

Microalgae

Current Research and Applications



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Microalgae, also known as phytoplankton, are abundant microorganisms, which are found in freshwater and marine environments. Phytoplankton are critical to global biogeochemistry since they produce the bulk of oxygen on Earth through photosynthesis. They form the base of the marine food web and are primary producers of organic carbon. Microalgal species can synthesize high value chemical products, such as carotenoids, antioxidants, fatty acids, and sterols. Most recently, microalgae have become an attractive raw material of biofuel, in the form of biodiesel.

In this concise book, expert authors describe the latest research and newest approaches to the study of these important organisms, as well as covering the more traditional methods such as morphotaxonomy. The reader is first provided with practical information on cultivation of phytoplankton, growth media and division rates for different algal species, optical techniques and automated instrumentation, such as flow cytometry. Furthermore, methods and approaches to study gene expression and regulation in phytoplankton are reviewed. A separate chapter is dedicated to the discussion of algal blooms and their effects on local environments. Coccolithophore *Emiliana huxleyi* and bioluminescent microalgae are thoroughly reviewed by experts in those fields. Finally, this book reviews the state-of-the-art of microfluidic and *in situ* sensors for phytoplankton identification.

This volume is an authoritative and contemporary review of current research on microalgae. It could be an indispensable tool for anyone working in this field, or who wishes to learn more about these microorganisms.

Chapter 1. Introduction (*Maria-Nefeli Tsaloglou and Carmelo R. Tomas*)

Chapter 2. The Cultivation of Marine Phytoplankton (*Maria G.S. Jutson, Richard K. Pipe and Carmelo R. Tomas*)

Chapter 3. Phytoplankton Gene Expression (*John H. Paul*)

Chapter 4. Marine Microalgae and Harmful Algal Blooms: A European Perspective (*Johanne Arff and Belén Martín Miguez*)

Chapter 5. *Emiliana huxleyi* in the Genomic Era (*Bethan M. Jones, Mónica Rouco, M. Débora Iglesias-Rodríguez and Kimberly H. Halsey*)

Chapter 6. Bioluminescent Microalgae (*Martha Valiadi, Charlotte L. J. Marcinko, Christos M. Loukas and M. Débora Iglesias-Rodríguez*)

Chapter 7. Microfluidics and *in situ* Sensors for Microalgae (*Maria-Nefeli Tsaloglou*)

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