

Mass Production of Endemic Diatoms in Polk County, Florida Concomitant with Biofuel Extraction

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Abstract : Algae are identified as an alternative source of biofuel because of their ubiquitous distribution in aquatic environments. Diatoms are unique forms of algae characterized by silicified cell walls which have gained prominence in various technological applications. Polk County is home to a multitude of ponds and lakes but has not been explored for the presence of diatoms. Considering the condition of the waters brought about by predominant phosphate mining activities in the area, this research was conducted to determine if endemic diatoms are present and explore their potential for low-cost mass production. Using custom-built photobioreactors, water samples from various lakes provided by the Polk County Parks and Recreation and from nearby ponds were used as the source of diatoms together with other algae obtained during collection. Results of the initial culture cycles were successful, but later an overgrowth of other algae crashed the diatom population. Experiments were conducted in the laboratory to tease out some factors possibly contributing to the die-off. Generally, the total biomass declines after two culture cycles and the causative factors need further investigation. The lipid yield is minimum; however, the high frustule production after die-off adds value to the overall benefit of the harvest.

Keywords : diatoms, algae, biofuel, lipid, photobioreactor, frustule

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