

Fungal Flocculation of Single Algae Species and Mixed Algal Communities

Authors : Digby Wrede, Stephen Gray, Syed Hussainy

Abstract : Microalgae are extremely useful organisms but notoriously hard to harvest. The use of fungal pellets has been found to be an efficient way to flocculate numerous species of algae. However, only the flocculation of single species of algae has been investigated. Algae are generally found in complex communities in the environment comprising of numerous species of algae ranging from simple single cell algae such as *Chlorella* to more complex or communal algae such as *Dictyosphaerium*. This study investigated the flocculation capabilities of *Aspergillus oryzae* to flocculate four species of algae; *Chlorella vulgaris*, *Scenedesmus quadricauda*, *Scenedesmus acuminatus* and *Dictyosphaerium* sp., and the algal communities in four different types of domestic effluent from a lagoon-based treatment plant; primary effluent, secondary effluent and the high rate algal pond effluent at a natural and at a lowered pH level. Spectrophotometry was used to measure the changes in algal population. *C. vulgaris*, *S. acuminatus* and *S. quadricauda*, had over 90% reduction of algal in suspension after 24 hours. *Dictyosphaerium* sp. showed a little to no removal after 24 hours. The primary, secondary, and natural pH level HRAP had roughly a 50% removal after 24 hours, the HRAP which was grown at a lower pH level had over a 90% removal after 24 hours. pH has been shown previously to affect fungal flocculation. Fungal and algae pellets have been shown to be able to treat wastewater and can be converted to biofuels in a very similar method to how algae are currently converted. The mixture of both fungi and algae has also been shown to provide a higher yield of oils then separately and are able to more efficiently treat wastewater then algae or fungi by themselves.

Keywords : algae harvesting, *Aspergillus oryzae*, fungal flocculation, wastewater treatment

Conference Title : ICABB 2018 : International Conference on Algae Biotechnology and Biofuels

Conference Location : Sydney, Australia

Conference Dates : March 29-30, 2018