land, and climate. Such interconnections enable us to address trade-offs and seek synergies among them. Energy, water, food, land, and climate are essential resources of our natural environment and support our quality of life. Competition between these resources is increasing globally and is exacerbated by climate change. Improving resilience and securing resource availability would require improving resource efficiency. Many policies and programs are announced nationally and internationally for replacing the conventional mode and also emphasizing on conservation of fossil fuels and reuse of exhausted energy, so a gap in implications and outcomes can be broadly traced by comparing the data. This book aims to highlight problems and solutions related to conventional energy utilization, formation, and multitudes of ecological impacts and tools for the conservation of fossil fuels. The book also discusses modern energy services as one of the sustainable development goals and how the pressure on resource energy disturbs the natural flows. The recent advances in alternative energy sources and their possible future growth are discussed and on how conventional energy leads to greenhouse gas formation, which reduces energy use efficiency. The different policies and models operating is also addressed, and the gaps that remained between them. Climate change poses a challenge for renewable energy, and thus it is essential to identify the factors that would reduce the possibility of relying on sustainable energy sources. This book will be of interest to researchers and stakeholders, students, industries, NGOs, and governmental agencies directly or indirectly associated with energy research.

New and Future Developments in Microbial Biotechnology and Bioengineering: Recent Advances in Application of Fungi and Fungal Metabolites: Environmental and Industrial Aspects provides a comprehensive overview of recent development and applied aspects of fungi and its metabolites in environmental and industrial settings. Fungi and fungal metabolites have great prospects for developing new products in a wide range of sectors. Many fungal metabolites are environmentally friendly, clean, non-toxic agents used for environmental management practices. This book offers a systems approach and provides a means to share the latest developments and advances about the exploitation of fungal products, including their wide uses in the field of environment and industry. Introduces the aspects and advances of fungi and fungal metabolites in environmental and industry perspectives Discusses the potential of fungi and its metabolites in environmental management Includes a description of traditional uses and the modern practices of harnessing the potential of fungi and its metabolites in solving environment issues Provides details about usage of fungi and its metabolites for environmental management and industrial purposes

Because of its ability to reduce tiredness, sleep deprivation and improve alertness, caffeine emerged in the twenty-first century as a miraculous specific, which allows humans to cross their normal physiological and psychological body limits. Its attractiveness comes from its natural origins and strong psycho-stimulating properties, with relatively weak side effects. Caffeine studies carry the hope to understand the associations between inherited genotype and drug action and to find highly personalized treatments for various diseases, more sophisticated drug delivery systems, safer ways of protecting plants and cheap, renewable fuels. This book consists of chapters covering caffeine history, methods of its determination and not only astonishing medicinal but also non-medicinal applications. It is our hope that every reader will find in this book something interesting, inspiring, informative and stimulating. Enzymes have interesting applications in our biological system and act as valuable biocatalysts. Their various functions allow enzymes to develop new drugs, detoxifications, and

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pharmaceutical chemistry. Research Advancements in Pharmaceutical, Nutritional, and Industrial Enzymology provides emerging research on biosynthesis, enzymatic treatments, and bioengineering of medicinal waste. While highlighting issues such as structural implications for drug development and food applications, this publication explores information on various applications of enzymes in pharmaceutical, nutritional, and industrial aspects. This book is a valuable resource for medical professionals, pharmacists, pharmaceutical companies, researchers, academics, and upper-level students seeking current information on developing scientific ideas for new drugs and other enzymatic advancements.

With the unprecedented increase in the world's population, the need for different foodprocessing techniques becomes extremely important. And with the increase in awareness of and demand for food quality, processed products with improved quality and better taste that are safe are also important aspects that need to be addressed. In this volume, experts examine the use of different technologies for food processing. They look at technology with ways to preserve nutrients, eliminate anti-nutrients and toxins, add vitamins and minerals, reduce waste, and increase productivity. Topics include, among others: • applications of ohmic heating • cold plasma in food processing • the role of biotechnology in the production of fermented foods and beverages • the use of modification of food proteins using gamma irradiation • edible coatings to restrain migration of moisture, oxygen, and carbon dioxide • natural colorants, as opposed to synthetic coloring, which may have toxic effects • hurdle technology in the food industry • the unrecognized potential of agro-industrial waste

By covering both the general principles of bioconversion and the specific characteristics of the main groups of waste materials amenable to bioconversion methods, this new book provides the chemical, biochemical, agrochemical and process engineer with clear guidance on the use of these methods in devising a solution to the problem of industrial waste products.

