



RSC Green Chemistry

White Biotechnology for Sustainable Chemistry

Edited by Maria Alice Z. Coelho
and Bernardo D. Ribeiro



White Biotechnology For Sustainable Chemistry Rsc Green Chemistry

M. N. Gupta



White Biotechnology For Sustainable Chemistry Rsc Green Chemistry:

White Biotechnology for Sustainable Chemistry Maria Alice Coelho, Bernardo D Ribeiro, 2015-11-30 White biotechnology is the use of enzymes and microorganisms in industrial production through applied biocatalysis. This allows for milder reaction conditions pH and temperature and the use of more environmentally compatible catalysts and solvents. This in turn leads to processes which are shorter, generate less waste, making them both environmentally and economically more attractive than conventional routes. This book describes the use of white biotechnology within the sustainable chemistry concept, covering waste minimization, the use of alternative solvents, supercritical fluids, pressurized gases, ionic liquids, and micellar systems, and energies, microwaves, and ultrasound. Sustainable approaches for the production of fine and bulk chemicals, aromas, polymers, pharmaceuticals, and enzymes, the use of renewable resources, and agro-industrial residues and biocatalysts recycling. Covering industrial processes and new technologies, this book combines expertise from academia and industry. It is a valuable resource for researchers and industrialists working in biotechnology, green chemistry, and sustainability.

Alternative Energy Sources for Green Chemistry Georgios Stefanidis, Andrzej Stankiewicz, 2016 Discussing the broad impact of alternative energy transfer technologies on reactions, separations, and materials synthesis for industrialists, academics, and postgraduates in alternative energy based processing.

Green Chemistry and Engineering Mukesh Doble, Ken Rollins, Anil Kumar, 2010-07-27 Chemical processes provide a diverse array of valuable products and materials used in applications ranging from health care to transportation and food processing. Yet these same chemical processes that provide products and materials essential to modern economies also generate substantial quantities of wastes and emissions. Green Chemistry is the utilization of a set of principles that reduces or eliminates the use or generation of hazardous substances in design. Due to extravagant costs needed to managing these wastes, tens of billions of dollars a year, there is a need to propose a way to create less waste. Emission and treatment standards continue to become more stringent, which causes these costs to continue to escalate. Green Chemistry and Engineering describes both the science, theory, and engineering application principles of Green Chemistry that lead to the generation of less waste. It explores the use of milder manufacturing conditions resulting from the use of smarter organic synthetic techniques and the maintenance of atom efficiency that can temper the effects of chemical processes. By implementing these techniques, means less waste, which will save industry millions of dollars over time. Chemical processes that provide products and materials essential to modern economies generate substantial quantities of wastes and emissions. This new book describes both the science, theory, and engineering application principles of Green Chemistry that lead to the generation of less waste. This book contains expert advice from scientists around the world encompassing developments in the field since 2000. Aids manufacturers, scientists, managers, and engineers on how to implement ongoing changes in a vast, developing field that is important to the environment and our lives.

Renewable Resources for Surface Coatings, Inks and Adhesives Rainer Höfer, 2022-11-11

Providing a detailed survey of renewable raw materials for paints inks and glues this text examines the raw materials that are used their sourcing and processing

Sustainable Textile and Fashion Value Chains André Matthes, Katja Beyer, Holger Cebulla, Marlen Gabriele Arnold, Anton Schumann, 2020-10-24 This book illustrates key sustainability issues in global textile and fashion value chains by examining individual types of fibers either at a single step in or along the entire value chain It approaches sustainability related issues in the textile and fashion value chain from an interdisciplinary and holistic viewpoint with each contribution linking questions on the textile and fashion value chain to various drivers indicators and concepts of sustainability Each chapter represents a single step in the textile and fashion value chain exploring and considering a wide range of interwoven and interdependent technological environmental social political and economic aspects Various fibers textile engineering and chemical treatment steps as well as innovative business concepts and regulatory frameworks across the entire textile and fashion value chain are identified analyzed discussed and critically evaluated The book provides a systematic overview of the potential and challenges of sustainable textile and fashion value chains making it of interest to practitioners and scientists in sustainability science environmental economics and business management and innovation Further it offers a valuable source of information for industrial and mechanical engineering researchers and for students in the areas of textile engineering fashion or the apparel and clothing industry

