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Microalgal Biomass Harvesting using Sewage Sludge Cultivated in Hydroponics Effluent

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ABSTRACT

The residual nutrient-rich hydroponics effluents pose severe challenges to the environment, including eutrophication. Treatment using conventional processes are neither sustainable nor economical in terms of nutrient removal. Because hydroponics effluents contain 126 mg L⁻¹ of nitrate and 130 mg L⁻¹ of phosphate, while the concentration of organic matter is relatively poor *i.e.*, 51 mg L⁻¹. Leveraging microalgae not only holds hydroponics effluent treatment but also effectively assimilate nutrients within their body and converts them into biochemical-rich biomass via photocatalytic reaction. Despite its potential, the efficient separation of microalgal biomass from hydroponics effluent is a significant challenge. Thus, in this study, we have explored hydroponics effluent as a growth media for *Scenedesmus obliquus*, and biomass separation using sewage sludge. According to our findings, *S. obliquus* could take up 75.9 % nitrate, 80.8 % phosphate, and 66.7% ammonia from hydroponics effluent. Besides, the residual biomass was easily separated by adding sewage sludge within 12 hours without the addition of any flocculant. Overall, this streamlined approach enhances nutrient removal efficiency and simplifies the biomass harvesting process, offering a practical and sustainable solution for hydroponics effluent treatment and biomass recovery.

Keywords: Microalgae, Hydroponics effluent, *Scenedesmus obliquus*, Sewage sludge

