

Special Issue on
Advanced Microalgae Biorefinery

CALL FOR PAPERS

Microalgae, unicellular microorganisms, capable of photosynthesis, have received considerable interest as a sustainable feedstock for chemical, food, feedstock, and material and fuel industries. Despite highly potential (e.g., high productivity, adaptability to diverse environmental conditions, ability to sequester carbon dioxide, and utilizing wastewater as a nutrients source), commercial cultivation technology is only a reality with few strains (*Spirulina* and *Chlorella*) for high-value, low volume food supplements and nutraceuticals, whereas high microalgal biomass production cost has been a major obstacle for commercialization of bulk chemicals such as biofuels. In fact, development of algal biomass production technology remains in its infancy.

Successful commercialization of microalgal cultivation technology will require the development of strains, conditions, and reactor system for culture that allow rapid production of biomass with minimal growth of competing strains (e.g., grazers and pathogens). Regarding strain development, a multidisciplinary approach such as system biology and metabolic engineering is necessarily applied, although it is a hard work, to achieve desirable strains. Reduction of culturing fertilizer cost by coupling cultivation of microalgal in wastewater for simultaneous nutrients (C, N, and P)/pollutants (CO₂) removal and biomass cogeneration is also considered as a feasible solution for reducing cultivation capital expenditures (CAPEX). The aspect of harvesting cells is an important economic factor needs to be taken into account, as it was estimated that harvesting algal cells can account for 20-30% of the total biomass production cost. Therefore, a significant engineering research effort aimed at developing cost-effective algal harvesting techniques will be required. Moreover, efficient conversion and more completion and valorization of all algal cellular components (e.g., lipids, proteins, carbohydrates, pigments, vitamins, and antioxidants) to produce different classes of products can significantly reduce production cost of algae-based industries. Innovation and industry collaboration efforts, however, are needed to develop microalgae biorefinery into a commercial activity for bulk products. To this end, an integrated biorefinery, coproducing commodity chemicals, a low-value high-volume product, with other value-added products such as protein, reduced sugar, and polar lipid, which are of low volume and high value, is reliable direction of microalgae-based industries.

Therefore, the present special issue invites research and review articles pertaining to advances in research and practice for exploitation of microalgae technologies from strain improvement to end product development along with its use for resolving environmental problems and building a sustainable society.

Potential topics include but are not limited to the following:

- ▶ Advances in microalgae strain improvement (e.g., isolation of extremophile microalgae)
- ▶ Advances in autophototrophic/heterotrophic/mixotrophic cultivation of microalgae for biomass production (e.g., microalgal polyculture and microalgae-bacteria consortia)
- ▶ Advanced CO₂ sequestration using microalgae
- ▶ Wastewater treatment and biomass cogeneration using microalgae
- ▶ Controlling biological contaminants in algae cultivation systems
- ▶ Algal harvesting and extraction systems
- ▶ Synthetic biology/metabolic engineering/genetic engineering for engineering microalgal cells for targeted product production (e.g., lipids)
- ▶ Conversion technology of algal biomass to commodity chemicals (e.g., biodiesel and ethanol) and bioproducts (e.g., nutraceuticals, pharmaceuticals, animal feed, and plastics)
- ▶ Technoeconomic, life cycle, and resource assessments of systems and processes using algae as a main source of biomass

Authors can submit their manuscripts through the Manuscript Tracking System at <https://mts.hindawi.com/submit/journals/scientifica/biotechnology/ambr/>.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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