Sustainable Solutions for Modern Economies Rainer Höfer, 2009-11-20 Limited supplies of fossil fuels and concerns about global warming have created a strong desire to solve the resource issue in the age beyond petroleum This reference book from the Green Chemistry Series contains the essential areas of green chemistry and sustainability in modern economies It is the first book to outline the contribution of chemistry and of renewable chemical or biological resources to the sustainability concept and to the potential resolution of the world's energy problems It describes the current status of technical research and industrial application as well as the potential of biomass as a renewable resource for energy generation in power stations as alternative fuels and for various uses in chemistry It outlines the historical routes of the sustainability concept and specifies sustainability in metrics facts and figures The book is written by European experts from academia industry and investment banking who are world leaders in research and technology regarding sustainability alternative energies and renewable resources The sustainability aspects covered include consumer behaviour and demands lifestyles and mega trends and their impact on innovation in the industry consumer industry requirements and their impact on suppliers emerging paradigm changes in raw material demand availability sourcing and logistics the contribution of the industry to restore the life support systems of the Earth socially responsible banking and investment sustainability metrics The book highlights the potential of the different forms of renewable raw materials including natural fats and oils plant based biologically active ingredients industrial starch sucrose natural rubber wood natural fibres It also covers the actual status of biomass usage for green energy generation green transportation green chemistry and sustainable nutrition and consumer goods and it depicts the potentials of green solvents

and white biotechnology for modern synthesis and manufacturing technologies The book is aimed at technical and marketing people in industry universities and institutions as well as readers in administrations and NGOs The book will also be of value to the worldwide public interested in sustainability issues and strategies as well as others interested in the practical means that are being used to reduce the environmental impact of chemical processes and products to further eco efficiency and to advance the utilization of renewable resources Plant Mycobiome Younes M. Rashad,Zakaria A. M. Baka,Tarek A. A. Moussa,2023-04-03

Plant mycobiome represents a diverse array of plant associated communities of endophytic and epiphytic fungi These communities fundamentally affect plant health development adaptation and communication with the surrounding ecosystem Furthermore they have key roles in the establishment diversification productivity and sustainability of different natural ecosystems However some of these communities are pathogenic for the plant itself or dangerous for the consumers due to the production of mycotoxins In other words plant mycobiome represents two faces of a coin This book aimed to explore contributions of the plant mycobiome in plant environment interactions from different perspectives Chapters of this book address numerous themes covering the recent advances in roles diversity and dynamics of these fungi as biocontrol agents biofertilizers growth promoters and their secondary metabolites in the area of crop improvement for sustainability and biotechnology as well as the plant pathogenic and toxigenic fungi This book will be useful to postgraduate students botanists mycologists ecologists plant pathologists and physiologists

Biocatalysis and Agricultural Biotechnology: Fundamentals, Advances, and Practices for a Greener Future Anjali Priyadarshini,Prerna Pandey,2018-10-03 This new volume Biocatalysis and Agricultural Biotechnology Fundamentals Advances and Practices for a Greener Future looks at the application of a variety of technologies both fundamental and advanced that are being used for crop improvement metabolic engineering and the development of transgenic plants The science of agriculture is among the oldest and most intensely studied by mankind Human intervention has led to manipulation of plant gene structure for the use of plants for the production of bioenergy food textiles among other industrial uses A sound knowledge of enzymology as well as the various biosynthetic pathways is required to further utilize microbes as sources to provide the desired products for industrial utility This volume provides an overview of all these aspects along with an updated review of the major plant biotechnology procedures and techniques their impact on novel agricultural development and crop plant improvement Also discussed are the use of white biotechnology and metabolic engineering as prerequisites for a sustainable development The importance of patenting of plant products world food safety and the role of several imminent organizations is also discussed The volume provides an holistic view that makes it a valuable source of information for researchers of agriculture and biotechnology as well as agricultural engineers environmental biologists environmental engineers and environmentalists Short exercises at the end of the chapters help to make the book suitable for course work in agriculture biotechnology genetics biology biotechnology and plant science *Polymer Science: A Comprehensive Reference* ,2012-12-05 The progress in polymer

