

FREE DOWNLOAD MICROALGAE BIOTECHNOLOGY ADVANCES IN BIOCHEMICAL ENGINEERINGBIOTECHNOLOGY

Microalgae Biotechnology

Antenna Mutants, Domestication, by Roberto Bassi Heterotrophic Cultivation, by William McCaffrey Chlorella for industrial applications: Advances and prospective, by Feng Chen Carotinoide, by Carola Griehl Engineering the algal chloroplast for synthesis of therapeutic proteins, by Saul Purton Design Concepts and recent developments of photobioreactors, by Clemens Posten Efficiency of flat plate reactors, by Mario Tredici Measuring modelling and control, by Olivier Bernard Microalgae in Life Support Systems, by Klaus Slenzka Heterotrophic oil production, by Makato Watanabe

Current Developments in Biotechnology and Bioengineering

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

Biofuels from Algae

This book provides in-depth information on basic and applied aspects of biofuels production from algae. It begins with an introduction to the topic, and follows with the basic scientific aspects of algal cultivation and its use for biofuels production, such as photo bioreactor engineering for microalgae production, open culture systems for biomass production and the economics of biomass production. It provides state-of-the-art information on synthetic biology approaches for algae suitable for biofuels production, followed by algal biomass harvesting, algal oils as fuels, biohydrogen production from algae, formation/production of co-products, and more. The book also covers topics such as metabolic engineering and molecular biology for algae for fuel production, life cycle assessment and scale-up and commercialization. It is highly useful and helps you to plan new research and design new economically viable processes for the production of clean fuels from algae. Covers in a comprehensive but concise way most of the algae biomass conversion technologies currently available Lists all the products produced from algae, i.e. biohydrogen, fuel oils, etc., their properties and potential uses Includes the economics of the various processes and the necessary steps for scaling them up

Microalgal Biotechnology

Microalgae are a group of single-celled, photosynthetic microorganisms. They are of great commercial interest as they are capable of producing biomass (with a vast array of biochemical) using sunlight, CO₂ and various other naturally occurring nutrients. Correctly utilised, they have the potential to provide sustainable supply of commercially relevant biochemicals, biofuels, nutraceuticals, food and feed supplements. The field of microalgal biotechnology is a fast-paced area of research, with technologies coming ever closer to commercial viability. Microalgal Biotechnology consolidates the latest research in the field together with a look at market potential and policy considerations. Highlighting the huge potential of microalgae as commercial commodities, it covers progress on various fronts including: bio-refinery and its technological challenges, genetic engineering, biosafety and regulatory issues, open and closed photo-bioreactors for biomass production, market space and sustainability for algal products. This book is a useful resource for researchers, academicians, postgraduate students, industries, policy makers and anyone interested in the status and future possibilities of microalgae commercialisation.

Grand Challenges in Algae Biotechnology

In this book, researchers and practitioners working in the field present the major promises of algae biotechnology and they critically discuss the challenges arising from applications. Based on this assessment, the authors explore the great scientific, industrial and economic potential opened up by algae biotechnology. The first part of the book presents recent developments in key enabling technologies, which are the driving force to unleash the enormous potential of algae biotechnology. The second part of the book focuses on how practical applications of algae biotechnology may provide new solutions to some of the grand challenges of the 21st century. Algae offer great potential to support the building of a bio-based economy and they can contribute new solutions to some of the grand challenges of the 21st century. Despite significant progress, algae biotechnology is yet far from fulfilling its potential. How to unleash this enormous potential is the challenge that the own field is facing. New cultivation technologies and bioprocess engineering allow for optimization of the operation strategy of state-of-the-art industrial-scale production systems and they reduce the production costs. Parallel to this, new molecular technologies for genetic and metabolic engineering of (micro)algae develop quickly. The optimization of existing biochemical pathways or the introduction of pathway components makes high-yield production of specific metabolites possible. Novel screening technologies including high-throughput technologies enables testing of extremely large numbers of samples and, thus, allow for large scale modelling of biomolecular processes, which would have not been possible in the past. Moreover, profitable production can demand for integrated biorefining, which combines consecutive processes and various feedstocks to produce both transportation fuel, electric energy and valuable chemicals.

