Spirulina platensis (Arthrospira): Physiology, Cell-biology and Biotechnology

Edited by Avigad Vonshak



<u>Spirulina Platensis Arthrospira Physiology Cell Biology</u> <u>And Biotechnology</u>

Brian A. Whitton

Spirulina Platensis Arthrospira Physiology Cell Biology And Biotechnology:

Spirulina Platensis Arthrospira Avigad Vonshak, 1997-05-21 This text contains detailed descriptions of both the biology and the biotechnological uses of Spirulina Platensis a blue green algae which has been recognized and used worldwide as a traditional source of protein in the food **Algal Culturing Techniques** Robert A. Andersen, 2005-01-21 A comprehensive reference on all aspects of the isolation and cultivation of marine and freshwater algae Cyanobacteria B.A. Whitton, M. Potts, 2007-05-08 Cyanobacteria make a major contribution to world photosynthesis and nitrogen fixation but are also notorious for causing nuisances such as dense and often toxic blooms in lakes and the ocean The Ecology of Cyanobacteria Their Diversity in Time and Space is the first book to focus solely on ecological aspects of these organisms Its twenty two chapters are written by some thirty authors who are leading experts in their particular subject The book begins with an overview of the cyanobacteria or blue green algae for those who are not specialists then looks at their diversity in the geological record and goes on to describe their ecology in present environments where they play important roles Why is one of the key groups of organisms in the Precambrian still one of the most important groups of phototrophs today The importance of ecological information for rational management and exploitation of these organisms for commercial and other practical purposes is also assessed Accounts are provided of nuisances as well as the ecology of the commercially successful Spirulina and the role of cyanobacteria in ecosystem recovery from oil pollution Many chapters include aspects of physiology biochemistry geochemistry and molecular biology where these help general understanding of the subject In addition there are three chapters dealing specifically with molecular ecology Thirty two pages of colour photos incorporate about seventy views and light micrographs These features make the book valuable to a wide readership including biologists microbiologists geologists water managers and environmental consultants The book complements the highly successful The Molecular Biology of Cyanobacteria already published by Kluwer Blue Biotechnology Stephane La Barre, Stephen S. Bates, 2018-09-06 With its integral treatment of ecosystem and resource management this is the only overview of the field to address current thinking and future trends All contributions have been written with the novice in mind explaining the basics and highlighting recent developments and achievements Unmatched in scope this two volume reference covers both traditional and well established areas of marine biotechnology such as biomass production alongside such novel ones as biofuels biological protection of structures and bioinspired materials In so doing it ties together information usually only found in widely dispersed sources to assemble a grand unified view of the current state of and prospects for this multi faceted discipline The combination of the breadth of topics and the focus on modern ideas make this introductory book especially suitable for teaching purposes and for guiding newcomers to the many possibilities offered by this booming field

Spirulina in Human Nutrition and Health M. E. Gershwin, Amha Belay, 2007-10-08 Astonishingly rich in nutrients Spirulina is one of the most popular and well researched functional foods in the multi billion dollar global food supplement

market This ancient species provides readily bioavailable protein along with carotenoids essential fatty acids vitamins and Ecology of Cyanobacteria II Brian A. minerals and has therapeutic applications in non communicable di Whitton, 2012-07-05 Cyanobacteria have existed for 3 5 billion years yet they are still the most important photosynthetic organisms on the planet for cycling carbon and nitrogen The ecosystems where they have key roles range from the warmer oceans to many Antarctic sites They also include dense nuisance growths in nutrient rich lakes and nitrogen fixers which aid the fertility of rice fields and many soils especially the biological soil crusts of arid regions Molecular biology has in recent years provided major advances in our understanding of cyanobacterial ecology Perhaps for more than any other group of organisms it is possible to see how the ecology physiology biochemistry ultrastructure and molecular biology interact This all helps to deal with practical problems such as the control of nuisance blooms and the use of cyanobacterial inocula to manage semi desert soils Large scale culture of several organisms especially Spirulina Arthrospira for health food and specialist products is increasingly being expanded for a much wider range of uses In view of their probable contribution to past oil deposits much attention is currently focused on their potential as a source of biofuel Please visit http extras springer com to view Extra Materials belonging to this volume This book complements the highly successful Ecology of Cyanobacteria and integrates the discoveries of the past twelve years with the older literature Handbook of Microalgal Culture Amos Richmond, Qiang Hu, 2013-04-03 Algae are some of the fastest growing organisms in the world with up to 90% of their weight made up from carbohydrate protein and oil As well as these macromolecules microalgae are also rich in other high value compounds such as vitamins pigments and biologically active compounds All these compounds can be extracted for use by the cosmetics pharmaceutical nutraceutical and food industries and the algae itself can be used for feeding of livestock in particular fish where on going research is dedicated to increasing the percentage of fish and shellfish feed not derived from fish meal Microalgae are also applied to wastewater bioremediation and carbon capture from industrial flue gases and can be used as organic fertilizer So far only a few species of microalgae including cyanobacteria are under mass cultivation The potential for expansion is enormous considering the existing hundreds of thousands of species and subspecies in which a large gene pool offers a significant potential for many new producers Completely revised updated and expanded and with the inclusion of new Editor Qiang Hu of Arizona State University the second edition of this extremely important book contains 37 chapters Nineteen of these chapters are written by new authors introducing many advanced and emerging technologies and applications such as novel photobioreactors mass cultivation of oil bearing microalgae for biofuels exploration of naturally occurring and genetically engineered microalgae as cell factories for high value chemicals and techno economic analysis of microalgal mass culture This excellent new edition also contains details of the biology and large scale culture of several economically important and newly exploited microalgae including Botryococcus Chlamydomonas Nannochloropsis Nostoc Chlorella Spirulina Haematococcus and Dunaniella species strains Edited by Amos Richmond and Qiang Hu each with a huge

