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S. cerevisiae Strains Co-Cultured with Isochrysis Galbana Create Greater Biomass for Biofuel Production than Nannochloropsis sp.

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Abstract : The increase in sustainable practices have encouraged the research and production of alternative fuels. New techniques of bio flocculation with the addition of yeast and bacteria strains have increased the efficiency of biofuel production. Fatty acid methyl ester (FAME) analysis in previous research has indicated that yeast can serve as a plausible enhancer for microalgal lipid production. The research hopes to identify the yeast and microalgae treatment group that produces the largest algae biomass. The mass of the dried algae is used as a proxy for TAG production correlating to the cultivation of biofuels. The study uses a model bioreactor created and built using PVC pipes, 8-port sprinkler system manifold, CO2 aquarium tank, and disposable water bottles to grow the microalgae. Nannochloropsis sp., and Isochrysis galbanawere inoculated separately in experimental group 1 and 2 with no treatments and in experimental groups 3 and 4 with each algaeco-cultured with Saccharomyces cerevisiae in the medium of standard garden stone fertilizer. S. cerevisiae was grown in a petri dish with nutrient agar medium before inoculation. A Secchi stick was used before extraction to collect data for the optical density of the microalgae. The biomass estimator was then used to measure the approximate production of biomass. The microalgae were grown and extracted with a french press to analyze secondary measurements using the dried biomass. The experimental units of Isochrysis galbana treated with the baker's yeast strains showed an increase in the overall mass of the dried algae. S. cerevisiae proved to be an accurate and helpful addition to the solution to provide for the growth of algae. The increase in productivity of this fuel source legitimizes the possible replacement of non-renewable sources with more promising renewable alternatives. This research furthers the notion that yeast and mutants can be engineered to be employed in efficient biofuel creation.

Keywords : biofuel, co-culture, S. cerevisiae, microalgae, yeast
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