Biomass, Biofuels, Biochemicals

Biomass, Biofuels and Biochemicals: Biofuels from Algae, Second Edition provides information on strategies for commercial microalgae based biofuel production, including their cultivation, pre-treatment and conversion methods. The book discusses methods for producing microalgal biomass in large scale by outdoor culturing and outlines new technologies for their use. In addition, it explains how modern genetic engineering enables the generation of recombinant strains that generate higher quantities of feedstock. The complete utilization of microalgal biomass, which can also be obtained from valorizing nutrients from wastewater and industrial exhaust gases, can be efficiently converted to energy rich biofuels and high value pharmaceuticals in a well-defined biorefinery. Includes the current technologies for the cultivation and conversion of energy rich microalgal biomass into biofuels Provides information on all the conversion methods – biochemical and thermochemical conversions Covers other high value products from microalgae and less conventional applications, such as fine chemical production and aviation fuel generation Discusses the economics of microalgal biofuel production and how to accomplish cost competitive results

Algae Biotechnology

This book examines the utilization of algae for the development of useful products and processes with the emphasis towards green technologies and processes, and the requirements to make these viable. Serving as a complete reference guide to the production of biofuels and other value added products from micro and macro algae, it covers various aspects of algal biotechnology from the basics to large scale cultivation, harvesting and processing for a variety of products. It is authored and edited by respected world experts in the field of algal biotechnology and provides the most up to date and cutting edge information on developments in the field. Over the past decade there has been substantial focus and related literature on the application of algal biomass for the generation of novel processes and products. 'Algae Biotechnology: Products and Processes' encompasses a holistic approach to critically evaluating developments in the field of algal biotechnology whilst taking into account recent advances and building on the body of knowledge. Aspects of the effects of harmful algae are also discussed, as well as the potential commercial application of algal biotechnology, the techno-economic feasibility of algal biodiesel production and the use of genetic and metabolic engineering for the improvement of yield. Other bioenergy sources such as alcohol fuels, aviation fuels, biohydrogen and biogas are also covered. This book is intended for postgraduates and researchers working in the biofuels and algal industry; it constitutes ideal reference material for both early stage and established researchers.

Bioprocess and Algae Reactor Technology, Apoptosis

This volume in the series *Advances in Biochemical Engineering/Biotechnology* focuses on bioprocess and algae reactor technology and apoptosis. All aspects of this interdisciplinary technology, where knowledge, methods and expertise are required from chemistry, biochemistry, microbiology, genetics, chemical engineering and computer science are treated.

Marine Biotechnology I

"The series *Advances in Biochemical Engineering/Biotechnology* presents critical reviews of the present and future trends in polymer and biopolymer science including chemistry, physical chemistry, physics and material science. It is addressed to all scientists at universities and in industry who wish to keep abreast of advances in the topics covered."--Title page verso.

Current Developments in Biotechnology and Bioengineering

Photobioreactors: Design and Applications provides a comprehensive overview of photobioreactor design, types and applications. It also introduces key principles that enable chemical and environmental engineers to engage in analysis, optimization and design with consistent control over biological and chemical transformations. The use of computational modeling of processes, control systems and CFD is in great demand. This book covers these aspects of chemical and bioprocesses. Focuses on design, types, modeling and simulation of photobioreactors and applications in biohydrogen and microalgae production Includes up-to-date reviews of photobioreactors Discusses biopolymers, diatoms, cyanobacteria and pigments production using different types of photobioreactors

Algal Biotechnology

Algae Biotechnology: Integrated Algal Engineering for Bioenergy, Bioremediation, and Biomedical Applications covers key applications of algae for bioenergy and how to integrate the production of biofuels with environmental, nutraceutical and biomedical processes and products. The book emphasizes cost-effective biofuels production through integrated biorefinery, combining continuous processes and various algae as feedstock to produce biofuel, bioenergy and various high value biochemicals. Novel algal culturing technologies and bioprocess engineering techniques are provided for the optimization of operational approaches for commercial-scale production, as well as to reduce the overall costs. New and existing

molecular methods for genetic and metabolic engineering of algae are also presented. Furthermore, methods for the optimization of existing biochemical pathways are explained, and new pathways are introduced, in order to maximize the potential for biofuels production and related nutraceutical and biomedical co-products. This book provides an ideal roadmap for bioenergy researchers and engineers who want to incorporate valuable nutraceutical and biomedical products and environmental practices into the production of biofuels. Addresses issues faced by the bioenergy sector and how to resolve them through the integration of algal biotechnology and engineering Provides a guide to the efficient and cost-effective production of bioenergy, while simultaneously mitigating pollution and producing valuable nutraceutical and biomedical biproducts Covers new and emerging approaches in integrated algal biotechnology Offers a roadmap to their application in the production of biofuels alongside nutraceutical, biomedical, and environmental processes and products