wealth of experience in microalgae its culture and biotechnology and drawing together contributions from experts around the globe this thorough and comprehensive new edition is an essential purchase for all those involved with microalgae their culture processing and use Biotechnologists bioengineers phycologists pharmaceutical biofuel and fish feed industry personnel and biological scientists and students will all find a vast amount of cutting edge information within this Second Edition Libraries in all universities where biological sciences biotechnology and aquaculture are studied and taught should all have copies of this landmark new edition on their shelves Advances in Biofeedstocks and Biofuels, Liquid Biofuel **Production** Lalit Kumar Singh, Gaurav Chaudhary, 2019-05-16 Biofuels production is one of the most extensively studied fields in the energy sector that can provide an alternative energy source and bring the energy industry closer to sustainability Biomass based fuel production or renewable fuels are becoming increasingly important as a potential solution for man made climate change depleted oil reserves and the dangers involved with hydraulic fracturing or fracking The price of oil will always be volatile and changeable and so long as industry and private citizens around the world need energy there will be a need for alternative energy sources The area known as biofuels and biofeedstocks is one of the most important and quickly growing pieces of the energy pie Biofuels and biofeedstocks are constantly changing and new processes are constantly being created changed and improved upon The area is rapidly changing and always innovative It is important therefore that books like the volumes in this series are published and the information widely disseminated to keep the industry informed of the state of the art This third volume in the Advances in Biofeedstocks and Biofuels series focuses on the production of liquid biofuel covering all of the major biofuels such as biodiesel biobutanol bioethanol and others This engaging text touches on all of the most important new processes and technologies providing the most up to date coverage of the science available to industry It is a must have for any engineer or scientist working with biofuel technology

Microbial Resources for Sustainable Energy Basanta Kumara Behera, Ajit Varma, 2016-06-15 This book sheds new light on how microbes can be used as effective and sustainable resources to produce green energy in the form of biogas algal diesel ethanol hydrogen and direct electricity. It discusses topics such as microbial energy conversion technologies including ethanol production by microbial catalytic reaction biomethanization biodiesel from microalgae microbial fuel cells and the microbiological production of hydrogen. The book will inspire scientists to find new approaches to meet local energy demands with the help of sustainable microbial resources available in and around a given location. Fatty Acids Angel.

Catala, 2017-06-21 The purpose of this book is to concentrate on recent developments on fatty acids. The articles collected in this book are contributions by invited researchers with a long standing experience in different research areas. We hope that the material presented here is understandable to a broad audience not only scientists but also people with general background in many different biological sciences. This volume offers you up to date expert reviews of the fast moving field of fatty acids. The book is divided into four major sections. 1 Fatty Acids in Physiopathology. 2 Fatty Acids and Cancer. 3 Fatty

