

Title:

Can algal biotechnology bring effective solution for closing phosphorus cycle?

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Abstract:

Eutrophication of water by nutrient pollution represents global environmental issue. High concentrations of phosphorus contribute to the process of eutrophication, resulting in the demand for effective and economic methods of phosphorus removal from treated water. The aim of presented research was to evaluate the capacity for phosphorus removal of a microalgal biofilm under light conditions consistent with the temperate climate of Central Europe. Moreover, next goal was to estimate the comprehensive benefit of the presented technology, including biomass production. Our study demonstrates the ability of an algal biofilm to remove phosphorus from municipal wastewater. The algal biofilm was able to remove 99% of phosphorus within 24 hours of P addition, with the $\text{PO}_4\text{-P}$ concentration in inflowing water ranging from 3 to 10 $\text{mg}\cdot\text{L}^{-1}$. Constructed biofilm system has a high efficiency for phosphorus removal and, therefore, has great potential for integration into wastewater treatment processes.