Biotechnological Applications of Biodiversity

This book review series presents current trends in modern biotechnology. The aim is to cover all aspects of this interdisciplinary technology where knowledge, methods and expertise are required from chemistry, biochemistry, microbiology, genetics, chemical engineering and computer science. Volumes are organized topically and provide a comprehensive discussion of developments in the respective field over the past 3-5 years. The series also discusses new discoveries and applications. Special volumes are dedicated to selected topics which focus on new biotechnological products and new processes for their synthesis and purification. In general, special volumes are edited by well-known guest editors. The series editor and publisher will however always be pleased to receive suggestions and supplementary information. Manuscripts are accepted in English.

Handbook of Marine Microalgae

Handbook of Microalgae: Biotechnology Advances offers complete coverage of marine microalgae, including biology, production techniques, biotechnological applications, economic perspectives of applications, and environmental effects of marine microalgae blooms. With contributions from world experts, Handbook of Microalgae: Biotechnology Advances focuses on microalgae from an organism perspective to offer a complete picture from evolution to biofuel. Focuses on a comprehensive approach from an organism point of view Contains full coverage of all aspects of microalgae from biology through biotechnological and biomedical applications Includes biological properties of commercial algal species Provides microalgae screening and identification methods, culturing methods and new aspects of processing

Microalgal Biotechnology: Potential and Production

Main description: This book treats the biological fundamentals of microalgal biotechnology and provides an overview of applications and products. It includes a survey of the state-of-the-art in process engineering of algae cultivation mass production, advanced technologies in closed photobioreactors, genetic manipulation and bioprocess engineering. Contributions from academia and industrial case studies make this book a comprehensive survey of current progress in microalgae biotechnology. This book will be of interest to active people in biology, biotechnology, and engineering.

Biorefineries

This book offers a comprehensive review on biomass resources, examples of biorefineries and corresponding products. The first part of this book covers topics such as different biorefinery resources from agriculture, wood processing residues and transport logistics of plant biomass. In the second part, expert contributors present biorefinery concepts of different biomass feedstocks, including vegetable-oils, sugarcane, starch, lignocellulose and microalgae. Readers will find here a summary of the syngas utilization and the bio-oil characterization and potential use as an alternative renewable fuel and source for chemical feedstocks. Particular attention is also given to the anaerobic digestion-based and Organosolv biorefineries. The last part

of the book examines relevant products and components such as alcohols, hydrocarbons, bioplastics and lignin, and offers a sustainability evaluation of biorefineries.

Current Developments in Biotechnology and Bioengineering

Advances in Bioprocess Engineering, the latest release in the Current Developments in Biotechnology and Bioengineering series, provides a comprehensive overview of bioprocess systems, kinetics, bioreactor design, batch and continuous reactors and introduces key principles that enable bioprocess engineers to engage in analysis, optimization and design with consistent control over biological and chemical transformations. The bioprocessing sector is also updating its technologies with state-of-the-art techniques to keep up with the rising demand of the industry and R&D. This book covers these aspects, taking readers through a step-by-step journey of bioprocessing while also guiding them towards a new era and future. Covers state-of-the-art, technological advancements in the field of bioprocessing Includes design and scale-up of bioreactors, monitoring and control systems, advances in upstream and downstream processing Includes design and development of fermentation processes such as the suitability of experimental design, full factorial, central composite design, Box-Behnken, Plackett-Burman, and more