Acids in Aquatic Organisms and 4 Fatty Acids in Veterinary and Dairy Products Sustainable Industrial Wastewater Treatment and Pollution Control Maulin P. Shah, 2023-06-27 This book summarizes the advanced sustainable trends in removing toxic pollutants by environmental and biotechnological processes from both industrial wastewater and sewage wastewater The book also provides an assessment of the potential application of several existing wastewater bioremediation techniques and introduces new cutting edge technologies Among other valuable information covered here are the methods procedures materials especially low cost materials originating from industrial and agricultural waste management of wastewater containing toxic pollutants and valorization possibilities of waste resulting from the removal of toxic pollutants from wastewater Tonnes of hazardous waste pollutants released by industries are a challenge worldwide With the ever growing population and shrinking landfill areas managing the disposal of pollutants is a matter of severe concern Industrial wastewater treatment recycling and reuse are serious issues in today s context not just to protect the environment from pollution but also to conserve water resources so that water stress is reduced This book is designed for engineers scientists and other professionals and serves as a good summary of the current state of the art and innovative research challenges to Cyanobacteria Naveen K. Sharma, Ashawani K. Rai, Lucas J. Stal, 2013-11-22 control pollution for coming generations Written by leading experts in the field Cyanobacteria An Economic Perspective is a comprehensive edited volume covering all areas of an important field and its application to energy medicine and agriculture Issues related to environment food and energy have presented serious challenge to the stability of nation states Increasing global population dwindling agriculture and industrial production and inequitable distribution of resources and technologies have further aggravated the problem The burden placed by increasing population on environment and especially on agricultural productivity is phenomenal To provide food and fuel to such a massive population it becomes imperative to find new ways and means to increase the production giving due consideration to biosphere s ability to regenerate resources and provide ecological services Cyanobacteria are environment friendly resource for commercial production of active biochemicals drugs and future energy biodiesel bioethanol and hydrogen Topics on isolation identification and classification of cyanobacteria are discussed as well as further sections on summarizing a range of useful products synthesized by cyanobacteria ecological services provided by cyanobacteria including their harmful effect in water bodies and associated flora and fauna Chapter on tools techniques and patents also focus on the economic importance of the group This book also provides an insight for future perspectives in each particular field and an extensive bibliography This book will be a highly useful resource for students researchers and professionals in academics in the life sciences including microbiology and biotechnology **Superfood and Functional Food** Naofumi Shiomi, Viduranga Waisundara, 2017-02-22 Superfoods and functional foods are receiving increasing attention because of their important roles in health This book focuses on the production of superfoods and functional foods and their role as medicine In the early chapters prominent researchers introduce the roles and production of microalgae and functional fruits through metabolic engineering the use of food waste and effective cooking procedures In the latter chapters other prominent researchers introduce the medical effects of polyphenols glutamine and unsaturated fatty acids which are contained in superfoods and functional foods They suggest the importance of superfoods and functional foods in the treatment and prevention of many diseases It is also recommended for readers to take a look at a related book Superfood and Functional Food An Overview of Their Processing and Utilization Microalgal Biotechnology Ajam Shekh, Peer Schenk, R Sarada, 2021-05-10 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 Aquaculture Zainal Muchlisin, 2012-01-27 This book provides an understanding on a large variety of aquaculture related topics The book is organized in four sections The first section discusses fish nutrition second section is considers the application of genetic in aquaculture section three takes a look at current techniques for controlling lipid oxidation and melanosis in Aquaculture products The last section is focused on culture techniques and management which is the larger part of the book The book chapters are written by leading experts in their respective areas Therefore I am quite confident that this book will be equally useful for students and professionals in aquaculture and biotechnology Handbook of Food and Feed from Microalgae Eduardo Jacob-Lopes, Maria Isabel Queiroz, Mariana Manzoni Maroneze, Leila Queiroz Zepka, 2023-06-09 Handbook of Food and Feed From Microalgae Production Application Regulation and Sustainability is a comprehensive resource on all aspects of using microalgae in food and feed This book covers applied processes including the utilization of compounds found in microalgae the development of food products with microalgae biomass in their composition the use of microalgae in animal nutrition and associated challenges and recent advances in this field Written by global leading experts in microalgae this book begins with the fundamentals of food and feed including microalgal biodiversity biogeography and nutritional purposes The book continues to describe compounds found within microalgae such as proteins pigments and antioxidants It explains the process incorporation of microalgae into meat dairy beverage and wheat products as well as real world food applications in finfish aquaculture mollusk poultry and pet feeding The book concludes by

