

INVESTIGATION OF THE POTENTIAL FOR USING SUGAR MILL WASTEWATERS TO MULTICULTURE RETENTION-POND PHYTOPLANKTON FOR BIOMASS AND LIPID PRODUCTION

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Wastewaters from sugar mills may have the potential to support algae biomass production for the making of bio-fuels, while receiving phytoremediation. This research provides information regarding the feasibility of this approach. This paper investigates three different scenarios using multicultures of sugar-mill pond phytoplankton by developing growth curves of biomass over time, determining maximum growth rates, and reporting extracted cell lipid content.

Lipid contents in the phytoplankton biomass were fairly consistent and moderately low but with the high observed maximum growth rates they may still be useable. The % dry wt biomass as lipid

content from the phytoplankton taken directly from the pond water was relatively close (9.4%) to that of the phytoplankton which was supplemented with Gillard's F/2 and CO₂ and cultured in a growth reactor (11.4%) (Figure 1). The phytoplankton in the second growth study, which was not supplemented, had lower lipid content (6.7%). The maximum growth rate of the culture in the first study (Figure 2) was 0.113 hr⁻¹ or 2.71d⁻¹, whereas, the culture of the second study had a maximum specific growth rate of 2.53 d⁻¹. Culture concentrations reached 1020 g dry wt biomass/m³. Remediation of P and biochemical oxygen demand (BOD₅) was also investigated.

As clean sources of energy are developing, low- priced microalgae biomass is in high demand. It will be important for the aquaculture industry to meet this demand in innovative ways. The use of endemic phytoplankton communities in sugar mills and other wastewater sources should be investigated further. This could result in conservation of nutrients and freshwater.

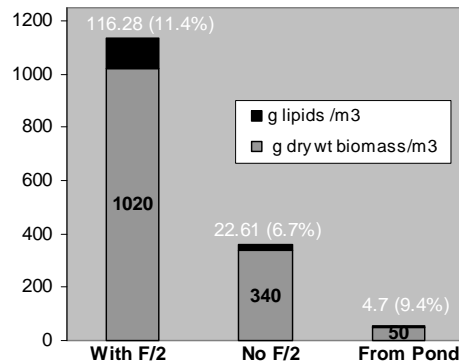


Figure 1. The lipid content in biomass of sugar mill pond phytoplankton in supplemented culture (with F/2), un-supplemented culture (no F/2), and taken directly from the pond.

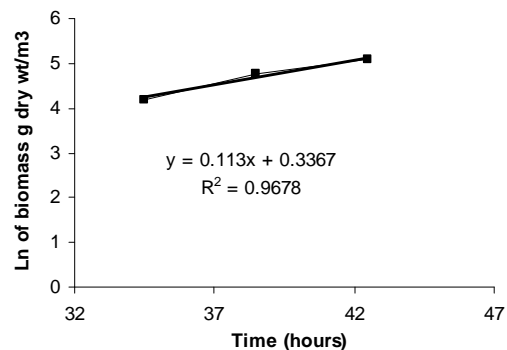


Figure 2. Maximum growth rate of sugar mill phytoplankton supplemented with F/2 nutrients and CO₂ and cultured in reactor.