Biotechnology in China III: Biofuels and Bioenergy

Cellulolytic Enzyme Production and Enzymatic Hydrolysis for Second-Generation Bioethanol Production, by Mingyu Wang, Zhonghai Li, Xu Fang, Lushan Wang and Yinbo Qu Bioethanol from Lignocellulosic Biomass, by Xin-Qing Zhao, Li-Han Zi, Feng-Wu Bai, Hai-Long Lin, Xiao-Ming Hao, Guo-Jun Yue and Nancy W. Y. Ho Biodiesel From Conventional Feedstocks, by Wei Du and De-Hua Liu Establishing Oleaginous Microalgae Research Models for Consolidated Bioprocessing of Solar Energy, by Dongmei Wang, Yandu Lu, He Huang and Jian Xu Biobutanol, by Hongjun Dong, Wenwen Tao, Zongjie Dai, Liejian Yang, Fuyu Gong, Yanping Zhang and Yin Li Branched-Chain Higher Alcohols, by Bao-Wei Wang, Ai-Qin Shi, Ran Tu, Xue-Li Zhang, Qin-Hong Wang and Feng-Wu Bai Advances in Biogas Technology, by Ai-Jie Wang, Wen-Wei Li and Han-Qing Yu Biohydrogen Production from Anaerobic Fermentation, by Ai-Jie Wang, Guang-Li Cao and Wen-Zong Liu Microbial Fuel Cells in Power Generation and Extended Applications, by Wen-Wei Li and Guo-Ping Sheng Fuels and Chemicals from Hemicellulose Sugars, by Xiao-Jun Ji, He Huang, Zhi-Kui Nie, Liang Qu, Qing Xu and George T. Tsao

Cyanobacteria in Biotechnology

This book provides a comprehensive and authoritative review of cyanobacteria and their applications as solar cell factories. Cyanobacteria are able to perform oxygenic photosynthesis and they are utilized in many different bioprocesses. The book covers two major aspects of a cyano-based bioprocess: the biological whole-cell catalyst and the technical environment in which the catalyst is applied. In the biocatalyst itself electron and carbon flow play an essential role for the performance of the cell and need to be tackled likewise for successful biocatalyst development. In the first chapters of this volume, cyanobacterial biotechnology and the fundamentals of cyanobacterial bioenergetics are introduced followed by an overview on tools and strategies for cyanobacteria engineering. Further on, examples of applications, engineering and production of different industrially relevant compounds in these organisms are provided, and finally process technology specific for cyanobacteria is covered. In this book, particular attention is given to topics such as cyanobacterial bioenergetics, metabolic engineering design strategies, utilizing cyanobacteria in biophotovoltaics, and production of pigments as well as photobiohydrogen in cyanobacteria, among others. This book will provide interested students and researchers in the area of photo-biotechnology with a deeper understanding of the cyanobacterial cell-factory, including the latest innovations and persistent challenges in the field.

Microalgal Biotechnology

With the high interest in renewable resources, the field of algal biotechnology has undergone a huge leap in importance. This book treats the biological fundamentals of microalgal biotechnology in physiology and molecular biology. It provides an overview of applications and products as well as a survey of the state-of-the-art in process engineering of algae cultivation. So this book will be of interest to active people in the area of sustainable production of high value products or mass production of food and fuel for the future.

Advances in Biochemical Engineering

This is the first book to present the idea of using Industry 4.0 and smart manufacturing in the microalgae industry for environmental biotechnology. It provides the latest developments on microalgae for use in environmental biotechnology, explains process analysis from an engineering point of view, and discusses the transition to smart manufacturing and how state of the art technologies can be incorporated. It covers applications, technologies, challenges, and future perspectives. • Showcases how Industry 4.0 can be applied in algae industry • Covers new ideas generated from Industry 4.0 for Industrial Internet of Things (IIoT) • Demonstrates new technologies invented to cater to Industry 4.0 in microalgae • Features worked examples related to biological systems Aimed at chemical engineers, bioengineers, and environmental engineers, this is an essential resource for researchers, academics, and industry professionals in the microalgae biotechnology field.

Microalgae for Environmental Biotechnology

The edited book covers all potential products from microalgal-based biorefinery having the focus on contemporary technologies and future outlook. Along with the focus on microalgal biorefinery products, the book also focuses on biotechnological advances via the utilization of modern molecular biology, system biology, synthetic biology, or metabolic engineering approach in microalgal biorefinery. The development of any technologies has a direct effect on the human being and the environment, therefore, the socio-economic, techno-economic, and environmental impact of the microalgae-based biorefineries will also be included in the book. In microalgal biomass-based biorefinery different biofuel- biodiesel, bioethanol, bio-hydrogen, and value-added compounds such as carotenoids, fatty acids, and protein can be produced simultaneously. Understanding the technical advances to develop an integrated biorefinery approach with the motive of designing a consolidated self-sustainable microalga-based biorefinery. This book is equally beneficial for researchers and engineers in biomass-based biorefineries or the bachelors, master, or young budding graduate students as a textbook.

