

SPRINGER BRIEFS IN MICROBIOLOGY

Luisa Gouveia

# Microalgae as a Feedstock for Biofuels

# Microalgae As A Feedstock For Biofuels Springerbriefs In Microbiology

**Eduardo Jacob-Lopes, Leila Queiroz  
Zepka, Maria Isabel Queiroz**



## **Microalgae As A Feedstock For Biofuels Springerbriefs In Microbiology:**

Microalgae as a Feedstock for Biofuels Luisa Gouveia, 2011-01-30 This Brief provides a concise review of the potential use of microalgae for biofuel production The following topics are highlighted the advantages of microalgae over conventional biofuel producing crops technological processes for energy production using microalgae microalgal biomass production systems production rates and costs algae cultivation strategies and main culture parameters biomass harvesting technologies and cell disruption CO<sub>2</sub> sequestration life cycle analysis and algal biorefinery strategies The conclusions section discusses the contribution of the technologies described to environmental sustainability and future prospects Microalgae-Based Biofuels and Bioproducts Raul Muñoz, Cristina Gonzalez-Fernandez, 2017-06-13 Microalgae Based Biofuels and Bioproducts From Feedstock Cultivation to End Products compiles contributions from authors from different areas and backgrounds who explore the cultivation and utilization of microalgae biomass for sustainable fuels and chemicals With a strong focus in emerging industrial and large scale applications the book summarizes the new achievements in recent years in this field by critically evaluating developments in the field of algal biotechnology whilst taking into account sustainability issues and techno economic parameters It includes information on microalgae cultivation harvesting and conversion processes for the production of liquid and gaseous biofuels such as biogas bioethanol biodiesel and biohydrogen Microalgae biorefinery and biotechnology applications including for pharmaceuticals its use as food and feed and value added bioproducts are also covered This book s comprehensive scope makes it an ideal reference for both early stage and consolidated researchers engineers and graduate students in the algal field especially in energy chemical and environmental engineering biotechnology biology and agriculture Presents the most current information on the uses and untapped potential of microalgae in the production of bio based fuels and chemicals Critically reviews the state of the art feedstock cultivation of biofuels and bioproducts mass production from microalgae including intermediate stages such as harvesting and extraction of specific compounds Includes topics in economics and sustainability of large scale microalgae cultivation and conversion technologies **Microalgae Biotechnology for Development of Biofuel and Wastewater Treatment** Md. Asraful Alam, Zhongming Wang, 2019-04-30 This book addresses microalgae which represent a very promising biomass resource for wastewater treatment and producing biofuels Accordingly microalgae are also an expanding sector in biofuels and wastewater treatment as can be seen in several high profile start ups from around the globe including Solix Biofuels Craig Venter s Synthetic Genomics PetroSun Chevron Corporation ENN Group etc In addition a number of recent studies and patent applications have confirmed the value of modern microalgae for biofuels production and wastewater treatment systems However substantial inconsistencies have been observed in terms of system boundaries scope the cultivation of microalgae and oil extraction systems production costs and economic viability cost lowering components etc Moreover the downstream technologies and core principles involved in liquid fuel extraction from microalgae cells are still in their early

stages and not always adequate for industrial production Accordingly multilateral co operation between universities research institutes governments stakeholders and researchers is called for in order to make microalgae biofuels economical Responding to this challenge the book begins with a general introduction to microalgae and the algae industry and subsequently discusses all major aspects of microalgal biotechnology from strain isolation and robust strain development to biofuel development refinement and wastewater treatment

*Marine Macro- and Microalgae* F. Xavier Malcata, Isabel Sousa Pinto, A. Catarina Guedes, 2018-12-07 The marine environment accounts for most of the biodiversity on our planet while offering a huge potential for the benefit and wellbeing of mankind Its extensive resources already constitute the basis of many economic activities but many more are expected in coming years This book covers current knowledge on uses of marine algae to obtain bulk and fine chemicals coupled with optimization of the underlying production and purification processes Major gaps and potential opportunities in this field are discussed in a critical manner The current trends pertaining to marine macro and microalgae are explained in a simple and understandable writing style This book covers a wide variety of topics and as such it will be appropriate as both student text and reference for advances researchers in the field

Biotechnology: Recent Trends and Emerging Dimensions Atul Bhargava, Shilpi Srivastava, 2017-11-22 Biotechnology is a multidisciplinary field encompassing microbiology biochemistry genetics molecular biology chemistry immunology cell and tissue culture physiology This book describes the recent developments in these areas Current research topics such as Quorum sensing Integrins Phytomining are discussed which would serve as an excellent reference work for both academicians and researchers in the field

