

A comparative study of biocrude production from two marine microalgae biomass produced in a large-scale raceway pond

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Harvesting of microalgae biomass is a major obstacle for the low-value microalgal product (e.g., biofuel). Although most of the microalgae remain in the culture suspension, some microalgae exhibit a self-settling phenomenon in the absence of mixing. A self-settling microalga could, therefore, be an ideal candidate for biofuel feedstock. The present study investigated the biocrude oil production potential of two indigenous marine microalgae: *Chlorocystis* sp. (self-settling), and *Picochlorum* sp. (non-settling). Both these strains were grown simultaneously in 2 identical 25,000L open raceway ponds in the Qatari desert. Anabaena-type cyanobacteria were spotted in *Picochlorum* sp. culture on the 6th day and the biomass was harvested on 8th day using a centrifuge. After 10 days of cultivation, *Chlorocystis* sp. biomass was harvested using sedimentation. Harvested biomass samples were then converted to biocrude oil, using a 500mL Parr reactor. The biocrude yield (AFDW basis) of *Picochlorum* sp. and *Chlorocystis* sp. were 39.6 and 34.8% respectively. The energy content of the biocrude oil samples was 32.78 and 33.38MJ/kg for *Chlorocystis* sp. and *Picochlorum* sp. respectively. Both the strains were capable of efficiently recycling more than 95% of the HTL aqueous phase (AP) nitrogen when 50% of culture nitrogen was supplied as HTL AP. Although lower biocrude yield was obtained from *Chlorocystis* sp. biomass, compared to *Picochlorum* sp., harvesting of *Chlorocystis* sp. biomass would require much lower energy compared to *Picochlorum* sp. Therefore, a self-settling marine microalga (e.g., *Chlorocystis* sp.) could potentially be a better candidate, over non-settling microalgae, for producing biofuel feedstock.

Biography

Probir Das has completed his PhD on Environmental Engineering at the age of 30 years from the National University of Singapore. Before joining Qatar University as post-doctorate, he worked at ICES, A*STAR Singapore as a scientist for 2 years. Currently, he is a Research Assistant Professor in the 'Center for Sustainable Development' at Qatar University. His research interests include biofuel, bioremediation of wastewater, and high-value metabolite production using microalgae and cyanobacteria. He has published 18 papers in reputed international journals.

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