science is revealed in the chapters of Polymer Science A Comprehensive Reference Ten Volume Set In Volume 1 this is reflected in the improved understanding of the properties of polymers in solution in bulk and in confined situations such as in thin films Volume 2 addresses new characterization techniques such as high resolution optical microscopy scanning probe microscopy and other procedures for surface and interface characterization Volume 3 presents the great progress achieved in precise synthetic polymerization techniques for vinyl monomers to control macromolecular architecture the development of metallocene and post metallocene catalysis for olefin polymerization new ionic polymerization procedures and atom transfer radical polymerization nitroxide mediated polymerization and reversible addition fragmentation chain transfer systems as the most often used controlled living radical polymerization methods Volume 4 is devoted to kinetics mechanisms and applications of ring opening polymerization of heterocyclic monomers and cycloolefins ROMP as well as to various less common polymerization techniques Polycondensation and non chain polymerizations including dendrimer synthesis and various click procedures are covered in Volume 5 Volume 6 focuses on several aspects of controlled macromolecular architectures and soft nano objects including hybrids and bioconjugates Many of the achievements would have not been possible without new characterization techniques like AFM that allowed direct imaging of single molecules and nano objects with a precision available only recently An entirely new aspect in polymer science is based on the combination of bottom up methods such as polymer synthesis and molecularly programmed self assembly with top down structuring such as lithography and surface templating as presented in Volume 7 It encompasses polymer and nanoparticle assembly in bulk and under confined conditions or influenced by an external field including thin films inorganic organic hybrids or nanofibers Volume 8 expands these concepts focusing on applications in advanced technologies e g in electronic industry and centers on combination with top down approach and functional properties like conductivity Another type of functionality that is of rapidly increasing importance in polymer science is introduced in volume 9 It deals with various aspects of polymers in biology and medicine including the response of living cells and tissue to the contact with biofunctional particles and surfaces The last volume is devoted to the scope and potential provided by environmentally benign and green polymers as well as energy related polymers They discuss new technologies needed for a sustainable economy in our world of limited resources Provides broad and in depth coverage of all aspects of polymer science from synthesis polymerization properties and characterization methods and techniques to nanostructures sustainability and energy and biomedical uses of polymers Provides a definitive source for those entering or researching in this area by integrating the multidisciplinary aspects of the science into one unique up to date reference work Electronic version has complete cross referencing and multi media components Volume editors are world experts in their field including a Nobel Prize winner

Industrial Biorefineries and White Biotechnology Ashok Pandey, Rainer Höfer, Mohammad Taherzadeh, Madhavan Nampoothiri, Christian Larroche, 2015-05-08 Industrial Biorefineries and White Biotechnology provides a comprehensive look at the increasing focus

on developing the processes and technologies needed for the conversion of biomass to liquid and gaseous fuels and chemicals in particular the development of low cost technologies During the last 3 4 years there have been scientific and technological developments in the area this book represents the most updated information and technological perspective on the topic Provides information on the most advanced and innovative pretreatment processes and technologies for biomass Covers information on lignocellulosic and algal biomass to work on the principles of biorefinery Provides information on integration of processes for the pretreatment of biomass Designed as a textbook for both graduate students and researchers **RSC Green Chemistry** Seth W. Snyder,2015 Industrial Biotechnology and Sustainable Chemistry Comité van de Academie voor Wetenschappen en Techniek (Brussel),2004 **White Biotechnology** Roland Ulber,Dieter Sell,2007-02-13 With contributions by numerous experts *White Biotechnology* M. N. Gupta,2013-07-31 Filling the need for a reference that introduces all relevant tools and approaches in an integrated fashion this coherently written book will appeal to all chemists working in industry as well as all those involved in biotechnology Following an introduction to white biotechnology and creating a sustainable society the author goes on to look at biocatalysts green chemistry enzymology and the applications of enzymes in industry There then follow sections on biofuels and biorefineries polymeric substances vitamins and antibiotics as well as microwaves and ultrasonics in biotechnology The final part presents the future outlook with current initiatives from governments and other agencies and emerging trends *Chemical Biotechnology and Bioengineering* Xuhong Qian,Zhenjiang Zhao,Yufang Xu,Jian-He Xu,Y. -H. Percival Zhang,Jingyan Zhang,Yang-Chun Yong,Fengxian Hu,2015 Introducing chemists and biologists to the important field of chemically promoted biotechnology and bioengineering which aims to improve bioprocesses with the use of chemistry Biotechnology in the Sustainable Environment Gary S. Sayler,John Sanseverino,Kimberly L. Davis,2012-12-06 Proceedings of a Conference held in Knoxville Tennessee April 14 17 1996 **Recent Advancement in White Biotechnology Through Fungi** Ajar Nath Yadav,Sangram Singh,Shashank Mishra,Arti Gupta,2019-10-01 Over the last decade considerable progress has been made in white biotechnology research and further major scientific and technological breakthroughs are expected in the future The first large scale industrial applications of modern biotechnology have been in the areas of food and animal feed production agricultural green biotechnology and in pharmaceuticals medical red biotechnology In contrast the productions of bioactive compounds through fermentation or enzymatic conversion are known as industrial or white biotechnology The fungi are ubiquitous in nature and have been sorted out from different habitats including extreme environments high temperature low temperature salinity and pH and associated with plants Epiphytic Endophytic and Rhizospheric The fungal strains are beneficial as well as harmful for human beings The beneficial fungal strains may play important roles in the agricultural industrial and medical sectors The fungal strains and its product enzymes bioactive compounds and secondary metabolites are very useful for industry e g the discovery of penicillin from *Penicillium chrysogenum* This discovery was a milestone in the development of white

biotechnology as the industrial production of penicillin and antibiotics using fungi moved industrial biotechnology into the modern era transforming it into a global industrial technology Since then white biotechnology has steadily developed and now plays a key role in several industrial sectors providing both high value nutraceutical and pharmaceutical products The fungal strains and bioactive compounds also play an important role in environmental cleaning This volume covers the latest research developments related to value added products in white biotechnology through fungi

