



Microalgae biomass and lipid production using primary treated wastewater

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ABSTRACT

The outdoor algal cultures are common in wastewater treatment, but the selection and investigation of microalgae species for efficient nutrient removal are more demanding, nowadays. The autochthonous algae are well adapted to the local environmental conditions, which may result in more efficient nutrient removal. This paper evaluates the potential of autochthonous microalgae for the removal of organics and nutrients from primary effluent and biomass production. The process parameters were investigated under batch, fill and draw, and continuous operation mode, at two different radiation intensities (100 and 200 $\mu\text{mol}/\text{m}^2\text{s}$). The maximum biomass concentration (450 mg/L) was observed in the continuous operation mode. Phosphate concentration in the influent ranged from 0.60 to 1.57 mg P/L, while in the effluent was, in most cases, almost zero and was the limiting factor for algal growth. The growth rate of microalgae and their lipid content were depended on the concentration of nutrients in the influent. Specifically, the nitrates in the influent ranged from 0.47 to 20.87 mg NO_3^-/L and were the main factor for the algal lipid content. The highest lipid content was observed when the system was operated in continuous mode with low nutrient content of wastewater and was up to 15% of the dry weight.

Keywords: Microalgae; Primary treated wastewater; Lipid production; Nutrient removal

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