Probiotic microorganisms are recognised as being beneficial for human health. Prebiotics are substrates that are used preferentially by the probiotic bacteria for their growth. A great deal of interest has been generated in recent years in identifying probiotic bacteria and prebiotics, their characterization, mechanisms of action and their role in the prevention and management of human health disorders. Together they are referred to as synbiotic. This book is in response to the need for more current and global scope of probiotics and prebiotics. It contains chapters written by internationally recognized authors. The book has been planned to meet the needs of the researchers, health professionals, government regulatory agencies and industries. This book will serve as a standard reference book in this important and fast-growing area of probiotics and prebiotics in human nutrition and health.

Frontiers in Natural Product Chemistry is a book series devoted to publishing monographs that highlight important advances in natural product chemistry. The series covers all aspects of research in the chemistry and biochemistry of naturally occurring compounds including coverage of work on natural substances of land and sea and of plants, microbes and animals. Reviews of structure elucidation, biological activity, organic and experimental synthesis of natural products as well as developments of new methods are included. The third volume of the series brings seven reviews covering natural products from marine plant sources, natural oligosaccharides, topical sesquiterpenes for pain treatment, biological activity of piperidinols and much more. Microbial technology plays an integral role in the biotechnology, bioengineering,

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biomedicine/biopharmaceuticals and agriculture sector. This book provides a detailed compendium of the methods, biotechnological routes, and processes used to investigate different aspects of microbial resources and applications. It covers the fundamental and applied aspects of microorganisms in the health, industry, agriculture and environmental sectors, reviewing subjects as varied and topical as pest control, health and industrial developments and animal feed.

This book contains 10 Chapters divided into three Sections. Section A covers synthesis of biopolymers. Lignocellulosic feedstock contains cellulose, hemicellulose, and lignin, which are used for synthesis of biopolymers. Polymer-coated noble metal nanoparticles are used in nanobiomedicine and fundamental biomaterials. Section B describes applications of biopolymers in biomedical, antimicrobial, industrial, nanotechnology, laser-based thin films, and regenerative medicines. Section C is dedicated for advancement and engineering in biopolymers for personal protective garments, equipments, membrane separation processes, purifications, and new generation of high-performance biomaterials. A new numerical-cum-graphical method called TI2BioP (Topological Indices to BioPolymers) has been developed to estimate topological indices (TIs) from two-dimensional (2D) graphical approaches for the natural biopolymers DNA, RNA, and proteins.

Environmental Materials and Waste: Resource Recovery and Pollution Prevention contains the latest information on environmental sustainability as a wide variety of natural resources are increasingly being exploited to meet the demands of a worldwide growing population and economy. These raw materials cannot, or can only partially, be substituted by renewable resources within the next few decades. As such, the efficient recovery and processing of mineral and energy resources, as well as recycling such resources, is now of significant importance. The book takes a multidisciplinary approach to fully realize the number of by-products which can be remanufactured, providing the foundation needed across disciplines to tackle this issue. As awareness and opportunities to recover valuable resources from process and bleed streams is gaining interest, sustainable recovery of environmental materials, including wastewater, offers tremendous opportunity to combine profitable and sustainable production.

Presents a state-of-the-art guide to environmental sustainability Provides an overview of the field highlighting recent and emerging issues in environmental resource recovery that cover a wide array of by-products for remanufacture potential Details a multidisciplinary approach to fully realize the number of by-products which can be remanufactured, providing the foundation needed across disciplines to tackle these global issues

This comprehensive volume covers recent studies into agricultural problems caused by soil and water contamination. Considering the importance of agricultural crops to human health, the editors have focused on chapters detailing the negative impact of heavy metals, excessive chemical fertilizer use, nutrients, pesticides, herbicides, insecticides, agricultural wastes and toxic pollutants, among others, on agricultural soil and crops. In addition, the chapters offer solutions to these negative impacts through various scientific approaches, including using biotechnology, nanotechnology, nutrient management strategies, biofertilizers, as well as potent PGRs and elicitors. This book serves as a key source of information on scientific and engineered approaches and challenges for the bioremediation of agricultural contamination worldwide. This book

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should be helpful for research students, teachers, agriculturalists, agronomists, botanists, and plant growers, as well as in the fields of agriculture, agronomy, plant science, plant biology, and biotechnology, among others. It serves as an excellent reference on the current research and future directions of contaminants in agriculture from laboratory research to field application.