Biotechnology for Zero Waste Chaudhery Mustansar Hussain,Ravi Kumar Kadeppagari,2022-01-18 Biotechnology for Zero Waste The use of biotechnology to minimize waste and maximize resource valorization In Biotechnology for Zero Waste Emerging Waste Management Techniques accomplished environmental researchers Drs Chaudhery Mustansar Hussain and Ravi Kumar Kadeppagari deliver a robust exploration of the role of biotechnology in reducing waste and creating a zero waste environment The editors provide resources covering perspectives in waste management like anaerobic co digestion integrated biosystems immobilized enzymes zero waste biorefineries microbial fuel cell technology membrane bioreactors nano biomaterials and more Ideal for sustainability professionals this book comprehensively sums up the state of the art biotechnologies powering the latest advances in zero waste strategies The renowned contributors address topics like bioconversion and biotransformation and detail the concept of the circular economy Biotechnology for Zero Waste effectively guides readers on the path to creating sustainable products from waste The book also includes A thorough introduction to modern perspectives on zero waste drives including anaerobic co digestion as a smart approach for enhancing biogas production Comprehensive explorations of bioremediation for zero waste biological degradation systems and bioleaching and biosorption of waste Practical discussions of bioreactors for zero waste and waste2energy with biotechnology An in depth examination of emerging technologies including nanobiotechnology for zero waste and the economics and commercialization of zero waste biotechnologies Perfect for process engineers natural products environmental soil and inorganic chemists Biotechnology for Zero Waste Emerging Waste Management Techniques will also earn a place in the libraries of food technologists biotechnologists agricultural scientists and microbiologists

Biotechnology in Environmental Remediation Jaspal Singh,Rajesh Bajpai,Ravi Kumar Gangwar,2023-08-01 A timely overview of techniques for involving biological organisms in the remediation of polluted ecosystems As a result of worldwide industry urbanization and population growth many harmful organic and inorganic pollutants have been introduced into the environment With bioremediation we can use fungi bacteria and plants along with their secondary metabolites to clean up areas that have been affected by industrial and commercial activities Biotechnology in Environmental Remediation presents a thorough consideration of the most important biologically based remediation methods in use today Environmental biotechnology is a more sustainable alternative to chemical and mechanical remediation methods which explains the rapidly growing popularity of these techniques This edited volume summarizes our current understanding of bioremediation approaches and presents research

outcomes from a diverse selection of geographies and ecosystems Chapters cover remediation techniques for pollutants affecting soil water air and sediments as well as tools for addressing these issues including tools for assessment and monitoring Uniquely Biotechnology in Environmental Remediation emphasizes the latest findings on the use of secondary metabolites in bioremediation Other topics covered include chemical sustainability nanotechnology and biofuels Readers will gain an understanding of issues including How biological organisms and their secondary metabolites are currently being used in environmental remediation projects worldwide New applications for phytomolecules lichens nanoparticles rhizobacteria and other technologies as well as future directions for bioremediation The steps in the process of biotechnology driven remediation including detection investigation assessment cleanup redevelopment and monitoring Remediation of petroleum hydrocarbons algal carbon sequestration wastewater management and the role of fatty acid and proteins in remediation The investigations in this book provide important knowledge for researchers in biotechnology ecology environmental science and related disciplines Additionally policymakers and NGOs with an interest in remediating environmental contaminants will gain valuable context Biotechnology in Environmental Remediation is a foundation for future research on biotechnological interventions for a clean planet

Environmental Biotechnology Vol. 2 K. M. Gothandam, Shivendu Ranjan, Nandita Dasgupta, Eric Lichtfouse, 2021-05-02 This book provides the technological insight on biorefinery and nanoremediation and provides comprehensive reviews on applications of Biochar for environmental sustainability Critical review on biosurfactants in food applications as well as sustainable agricultural practices has also been provided in this book It also highlights the microbial omics and microRNAs for protecting ecotoxicity Overall this book provides critical as well as comprehensive chapters on wastewater treatment using different technologies

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