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Modern Advancement in Biotechnological Applications for Wastewater Treatment through Microalgae: a Review

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Abstract Microalgae are microscopic organisms that have a broad range of applications, from wastewater treatment, CO_2 mitigation to therapeutic proteins, and pharmaceuticals. Recently, the combination of wastewater treatment-based microalgae and the use of the obtained biomass as biofertilizers/stimulants/pesticides have been highly emphasized for their use in the agriculture field. Biofertilizers are a need of today's agriculture practices due to the increasing demand for food to feed a hungry planet while avoiding chemical contamination by the over-application of synthetic fertilizers. There is a constant need for modern techniques for the use of microalgae in a sustainable manner to harness their products to their full extent. Various types of bioreactors are available on the market, each with its own advantages and disadvantages, which, based on their efficiency, can be used for microalgae cultivation. This review aims at reporting recent developments in microalgae biotechnology, especially related to CO_2 mitigation, wastewater purification, biofuel, feedstock, future food, therapeutic proteins, pharmaceuticals, and biofertilizers, highlighting some of the current research in this field and future development priorities.

Keywords Biofertilizers · Feedstock and future food · Microalgae · Pharmaceuticals · Wastewater treatment

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