

Bio-Recovery of N and P from an Anaerobic Digester Effluent: The Potential of Duckweed (*Lemna minor*)

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Abstract

The possibility of growing duckweed (*Lemna minor*) on anaerobic digester effluent and its nitrogen and phosphorus acquisition potential was studied. Duckweed was cultured for 21 days on an anaerobic digester effluent using two methods: static aeration (SAT) and normal batch reactor (NBR) techniques, respectively. The treatments involved pure effluent and 1/10, 1/25 and 1/50 effluent dilutions, respectively. Fifty duckweed fronds were grown in the anaerobic digester effluent for 21 days. At the end of the growth period, phosphate levels, total ammonium nitrogen (TAN) and total oxidized nitrogen (TON) contents of the growth media were determined. Total nitrogen concentration and orthophosphate P content in the duckweed were also determined. The results obtained indicated that duckweed was capable of growing on the anaerobic digester effluent provided its TAN content did not exceed 42 mg N l⁻¹. Nitrogen uptake by the duckweed from the effluent ranged between 53 and 115.7 mg l⁻¹ whereas P uptake varied from 1.40 to 8.4 mg P l⁻¹. The relative growth rate of duckweed in the anaerobic digester effluent was observed to be comparable to literature value of 0.22 mg day⁻¹. The results have demonstrated that duckweed has the potential to recover N and P from anaerobic digester effluent.