Food Industry Wastes: Assessment and Recuperation of Commodities, Second Edition presents a multidisciplinary view of the latest scientific and economic approaches to food waste management, novel technologies and treatment, their evaluation and assessment. It evaluates and synthesizes knowledge in the areas of food waste management, processing technologies, environmental assessment, and wastewater cleaning. Containing numerous case studies, this book presents food waste valorization via emerging chemical, physical, and biological methods developed for treatment and product recovery. This new edition addresses not only recycling trends but also innovative strategies for food waste prevention. The economic assessments of food waste prevention efforts in different countries are also explored. This book illustrates the emerging environmental technologies that are suitable for the development of both sustainability of the food systems and a sustainable economy. So, this volume is a valuable resource for students and professionals including food scientists, bio/process engineers, waste managers, environmental scientists, policymakers, and food chain supervisors. Provides guidance on current regulations for food process waste and disposal practices Highlights novel developments needed in policy making for the reduction of food waste Raises awareness of the sustainable food waste management techniques and their appraisal through Life Cycle Assessment Explores options for reducing food loss and waste along the entire food supply chain.

Bioprocess Engineering for a Green Environment examines numerous bioprocesses that are crucial to our day-to-day life, specifically the major issues surrounding the production of energy relating to biofuels and waste management. The nuance of this discussion is reflected by the text's chapter breakdown, providing the reader with a fulsome investigation of the energy sector; the importance of third-generation fuels; and the application of micro- and macroalgae for the production of biofuels. The book also provides a detailed exploration of biocatalysts and their application to the food industry; bioplastics production; conversion of agrowaste into polysaccharides; as well as the importance of biotechnology in bio-processing. Numerous industries discharge massive amounts of effluents into our rivers, seas, and air systems. As such, two chapters are dedicated to the treatment of various pollutants through biological operation with hopes of achieving a cleaner, greener, environment. This book represents the most comprehensive study of bioprocessing—and its various applications to the environment—available on the market today. It was furthermore written with various researchers in mind, ranging from undergraduate and graduate students looking to enhance their knowledge of the topics presented to scholars and engineers interested in the bioprocessing field, as well as members of industry and policy-makers. Provides a comprehensive overview of bioprocesses that apply to day-to-day living. Is learner-centered, providing detailed diagrams for easy understanding. Explores the importance of biocatalysts and their applications to the food industry, as well as bioplastics production. Examines the unique capabilities of bioprocess engineering and its ability to treat various pollutants. .

A guide to the wide-variety of waste valorisation techniques related to various biomass, waste materials and by products *Waste Valorisation* provides a comprehensive review of waste chemistry and its application to the generation of value-added products. The authors – noted experts on the topic – offer a clear understanding of waste diversity, drivers and policies governing its valorisation based on the location. The book provides information on the principles behind various valorisation schemes and offers a description of general treatment options with their evaluation guidelines in terms of cost, energy consumption and waste

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generation. Each of the book's chapters contain an introduction which summarises the current production and processing methods, yields, energy sources and other pertinent information for each specific type of waste. The authors focus on the most relevant novel technologies for value-added processing of waste streams or industrial by-products which can readily be integrated into current waste management systems. They also provide the pertinent technical, economic, social and environmental evaluations of bioconversions as future sustainable technologies in a biorefinery. This important book: Presents the most current technologies which integrate waste and/or by-product valorisation Includes discussions on end-product purity and life-cycle assessment challenges Explores relevant novel technologies for value-added processing of waste streams or industrial by-products which can be integrated into current waste management systems Offers a guide to waste reuse, a key sustainability goal for existing biorefineries wishing to reduce material and environmental costs Written for academic researchers and industrial scientists working in agricultural and food production, bioconversions and waste management professionals, Waste Valorisation is an authoritative guide to the chemistry and applications of waste materials and provides an overview of the most recent developments in the field.

Agro-industrial Wastes as Feedstock for Enzyme Production: Apply and Exploit the Emerging and Valuable Use Options of Waste Biomass explores the current state-of-the-art bioprocesses in enzyme production using agro-industrial wastes with respect to their generation, current methods of disposal, the problems faced in terms of waste and regulation, and potential value-added protocols for these wastes. It surveys areas ripe for further inquiry as well as future trends in the field. Under each section, the individual chapters present up-to-date and in-depth information on bioprospecting of agro-industrial wastes to obtain enzymes of economic importance. This book covers research gaps, including valorization of fruit and vegetable by-product—a key contribution toward sustainability that makes the utmost use of agricultural produce while employing low-energy and cost-efficient bioprocesses. Written by experts in the field of enzyme technology, the book provides valuable information for academic researchers, graduate students, and industry scientists working in industrial-food microbiology, biotechnology, bioprocess technology, post-harvest technology, agriculture, waste management, and the food industry. Addresses key opportunities and challenges in the emerging field of enzyme technology, with an emphasis on energy and bio-based industrial applications Explores the current state of the art bioprocesses in enzyme production using fruit and vegetable wastes with respect to their generation, current methods of disposal, and problems faced in terms of waste and regulation Presents in-depth information on bioprospecting of fruit and vegetable to obtain enzymes of economic importance Delves into environmental concerns and economic considerations related to fruit and vegetable processing by-products

