

## **The Potential of Marine *micro-algae* grown in Wastewater to remove Nutrients and Produce Biomass**

**Mariam Swaleh, Laila Abubakar , Saeed Mwanguni<sup>1</sup> , Daniel Munga<sup>1</sup> , Eric Okuku**

### **Abstract**

Wastewater is a free source of nutrients for microalgae cultivation as it offers an opportunity to produce biofuel hence, significantly lowering their production costs. Microalgae was cultured in wastewater to determine the optimal condition for nutrients removal and production of low-cost biomass. Three different microalgal cultures containing cyanobacteria (*Oscillatoria* sp.), chlorophyte (*Chlorella* sp.) and diatoms (*Entomoneis* sp.) were cultivated in various mixtures of wastewater in seawater, ranging from 0% to 60% volume by volume (v/v). A significant difference ( $p < 0.05$ ) was recorded between the concentration of phosphates and nitrates before and after the experimental period for all the cultures. Removal of phosphates in the wastewater cultures dominated by *Oscillatoria*, *Entomoneis* and *Chlorella* ranged between 25.4%-86.3%, 14%-100% and 85.7%-100% respectively, while removal of nitrates ranged between 7.5%-64.8%, 8.5%-64.1% and 4.0-67.6% respectively. A significant difference ( $p < 0.05$ ) was also recorded in the microalgae growth for the different wastewater concentrations. The cultures dominated with *Chlorella* showed highest biomass production at 60% wastewater concentration, while cultures with *Entomoneis* and *Oscillatoria* had highest productivity at 20% wastewater concentration. Seemingly, the optimal conditions of wastewater treatment and biomass production of microalgae depends on the species and nutrient availability.

Key words: microalgae, wastewater, nutrients, biomass