

Potential of Lubricating Oil (MGALO) and organic Bio-fertilizer production from Marine Green Algae

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Abstract

Green seaweed *Euchuma rhodophyta*, *Ulva lactuca* and *Enteromorpha flexuosa* harvested from the Indian Ocean (Kenya) were characterized as feedstock for the production of lubricating oil and bio-fertilizer. *Euchuma rhodophyta* had the highest oil yields of 10.5% (g/g) followed by *Ulva lactuca* with 6.3% (g/g) and *Enteromorpha flexuosa* with 3% (g/g) from 100 g of algal biomass respectively. The average kinematic viscosity from all the three algae was 32 cst at 40°C suggesting a potential industrial application of the oils as lubricating base stock. Oil from the three marine algae had similar densities of 0.9132, 0.9136 and 0.9151 kg/L at 20°C though the oils were denser than the stipulated range of Shell Tellus Lubricating oils ranging between 0.8850kg/L-0.870kg/L. After oil extraction, the biomass was further converted into bio-fertilizer containing 10% potassium which is absent from many commercial fertilizers and rich in nitrogen (10%) and phosphorus (8%). We conclude that the three marine algae are potential source of bio-energy and bio-fertilizer and that industrial processing of the algae will be of significant economic and environmental advantage.

Key words: *Algae, Bio-fertilizer, Lubricating oil, Marine.*