The aim of food processing is to produce food that is palatable and tastes good, extend its shelf-life, increase the variety, and maintain the nutritional and healthcare quality of food. To achieve favorable processing conditions and for the safety of the food to be consumed, use of food grade microbial enzymes or microbes (being the natural biocatalysts) is imperative. This book discusses the uses of enzymes in conventional and non-conventional food and beverage processing as well as in dairy processing, brewing, bakery and wine making. Apart from conventional uses, the development of bioprocessing tools and techniques have significantly expanded the potential for extensive application of enzymes such as in production of bioactive peptides, oligosaccharides and lipids, flavor and colorants. Some of these developments include extended use of the biocatalysts (as immobilized/encapsulated enzymes), microbes (both natural and genetically modified) as sources for bulk enzymes, solid state fermentation technology for enzyme production. Extremophiles and marine microorganisms are another source of food grade enzymes. The book throws light on potential applications of microbial

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enzymes to expand the base of food processing industries.

This book is a printed edition of the Special Issue "Biomass Chars: Elaboration, Characterization and Applications" that was published in *Energies*

Carotenoids are one of the most widespread pigment groups distributed in nature; more than 700 natural carotenoids have been described so far. These pigments are known for versatile roles they play in living organisms; however, their most pivotal function is involvement in scavenging of reactive oxygen species and photoprotection. In the same time, carotenoids as natural pigments with important biological activities, such as antioxidant and provitamin A activity, have a great potential in the food, feed and pharmaceutical industries. They can be either extracted from plants and algae or synthesized by various microorganisms, including bacteria, yeasts, filamentous fungi and microalgae.

Platform Chemical Biorefinery: Future Green Chemistry provides information on three different aspects of platform chemical biorefinery. The book first presents a basic introduction to the industry beneficial for university students, then provides engineering details of existing or potential platform chemical biorefinery processes helpful to technical staff of biorefineries. Finally, the book presents a critical review of the entire platform chemical biorefinery process, including extensive global biorefinery practices and their potential environmental and market-related consequences. Platform chemicals are building blocks of different valuable chemicals. The book evaluates the possibility of renewable feedstock-based platform chemical production and the fundamental challenges associated with this objective. Thus, the book is a useful reference for both academic readers and industry technical workers. The book guides the research community working in the field of platform chemical biorefinery to develop new pathways and technologies in combination with their market value and desirability. Offers comprehensive coverage of platform chemicals biorefineries, recent advances and technology developments, potential issues for preventing commercialization, and solutions Discusses existing technologies for platform chemicals production, highlighting benefits as well their possible adverse effects on the environment and food security Includes a global market analysis of platform chemicals and outlines industry opportunities Serves as a useful reference for both academic readers and industry technical workers

The Handbook of Chitin and Chitosan: Chitin and Chitosan Based Polymer Materials for Various Applications, Volume Three, is a must-read for polymer chemists, physicists and engineers interested in the development of ecofriendly micro and nanostructured functional materials based on chitin and their various applications. The book addresses their isolation, preparation and properties and their composites, nanomaterials, manufacturing and characterizations. This is the third of three volumes in a series that contains the latest on the major applications of chitin and chitosan based IPN's, blends, gels, composites and nanocomposites, including environmental remediation, biomedical applications and smart material applications. Provides a comprehensive overview of Chitin and Chitosan materials, from their synthesis and nanomaterials, to their manufacture and applications Volume Three focuses on the applications of Chitin and Chitosan Includes contributions from leading researchers across the globe and from industry, academia, government and private research institutions Highlights current status and future opportunities

This book provides an up-to-date account of the current understanding of climate change and global warming related to environment, climate, plant and vegetation growth. The aim of this book is to provide a platform for scientists and academics world-wide to promote, share, and discuss various new issues and developments in the area of plant and vegetation growth related to climate change. Over the next decades, it is predicted that billions of people, particularly those in developing countries, face shortages of water and food and greater risks to health and life as a result of climate change. Concerted global action is needed to enable developing countries to adapt to the effects of climate change that are happening now and will

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worsen in the future. The book will also enhance the understanding on issues related to climate change, giving a clear indication of a looming global warming crisis. Addressing global climate change is a monumental battle that can only be fought by the leaders of tomorrow, but future leaders are molded through education and shaped by the leaders of today.

