

**IDENTIFICATION AND CHARACTERIZATION OF KENYAN  
MARINE MICROALGAE STRAINS TOWARDS BIOFUEL  
PRODUCTION**

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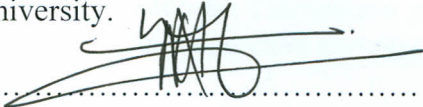
**Department of Biochemistry and Biotechnology**

**A Research Proposal Submitted in Partial Fulfillment of the Requirements for the  
Award of the Degree of Master of Science (Biotechnology) in the School of Pure and  
Applied Sciences of Kenyatta University**

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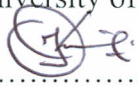
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## ABSTRACT

The rising global energy demand in both developed and developing countries is heavily straining the limited energy reservoir. The increased use of fossil fuels result in large Green House Gases (GHS) emissions, that are usually considered the main cause of global warming. Microalgae are projected to be the source for the third generation biofuel. The proposed study seeks to identify, characterize microalgae from the Indian Ocean and its environs for biofuel production. Algal strains will be isolated, identified and evaluated for their use in biodiesel production. The methods of isolation will include; Dilution in liquid media (Walne, TAP and F/2Media) Density centrifugation and addition of antibiotics. The strains will be screened for lipid component using the Nile red staining method, while fatty acid profiles will be screened during the selection of suitable candidates. The identified algae will be subjected to Walne and F/2 Media whose component has potential of influencing lipid production. Both conventional and molecular characterization methods will be adopted to identify the microalgae strains. Conventional methods used will include; microscopy accompanied by the Phytoplankton guide. Molecular characterization will be done using 18S rDNA. Sequencing of the Polymerase chain reaction (PCR) products will be done using the ABI 3750 capillary electrophoresis machine. GeneMapper software will be used to calculate the allele sizes of the samples. Power Marker version 4.0 software will be used for genetic analysis and construction of a dendrogram to determine the phylogenetic relationship of the isolated algal strains. Suitable candidate strains will be recommended for mass cultivation for mass biodiesel production exploitation. Parametric statistics will be used to analyze the occurrences of microalgae in various locations. Data for growth rates and lipid productivity will be analyzed by Analysis of variance (ANOVA) with different microalgae species as the source of variance and growth rate or lipid productivity as the dependent variable. Scatter plots will be made to establish bivariate relations between the variables and the outcome. Correlation coefficient values will also be obtained between the physico-chemical parameters and phytoplankton abundance and diversity.