

## Abstract

With the depletion of oil resources as well as the negative environmental impact associated with the use of fossil fuels, there is a renewed interest in seeking alternative energy sources. The present study was conducted to determine the microalgae biodiversity in Kenyan aquatic environment and their potential in bio-fuel production. Microalgae species were collected from 3 lakes in Kenya (Lake Turkana, Baringo and Magadi) and identified morphologically. The abundant species were cultured in BBM and BG-11 media to obtain pure clones and lipids (oil) extracted by the Bligh and Dyer method. The results showed that the blue-green algae (Cyanophytes) were widespread and dominated the algal community in all the 3 lakes. However, Lake Turkana exhibited the highest species biodiversity, followed by Lake Magadi, while Lake Baringo had the least. Screening for lipid/oil content identified high oil yielding algae species abundantly distributed naturally in the Kenyan aquatic environment. The peak lipid content ranged from 1.5 – 10.5% of algal biomass. *Chlorella* species showed the highest yields (10.5%), followed by *Euglena* (5.78%), *Nitzschia* (3.68%), *Ankistrodesmus falcatus* (1.58%) and *Scenedesmus acuminatus* (1.575%). The lipid profiles revealed high concentrations of oleic acid which is a main constituent of biodiesel production. DNA barcode for the species with highest lipid content was developed using cytochrome oxidase subunit I (COI). Phylogenetic analyses by MEGA 4 indicated that *Nitzschia* spp and *Chlorella* spp are different evolutionally, *Scenedesmus* spp and *Chlorella* spp both being of the same phyla show great similarity with a 71% score compared to the *Nitzschia* spp which is a diatom. These species can therefore be potential candidates for biofuel production.