Micro-algae: Next-generation Feedstock for Biorefineries

"Microalgae Biotechnology for Food, Health and High Value Products" presents the latest technological innovations in microalgae production, market status of algal biomass-based products, and future prospects for microalgal applications. It provides stimulating overviews from different perspectives of application that demonstrate how rapidly the commercial production of microalgae-based food, health and high value products is advancing. It also addresses a range of open questions and challenges in this field. The book highlights the latest advances of interest to those already working in the field, while providing a comprehensive overview for those readers just beginning to learn about the promise of microalgae as a sustainable source of both specialty and commercial products. It offers a valuable asset for commercial algae producers, algae product developers, scientific researchers and students who are dedicated to the advancement of microalgae biotechnology for applications in health, diet, nutrition, cosmetics, biomaterials etc.

Microalgae Biotechnology for Food, Health and High Value Products

Biochemical engineering is the application of engineering principles to conceive, design, develop, operate, and/or use processes and products based on biological and biochemical phenomena. Biochemical engineering

influences a broad range of industries, including health care, agriculture, food, enzymes, chemicals, waste treatment, and energy, among others. Historically, biochemical engineering has been distinguished from biomedical engineering by its emphasis on biochemistry and microbiology and by the lack of a health care focus. This is no longer the case. There is increasing participation of biochemical engineers in the direct development of pharmaceuticals and other therapeutic products. Biochemical engineering has been central to the development of the biotechnology industry, given the need to generate prospective products on scales sufficient for testing, regulatory evaluation, and subsequent sale. This book begins with a review of biodiesel processing technology, the use of varied biodiesel in diesel engines and an analysis of economic scale and ecological impact of biodiesel fuel. Other areas of research include the application of biochemical engineering in the fishery industry, algae growth, and waste water management.

Biochemical Engineering

Microalgae are sunlight driven single-cell factories for protein, lipids, carbohydrates, pigments, vitamins and minerals, etc. Microalgae have long been used as health food and additives for human consumption, as well as animal feed in aquaculture. Microalgae also prove to be beneficial to environmental cleanup such as bioremediation of industrial flue gases and waste water. Recently, owing to the demand of renewable energy, microalgal biofuels, biodiesel in particular, have attracted unprecedentedly interest. Also, microalgae emerge as promising hosts for the expression of recombinant proteins. Nevertheless, there are still tremendous challenges involved in the algae production pipeline such as strain improvement, mass cultivation, harvest and drying, biomass disruption, and recycling of water and nutrients, which have been impeding commercial application of microalgae in many different ways. The great opportunities lying ahead will be the innovations and breakthroughs occurred in microalgal biotechnology. This book brings together recent advances in microalgal biotechnology, dedicated to both the understanding of the fundamentals and development of industry-oriented technologies.

Recent Advances in Microalgal Biotechnology

Microalgal biomasses have a long history of industrial production for application in a variety of fields. The success of commercial large-scale production of microalgae depends on many factors, one which is the development of cost-effective systems. Open pond reactors are the most widely used system in large-scale microalgal cultivation due to their low cost of construction, maintenance, and operation. However, closed photobioreactors have a high photosynthetic efficiency and biomass productivity. This study presents the advantages and disadvantages of open ponds compared with other photobioreactors and examines the factors that affect the cultures and their bioproducts.

Biofuels from Algae

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.

Biotechnology of Microalgae, Based on Molecular Biology and Biochemistry of Eukaryotic Algae and Cyanobacteria

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.

Microalgae Biotechnology for Development of Biofuel and Wastewater Treatment

Today, ergot alkaloids have found widespread clinical use and more than 50 formulations contain natural or semisynthetic ergot alkaloids. They are used in the treatment of uterine atonia, postpartum bleeding, migraine, orthostatic circulatory disturbances, senile cerebral insufficiency, hypertension, hypoprolactinemia, acromegaly, and Parkinsonism. Recently, new therapeutic applications have emerged, e.g., against schizophrenia and for therapeutic usage based on newly discovered antibacterial and cytostatic effects, immunomodulatory and hypolipemic activity. The broad physiological effects of ergot alkaloids are based mostly on their interactions with neurotransmitter receptors on the cells. The presence of "hidden structures" resembling some important neurohumoral mediators (e.g., noradrenaline, serotonin, dopamine) in the molecules of ergot alkaloids could explain their interactions with these receptors [1]. Ergot alkaloids are produced by the filamentous fungi of the genus, *Claviceps* (e.g., *Claviceps purpurea* – Ergot, Mutterkorn). On the industrial scale these alkaloids were produced mostly by parasitic cultivation (field production of the ergot) till the end of the 1970s. Today this uneconomic method has been replaced by submerged fermentation. Even after a century of research on ergot alkaloids the search still continues for new, more potent and more selective ergot alkaloid derivatives.