Biotechnology for Waste Biomass Utilization Prakash K. Sarangi, Latika Bhatia, 2022-10-13 This volume focuses on how waste biomass can be transformed into useful biomaterials food and feed fuel and chemicals by using various processes such as chemical physical thermal biological and biotechnological procedures Biomass from biowastes such as agriculture crop residues wood processing residues forest residues food waste industrial waste and municipal solid waste have emerged as potential substrates for bioenergy production This volume explores the key features of biotechnology for waste biomass utilization presenting scientific and technical literature on sustainable waste biomass management as well as for biomass conversion for biofuels chemicals and other new commercial products It discusses a variety of novel biotechnical applications and interventions including microbial fermentation and anaerobic digestion biotechnological modes of xylooligosaccharides production multifaceted utilization of microalgal biomass vermiculture and vermicomposting and more Key features Provides the most recent information about waste biomass utilization for the production of biofuels and biochemicals Shows a wide range of novel technologies in the field of biotechnology towards waste biomass utilization Focuses on the utilization of microbial resources for waste biomass conversion into value added products Explores methods for food wastes and crop wastes conversion into biofuels and biochemicals Provides the scientific information describing various examples and case studies which aid gaining knowledge

to researchers and academicians With chapters from eminent researchers who have significant global experience in the field of waste biomass management this volume delivers a wealth of valuable information for researchers involved in bioenergy utilization It will also be an essential source for academicians researchers economists policymakers and policy analysts

Plants as Bioreactors for Industrial Molecules Santosh Kumar Upadhyay, Sudhir Pratap Singh, 2023-02-06 PLANTS AS BIOREACTORS FOR INDUSTRIAL MOLECULES An incisive and practical discussion of how to use plants as bioreactors In Plants as Bioreactors for Industrial Molecules a team of distinguished researchers delivers an insightful and global perspective on the use of plants as bioreactors In the book you ll find coverage of the basic applied biosynthetic and translational approaches to the exploitation of plant technology in the production of high value biomolecules The authors focus on the yield and quality of amino acids vitamins and carbohydrates The authors explain how high value biomolecules enable developers to create cost effective biological systems for the production of biomolecules useful in a variety of sectors They provide a holistic approach to plant based biological devices to produce natural molecules of relevance to the health and agriculture industries Readers will also find A thorough overview of plants as bioreactors and discussions of molecular farming for the production of pharmaceutical proteins in plants Comprehensive explorations of plants as edible vaccines and plant cell culture for biopharmaceuticals Practical discussions of the production of attenuated viral particles as vaccines in plants and insecticidal protein production in transgenic plants Extensive treatment of the regulatory challenges involved in using plants as bioreactors Perfect for academics scientists and researchers in industrial microbiology and biotechnology Plants as Bioreactors for Industrial Molecules will also earn a place in the libraries of biotechnology company professionals in applied product development

Microbial Biofilms Bakrudeen Abdul, 2020-11-05 This book provides a broad range of applications and recent advances in the search for biofilm materials in nature It also explains the future implications for biofilms in the areas of advanced molecular genetics pharmaceuticals pharmacology and toxicology This book is comprised of 20 chapters from leading experts in the field and it examines immunology and microbiological studies derived from biofilms as well as explores environmental agricultural and chemical impacts on biofilms It is divided into five subdivisions biofilms and its complications biofilm infections in human body detection of biofilm forming pathogens antibiofilm chemotherapy and biofilms production tools in aquaculture This book may be used as a text or reference for everyone interested in microbial biofilms and their current applications It is also highly recommended for environmental microbiologists medical microbiologists bioremediation experts and microbiologists working in biocorrosion biofouling biodegradation water microbiology quorum sensing and many other related areas Scientists in academia research laboratories and industry will also find it of interest This book includes chapter homework problems and case studies Powerpoints are also available for adopting instructors Discusses and clarifies the resource of isolation and chemical properties from biofilms Discusses the latest pharmaceutical pharmacological and medicinal approaches toward the treatment of chronic and uncured diseases such

as Alzheimer's osteoporotic sexual dysfunction sleep sickness allergy treatment asthma hair loss AIDS hypertension antiaging etc Examines immunology and microbiological studies derived from biofilms Explores environmental agricultural and chemical impacts on biofilms Dr Bakrudeen Ali Ahmed Abdul is an Associate Professor the Head of the Department of Biochemistry and Dean of the School of Life Sciences Centre for Research and Development CRD PRIST Deemed University Vallam Thanjavur Tamil Nadu India His research areas include the application of plant biochemistry bioactive compound production biotechnological methods development of pharmaceutical products and pharmacological studies *Biosystems Engineering: Biofactories for Food Production in the Century XXI* Ramon Guevara-Gonzalez, Irineo

