

Removal of nitrogen and phosphorus from agro-industrial wastewater by using microalgae collected from coastal region of peninsular Malaysia

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ABSTRACT

The potential of microalgae as a source of renewable energy based on wastewater has received increasing interest worldwide in recent decades. A freshwater microalga *Chlorella vulgaris* was investigated for its ability to remove both nitrogen and phosphorus from three industrial wastewaters which were diluted in microalgae in two different proportions (namely, 50% and 75%). *C. vulgaris* grew fastest under 75% palm oil mill, and showed an maximum cell density (0.408 ± 0.012 g/L) for Palm Oil Mill Effluent (POME) wastewater, followed by riboflavin manufacturing wastewater (0.402 ± 0.083 g/L), and fertilizer industrial wastewater (0.320 ± 0.074 g/L), indicating the levels of nitrogen and phosphorus greatly influenced algal growth. Low removal efficiency for total nitrogen (TN) ($11.35 \pm 0.07\%$ – $51.31 \pm 0.03\%$) and total phosphorus (TP) ($31.25 \pm 0.24\%$ – $93.62 \pm 0.16\%$) was observed. *C. vulgaris* grew well when TP concentration was very low, indicating that this might be not the limiting factor to algal growth. The results suggest the potential of removing nutrient from wastewater by microalgae cultivation as production feedstock

KEYWORDS

Chlorella vulgaris; Microalgae; Nutrients removal; N removal; P removal; Wastewater treatment

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