Nutrient removal of nursery and municipal wastewater using *Chlorella vulgaris* microalgae for lipid extraction

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**ABSTRACT**

Microalgae grown in wastewater media can not only be exploited for the nutrient removal from the wastewater, but also for the production of biofuels. In this paper, we investigated the growth of *Chlorella vulgaris* in iceberg lettuce nursery and municipal wastewater in a batch reactor. We analyzed the microalgal growth rate, nutrient removal rate and lipid production along with real-time monitoring of pH and dissolved oxygen (DO) dynamics during the culture period, which is rarely reported. NH\(_4\)-N was found to be the preferred form of nitrogen among different species of nitrogen for the growth of microalgae, and total specific nitrogen depletion rates of 33.0 and 39.6 mg TN/g SS/d were observed for nursery and municipal wastewater, respectively. The specific phosphate removal rates were 3.4 and 10.8 mg PO\(_4\)-P /g SS/d for nursery and municipal wastewater, respectively. The algal growth in nutrient-rich media resulted in increase in pH and DO concentration concurrently. The online measurements including pH and DO proved to be real-time indicators of algal growth not only during the different stages of culture period but also during dark and light hours in a day indicating definite variations in measured values depicting the photosynthesis dynamics.

**Keywords:** Microalgae; *Chlorella vulgaris*; Nutrient removal; Online-monitoring; Wastewater; Biofuel

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