

POSSIBILITY OF BIODIESEL PRODUCTION THROUGH SELECTED ALGAE SPECIES UNDER SRI LANKAN CONDITIONS

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Microalgal biofuels are currently considered to be the most promising alternative for future renewable energy source. The key to economic algal biomass production is to optimize the growth conditions. The two robust microalgae strains; *Nannochloropsis* sp. and *Chlorella* sp. were cultivated in Guillard and Ryther's modified F/2 media with different levels of Nitrate, Phosphate, salinity, light intensity and photo periods with the aim to obtain optimum conditions for biomass cultivation for biofuel production under Sri Lankan climatic conditions.

In general, there was a significant trend of increased percentage lipid content and decreased dry biomass weight with increasing N and P concentrations in the culture medium in both species. The best lipid productivity was achieved using KNO₃ or Urea as N source with 12.4 mg/L concentration and NaH₂PO₄ as P source in 1.3 mg/L concentration for *Nannochloropsis* sp. while NaNO₃ and KNO₃ in double of that N concentration (24.8 mg/L) is well suited for highest lipid yield in *Chlorella vulgaris*. *Nannochloropsis* sp. reported a significantly higher lipid yield of 0.13 g/ L, when cultured at higher salinities of 30 and 35 ppt. Salinities lower than 10 ppt reported significantly higher lipid yield of 0.12 g/ L for *Chlorella* sp. Further, it was found that the amount of light intensity affect significantly to the lipid yield of micro algae. The optimum photo period for culturing *Chlorella vulgaris* and *Nannochloropsis* sp. for lipid production, is to cultivate them with a light-dark cycle of 16:8 hour with 5 Klux light intensity.

Finally, the free fatty acid value of the lipid extracted from these two species of microalgae found to be in the recommended range for biodiesel production. Therefore, it is clear that *Nannochloropsis* sp. and *Chlorella* sp. can be successfully cultivated in Sri Lanka to produce biodiesel where the prevailing natural environmental conditions are ideal for their optimal growth.