Advances in Biochemical Engineering

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

Biotechnology for Waste Biomass Utilization

General interest; Culture; Gene expression and sequencing studies; Products and product development; Bioremediation using algae.

New Products and New Areas of Bioprocess Engineering

Part of a review series that looks at trends in modern biology. This book covers aspects of bioprocessing and biotransformation, where knowledge, methods and expertise are required from chemistry, biochemistry, microbiology, genetics, chemical engineering and computer science.

Microalgae-Based Biofuels and Bioproducts

Microalgae are a valuable resource of carbon materials that may be used in biofuels, pharmaceuticals, cosmetics, and health supplements. There are, however, many challenges in the microalgae production process, such as mass cultivation, strain improvement, biomass disruption, and reprocessing of nutrients and water that have been encumbering the microalgal industry. Microalgal biotechnology has the capability to introduce remarkable breakthroughs and innovations. This volume highlights current advancements in the field of microalgal biotechnology. The key features of the book: • Presents the role of microalgae in various industries, including food, agriculture, aquaculture, biofuel, and metabolites • Shows the historical and prospective uses of microalgae elements for economic and ecological benefits • Explains the integrated technologies for massive production of microalgae-derived products • Includes industrial case studies that illustrate sustainable production of microalgae products • Discusses current developments and advances in microalgae bioprocessing

Biotechnology of Algae

This book offers a comprehensive review of the latest developments, challenges and trends in C1-based (one-carbon based) bioproduction, and it presents an authoritative account of one-carbon compounds as promising alternative microbial feedstocks. The book starts with a perspective on the future of C1 compounds as alternative feedstocks for microbial growth, and their vital role in the establishment of a sustainable circular carbon economy, followed by several chapters in which expert contributors discuss about the recent strategies and address key challenges regarding one or more C1 feedstocks. The book covers topics such as acetogenic production from C1 feedstocks, aerobic carboxydrotrophic bacteria potential in industrial biotechnology, bioconversion of methane to value-added compounds, combination of electrochemistry and biology to convert C1 compounds, and bioprocesses based on C1-mixotrophy. Particular attention is given to the current metabolic engineering, systems biology, and synthetic biology strategies applied in this field.

History and Trends in Bioprocessing and Biotransformation

This comprehensive book details the most recent advances in the microalgae biological sciences and engineering technologies for biomass and biofuel production in order to meet the ongoing need for new and affordable sources of food, chemicals and energy for future generations. The chapters explore new

microalgae cultivation techniques, including solid (biofilm) systems, and heterotrophic production methods, while also critically investigating topics such as combining wastewater as a source of nutrients, the effect of CO₂ on growth, and converting biomass to methane through anaerobic digestion. The book highlights innovative bioproduct optimization and molecular genetic techniques, applications of genomics and metabolomics, and the genetic engineering of microalgae strains targeting biocrude production. The latest developments in microalgae harvesting and dewatering technologies, which combine biomass production with electricity generation, are presented, along with detailed techno-economic modeling. This extensive volume was written by respected experts in their fields and is intended for a wide audience of researchers and engineers.

Microalgal Biotechnology

With the high interest in renewable resources, the field of algal biotechnology has undergone a huge leap in importance in recent years. The book *Microalgae Biotechnology - Integration and Economy* treats integrated approaches to bring the high potential of microalgae into application, accelerate the development of really working production processes and put finally the products on the market. Close interaction of biology and process engineering becomes visible in the described processes. The big impact of microalgal biotechnology on our future society is outlined as a desirable consequence of scientific progress. This book will allow protagonists in academia and industry as well as decision makers in industry and politics to get a clear picture of current possibilities and future trends in microalgal biotechnology.

One-Carbon Feedstocks for Sustainable Bioproduction

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Biomass and Biofuels from Microalgae

Microalgal Biotechnology: Integration and Economy

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