Biotransformation of Agricultural Waste and By-Products in the 4F Economy: The Food, Feed, Fiber, Fuel (4F) Economy presents an evaluation of plant species better exploitable for a particular transformation. As crops are already covering large parts of cultivable soils, is it not conceivable to try to extend the cultures beyond the limit of available soils, but a further increase in productivity is not easy to obtain. The book discusses advances in technology and plants design which support the exploitation and valorization of vegetable and fruit by-products through fermentation (feed-batch liquid fermentation, solid-state fermentation) in bio-based biochemicals/biofuels production. Pathways in the biosynthesis of fibers, sugars, and metabolites are provided with a focus on the lifecycle of bacteria, yeasts, and even plant species. The text analyzes cellular structures and the organization of cell walls in order to show which polysaccharides offer more favorable fermentative processes and which are detrimental.

Provides an overview of all plant based biosources Includes examples of biochemical/biofuel production from plant waste Discusses the production of enzymes used in the plant fermentation processes Explores the new fermentation technologies and production of chemicals and fuels from various plants

March 29-30, 2018 | Edinburgh, Scotland Key Topics : Biomass, Biogas, Bioenergy, Renewable Energy, Biorefineries, Bioethanol, Biodiesel, Aviation Biofuels, Advanced Biofuels, Algal Biofuels, Nanotechnology In Biofuels, Food V/S Fuel Debate, Bioeconomy, Energy And Environment, Green Energy And Economy, Advances In Renewable Chemicals, Entrepreneurs Investment Meet,

This book focuses on the crucial sustainability challenge of reducing food waste at the level of consumer-society. Providing an in-depth, research-based overview of the multifaceted problem, it considers environmental, economic, social and ethical factors. Perspectives included in the book address households, consumers, and organizations, and their role in reducing food waste. Rather than focusing upon the reasons for food waste itself, the chapters develop research-based solutions for the problem, providing a much-needed solution-orientated approach that takes multiple perspectives into account. Chapters 1, 2, 12 and 16 of this book are available open access under a CC BY 4.0 license at link.springer.com

Agro-industrial wastes are end-products emerging after industrial processing operations and also from their treatment and disposal e.g. solid fruit wastes and sludge. The agro-industrial wastes are often present in multiphase and comprise multicomponent. Nevertheless, these wastes are a goldmine as they possess valuable organic matter which can be diverted towards high value products ranging from polymers to antibiotics to platform chemicals. There have been plenty of books published on bioenergy, enzymes and organic acids, among others.

However, this emerging field of biochemical has not yet been covered so far which is an important entity of the biorefinery model from waste biomass and needs to be understood from fundamental, applied as well as commercial perspective which has been laid out in this book.

Multifunctional Polymeric Nanocomposites Based on Cellulosic Reinforcements introduces the innovative applications of polymeric materials based on nanocellulose, and covers extraction methods, functionalization approaches, and assembly methods to enable these applications.

The book presents the state-of-the-art of this novel nano-filler and how it enables new applications in many different sectors, beyond existing products. With a focus on application of nano-cellulose based polymers with multifunctional activity, the book explains the methodology of nano-cellulose extraction and production and shows the potential performance benefits of these particular nanostructured polymers, for applications across different sectors, including food active packaging, energy-photovoltaics, biomedical, and filtration. The book describes

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how the different methodologies, functionalization, and organization at the nano-scale level could contribute to the design of required properties at macro level. The book studies the interactions between the main nano-filler with other active systems and how this interaction enables multi-functionality in the produced materials. The book is an indispensable resource for the growing number of scientists and engineers interested in the preparation and novel applications of nano-cellulose, and for industrial scientists active in formulation and fabrication of polymer products based on renewable resources. Provides insight into nanostructure formation science, and processing of polymeric materials and their characterization Offers a strong analysis of real industry needs for designing the materials Provides a well-balanced structure, including a light introduction of basic knowledge on extraction methods, functionalization approaches, and assembling focused to applications Describes how different methodologies, functionalization, and organization at the nano-scale level could contribute to the design of required properties at macro level

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