


Review

Microalgae-Enabled Wastewater Treatment: A Sustainable Strategy for Bioremediation of Pesticides

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Abstract: Pesticides have been identified as major contaminants of various waterways. Being classified as potential endocrine disrupting compounds, pesticides in aqueous system are highly hazardous to aquatic organisms and the ecosystem. The treatment of pesticide-containing wastewater can be performed through several means, but a wastewater treatment strategy which emphasizes both treatment efficiency and sustainability is a necessity of current time. In this context, bioremediation has been increasingly promoted as an alternative technique for the remediation of diverse pollutants. Particularly, bioremediation which involves the utilization of microalgae for the removal or conversion of pesticides to the harmless or less harmful compounds is becoming a trend. Exploiting microalgae as a tool for wastewater treatment presents multiple advantages over conventional treatment technologies, which include an opportunity to simultaneously treat pesticide-containing wastewater and nutrient recovery for microalgae cultivation as well as less formation of toxic sludge. This review discusses the roles of microalgae in mitigating pesticide pollution issue, while offering an opportunity for nutrient recovery from various wastewater sources. Based on the current laboratory studies, the use of microalgae bioremediation as a promising strategy for pesticide treatment has been rationalized. The establishment of more pilot scale studies is highly encouraged to further facilitate the implementation of this treatment approach for practical application.

Keywords: microalgae; pesticide; bioremediation; wastewater treatment



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1. Introduction