Torres-Pacheco, 2014-01-24 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 aquaculture contributing in food production is also highlighted in this book

*Microalgal Biotechnology* Eduardo Jacob-Lopes, Leila Queiroz Zepka, Maria Isabel Queiroz, 2018-06-27 Microalgal Biotechnology presents an authoritative and comprehensive overview of the microalgae based processes and products Divided into 10 discreet chapters the book covers topics on applied technology of microalgae Microalgal Biotechnology provides an insight into future developments in each field and extensive bibliography It will be an essential resource for researchers and academic and industry professionals in the microalgae biotechnology field *Marine Bioenergy* Se-Kwon Kim, Choul-Gyun Lee, 2015-05-21 Marine Bioenergy Trends and Developments features the latest findings of leading scientists from around the world Addressing the key aspects of marine bioenergy this state of the art text Offers an introduction to marine bioenergy Explores marine algae as a source of bioenergy Describes biotechnological techniques for biofuel production Explains the *The Future of Effluent Treatment Plants* Maulin P. Shah, Susana Rodriguez-Couto, Kavita Mehta, 2021-05-24 The Future of Effluent Treatment Plants Biological Treatment Systems is an advanced and updated version of existing biological technologies that includes their limitations challenges and potential application to remove chemical oxygen demand COD refractory chemical oxygen demand biochemical oxygen demand BOD color removal and environmental pollutants through advancements in microbial bioremediation The book introduces new trends and advances in environmental bioremediation with thorough discussions of recent developments In addition it illustrates that the application of these new emerging innovative technologies can lead to energy savings and resource recovery The importance of respiration nitrogen mineralization nitrification denitrification and biological phosphorus removal processes in the development of a fruitful and applicable solution for the removal of toxic pollutants from wastewater treatment plants is highlighted Equally important is the knowledge and theoretical modeling of water movement through wastewater ecosystems Finally emphasis is given to the function of constructed wetlands and activated sludge processes Considers different types of industrial wastewater Focuses on biological wastewater treatments Introduces new trends in bioremediation Addresses the

future of WWTPs      *Prospects of Renewable Bioprocessing in Future Energy Systems* Ali Asghar Rastegari, Ajar Nath Yadav, Arti Gupta, 2019-04-03 This book discusses various renewable energy resources and technologies Topics covered include recent advances in photobioreactor design microalgal biomass harvesting drying and processing and technological advances and optimised production systems as prerequisites for achieving a positive energy balance It highlights alternative resources that can be used to replace fossil fuels such as algal biofuels biodiesel bioethanol and biohydrogen Further it reviews microbial technologies discusses an immobilization method and highlights the efficiency of enzymes as a key factor in biofuel production In closing the book outlines future research directions to increase oil yields in microalgae which could create new opportunities for lipid based biofuels and provides an outlook on the future of global biofuel production Given its scope the book will appeal to all researchers and engineers working in the renewable energy sector      **Biomass to Energy Conversion Technologies** Pratima Bajpai, 2019-10-22 Biomass to Energy Conversion Technologies The Road to Commercialization examines biomass production biomass types properties and characterization and energy conversion technologies with an emphasis on the production of a gaseous fuel to supplement the gas derived from the landfilling of organic wastes landfill gas and used in gas engines to produce electricity The book discusses the integration of both fermentation and anaerobic digestion in a biorefinery concept that allows the production of ethanol along with biogas to be used to produce heat and electricity thus improving overall energy balance Included case studies based on worldwide projects discuss both risks and challenges The main studies on the combination of both bioethanol and biogas production processes are reviewed and the strength and weakness of the integrated treatment for industrial application are highlighted The book also considers gasification technologies and their potential for biomass gasification and lists the advantages and disadvantages of using of biomass as a source of energy the path of commercialization of the various processes energy related environmental issues Highlights commercialization and technological risks Discusses challenges limitations and future prospects of third and fourth generation biofuels Includes integration of both fermentation and anaerobic digestion in a biorefinery concept Discusses energy related environment issues Greenhouse effect acid rain air pollution      *Biorefinery* Juan-Rodrigo Bastidas-Oyanedel, Jens Ejbye Schmidt, 2019-04-15 This book discusses the biorefinery of biomass feedstocks In depth chapters highlight the scientific and technical aspects and present a techno economic analysis of such systems By using a TEA approach the authors present feasible pathways for the conversion of biomass both residual biomass energy crops and algae biomass showing the different possibilities for the production of biochemical materials biofuels and fertilizers The concepts presented in this book will link companies investors and governments by providing a framework that will help reduce pollutants and create a biomass related economy that incorporates the newest developments and technologies in the area      **Biotechnological Applications of Biomass** Thalita Peixoto Basso, Thiago Olitta Basso, Luiz Carlos Basso, 2021-08-18 Biotechnological Applications of Biomass provides a comprehensive overview of the current state of

