

Abstract: A survey of microalgae biodiversity in three Kenyan Rift valley lakes identified high oil yielding species abundantly distributed naturally. The species were cultured in BBM and BG-11 media to obtain pure clones and lipids (oil) extracted by the Bligh and Dyer method. The peak lipid content ranged from 1.5 – 10.5% of algal biomass with *Chlorella* species showing the highest yields (10.5%), followed by *Euglena acus* (5.88%), *Nitzschia* (3.68%), *Ankistrodesmus falcatus* (1.58%) and *Scenedesmus acuminatus* (1.56 %). The algae oil extracted from *Chlorella* spp contained significantly higher polyunsaturated long chain fatty acids with docosatetraenoate (C22:4) and octadecatetraenoate (C18:4) to be the major components. On the other hand, algae oil from *Euglena* spp exhibited higher mono-unsaturated long chain fatty acids with erucate (C22:1) and eicosenoate (18:1) being the major components. This implies that algae oil from *Euglena* spp has a much higher degree of oxidative stability compared to *Chlorella* spp and has can be cultivated for biofuel.

Keywords: Microalgae, algae oil, biofuel, in Kenya