discussing challenges and issues in the field encompassing bioavailability bio accessibility and how to address safety regulatory market economics and sustainability concerns This book is a valuable resource for aquaculturists food scientists and advanced undergraduate and graduate students interested in microalgae as a sustainable food and feed ingredient Examines current data behind the food and feed production using microalgae based processes Analyzes and details the use of microalgae across industries and disciplines Addresses and offers solutions to safety market sustainability and economic 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 productionExplains th **Biotechnology of Bioactive Compounds** Vijai Kumar Gupta, Maria G. Tuohy, Anthonia O'Donovan, Mohtashim Lohani, 2015-01-22 Bioactive compounds play a central role in high value product development in the chemical industry Bioactive compounds have been identified from diverse sources and their therapeutic benefits nutritional value and protective effects in human and animal healthcare have underpinned their application as pharmaceuticals and functional food ingredients. The orderly study of biologically active products and the exploration of potential biological activities of these secondary metabolites including their clinical applications standardization quality control mode of action and potential biomolecular interactions has emerged as one of the most exciting developments in modern natural medicine Biotechnology of Bioactive Compounds describes the current stage of knowledge on the production of bioactive compounds from microbial algal and vegetable sources In addition the molecular approach for screening bioactive compounds is also discussed as well as examples of applications of these compounds on human health The first half of the book comprises information on diverse sources of bioactive compounds ranging from microorganisms and algae to plants and dietary foods The second half of the book reviews synthetic approaches as well as selected bioactivities and biotechnological and biomedical potential The bioactive compounds profiled include compounds such as C phycocyanins glycosides phytosterols and natural steroids An overview of the usage of bioactive compounds as antioxidants and anti inflammatory agents anti allergic compounds and in stem cell research is also presented along with an overview of the medicinal applications of plant derived compounds Biotechnology of Bioactive Compounds will be an informative text for undergraduate and graduate students of bio medicinal chemistry who are keen to explore the potential of bioactive natural products It also provides useful information for scientists working in various research fields where natural Microalgal Production for Biomass and High-Value Products Stephen P. Slocombe, John R. products have a primary role Benemann, 2017-12-19 Microalgae are a particularly interesting source of products that range from currently marketed human nutritionals and food ingredients to potential sources of biofuels and animal feeds Rapid advances in technology and commercial development are taking place worldwide Importantly algal cultivation does not compete with agriculture for land

water and in some cases fertilizer resources Microalgal Production for Biomass and High Value Products covers the field from a variety of perspectives with 14 chapters contributed by recognized academic experts and industrial practitioners The book presents the latest technologies and innovations in algal biomass production from cultivation in open ponds and photobioreactors to strain selection synthetic biology pest control harvesting and processing It explores novel algal products and addresses key issues including markets supply chains business strategies legal issues current products and future prospects This book brings together the latest advances of interest to those already working in the field while providing an introduction to those beginning to learn about the promise of microalgae as a sustainable source of both specialty and commodity products It gives stimulating overviews from many different perspectives that describe how laboratory and applied research are creating advances in commercial microalgae production It also addresses the still many open questions and challenges in this field **Industrial Exploitation of Microorganisms** R. Saravanamurthu, 2013-12-30 This book embodies 21 review articles contributed by subject experts of various areas of industrial microbiology. The articles are devoted to pharma industries food and enzyme industries textile industry agro industry and cottage industry Yeast is one of the important microorganisms which have been used to produce beverages alcohols and fermented food commodities for a very long time In recent years it has been the first choice among eukaryotes to use in recombinant technology Yeast and Spirulina are being used and marketed as Single Cell Protein SCP Mushrooms have been used by humans down the ages In addition to a rich source of mycoprotein they have medicinal values also against many ailments Number of bioactive novel compounds is increasing with the discovery of microbial species and newer groups of microorganisms Some chapters are devoted to microbial bioinoculants used as biofertilizers because they are rich source of nitrogen and phosphorus for both legumes and non legumes They are being manufactured and sold in market with different trade names In addition several microbial enzymes have been produced and commercialized by various industries but highly active and potential enzymes produced through recombinant DNA technology hold much importance For example microbial proteases find application in detergent leather food and pharma industries and provide eco friendly technology for bioremediation Laccase has been worked out to be a good tool for bioremediation of non degradable wastes and xenobiotic chemicals Besides laccase based biosensors have also been constructed which can be used for phenol determination monitoring of lignin and plant flavonoids Various microbial phytases as feed supplemented have been used in freshwater and marine aquaculture for improving the growth performance of fishes Nowadays aquaculture is growing rapidly to meet increasing food demand throughout the world for high quality fish More than 16 000 bioactive compounds have been isolated from actinomycetes alone including antibiotics enzymes vitamins amino acids siderophores and nanoparticles Biosynthesis of nanoparticles by bacteria actinomycetes and algae has been reported and work is being done nationally and internationally

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