the art of biomass utilization in agriculture and pharmaceuticals The information contained herein is useful to researchers and other readers interested in biomass utilization and production of bioproducts     Algal Biorefineries Rakesh Bajpai,Aleš Prokop,Mark Zappi,2013-10-01 This book reviews efforts to produce chemicals and fuels from forest and plant products agricultural residues and more Algae can potentially capture solar energy and atmospheric CO<sub>2</sub> the book details needed research and legislative initiatives     **Biotechnology: Prospects and Applications** R.K. Salar,S.K. Gahlawat,P. Siwach,J.S. Duhan,2014-02-06 Biotechnology Prospects and Applications covers the review of recent developments in biotechnology and international authorship presents global issues that help in our understanding of the role of biotechnology in solving important scientific and societal problems for the benefit of mankind and environment A balanced coverage of basic molecular biology and practical applications relevant examples colored illustrations and contemporary applications of biotechnology provide students and researchers with the tools and basic knowledge of biotechnology In our effort to introduce students and researchers to cutting edge techniques and applications of biotechnology we dedicated specific chapters to such emerging areas of biotechnology as Emerging Dynamics of Brassinosteroids Research Third generation green energy Bioremediation Metal Organic Frameworks New smart materials for biological application Bioherbicides Biosensors Fetal Mesenchymal Stem Cells and Animal forensics Biotechnology Prospects and Applications will be highly useful for students teachers and researchers in all disciplines of life sciences agricultural sciences medicine and biotechnology in universities research stations and biotechnology companies The book features broader aspects of the role of biotechnology in human endeavor It also presents an overview of prospects and applications while emphasizing modern cutting edge and emerging areas of biotechnology Further it provides the readers with a comprehensive knowledge of topics in food and agricultural biotechnology microbial biotechnology environmental biotechnology and animal biotechnology The chapters have been written with special reference to the latest developments in above broader areas of biotechnology that impact the biotechnology industry A list of references at the end of each chapter is provided for the readers to learn more about a particular topic Typically these references include basic research research papers review articles and articles from the popular literature     **Genetic and Genome-Wide Microbial Insights: Bioenergy** Javid Ahmad Parray,Niraj Singh,Dilfuza Egamberdieva,2025-02-24 Genetic and Genome Wide Microbial Insights Bioenergy Microbial Genomics Volume 3 delves into the cutting edge developments in the field of metagenomics encompassing both metatranscriptomics and metaproteomics This comprehensive resource highlights the significant potential of metagenomics in screening previously uncultivated microbial species It underscores the pivotal role of these advanced genomic techniques in accessing elusive microorganisms thereby revolutionizing the production of biofuels This book emphasizes the practicality of these methods aiming to make biofuel production more economically feasible and efficient Genetic and Genome Wide Microbial Insights Bioenergy offers both a foundational overview and the most recent advancements in microbial genomics computational



genomics and enzyme engineering It details the process of upscaling and bio prospecting microbial strains specifically tailored for biofuel production providing a comprehensive guide that bridges basic concepts with cutting edge research This book covers a range of topics including advanced microbial fuel production techniques Sustainable bioenergy genomics and biofuel development and microbial engineering The comprehensive chapters in this book will appeal to readers from diverse backgrounds in biology life sciences agriculture environmental engineering genome engineering and even medicine Explores the integration of metagenomics and enzyme engineering in the upscaling of biofuel production Presents recent omics applications and delves into the biological mechanisms that drive microbial biofuel production Traces the journey from metagenomics to byproducts focusing on the bio prospecting of microbial strains      **Advanced Biofuels** Kalam Abul Azad, Mohammad Rasul, 2019-06-09 Advanced Biofuels Applications Technologies and Environmental Sustainability presents recent developments and applications of biofuels in the field of internal combustion engines with a primary focus on the recent approaches of biodiesel applications low emission alternative fuels and environmental sustainability Editors Dr Azad and Dr Rasul along with their team of expert contributors combine a collection of extensive experimental investigations on engine performance and emissions and combustion phenomena using different types of oxygenated fuel with in depth research on fuel applications an analysis of available technologies and resources energy efficiency improvement methods and applications of oxygenated fuel for the sustainable environment Academics researchers engineers and technologists will develop a greater understanding of the relevant concepts and solutions to the global issues related to achieving alternative energy application for future energy security as well as environmental sustainability in medium and large scale industries Fills a gap in the literature on alternative fuel applications with in depth research and experimental investigations of different approaches technologies and applications Considers the important issue of sustainability using case studies to deepen understanding Includes energy security within various industries including aviation and transport

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